

Friendship Jr. High School
Accelerated Math Program

Algebra

*Food
is my life!*



3

UNIT #7

Factoring & Problem Solving

UNIT #8

Linear Equations

UNIT #9

Linear Systems

7.1

Answer Key

① $m^3 + 6m^2 + 9m$
 $m(m^2 + 6m + 9)$
 $m(m+3)^2$

② $18y + 12y^2 + 2y^3$
 $2y(9 + 6y + y^2)$
 $2y(y+3)^2$

③ $4a^3 - 36a$
 $4a(a^2 - 9)$
 $4a(a+3)(a-3)$

④ $3x^3 - 27x$
 $3x(x^2 - 9)$
 $3x(x+3)(x-3)$

⑤ $m^4 - p^2$
 $(m^2 + p)(m^2 - p)$

⑥ $5a^2 + 7a + 3$
 not factorable

⑦ $3b^2 - 36$
 $3(b^2 - 12)$

⑧ $m^3n^2 - 49m$
 $m(m^2n^2 - 49)$
 $m(mn+7)(mn-7)$

⑨ $2a^2 - 4ab - 70b^2$
 $2(a^2 - 2ab - 35b^2)$
 $2(a-7b)(a+5b)$

⑩ $3y^4 - 48$
 $3(y^4 - 16)$
 $3(y^2 + 4)(y^2 - 4)$
 $3(y^2 + 4)(y+2)(y-2)$



⑪ $9y^4 + 8y^2 - 1$
 $9y^4 + 9y^2 - y^2 - 1$
 $9y^2(y^2 + 1) - 1(y^2 + 1)$
 $(y^2 + 1)(9y^2 - 1)$
 $(y^2 + 1)(3y+1)(3y-1)$

⑫ $8y^4 + 14y^2 - 4$
 $2(4y^4 + 7y^2 - 2)$
 $2(4y^4 + 8y^2 - y^2 - 2)$
 $2[4y^2(y^2 + 2) - 1(y^2 + 2)]$
 $2(y^2 + 2)(4y^2 - 1)$
 $2(y^2 + 2)(2y+1)(2y-1)$

⑬ $(3x+2)(x-7) = 0$
 $\frac{2}{3}, 7$

⑭ $(x-8)(2x+7) = 0$
 $8, -\frac{7}{2}$

⑮ $(4x-7)(3x+5) = 0$
 $\frac{7}{4}, -\frac{5}{3}$

⑯ $(3x-5)(4x-7) = 0$
 $\frac{5}{3}, \frac{7}{4}$

⑰ $(2x+3)(x+7) = 0$
 $-\frac{3}{2}, -7$

⑱ $(4x - \frac{1}{3})(3x + \frac{1}{8}) = 0$
 $\frac{1}{3}, -\frac{1}{8} = \frac{1}{12}, -\frac{1}{24}$

⑲ $(n-5)(n+7) = 0$
 $5, -7$

⑳ $(n+2)(n-34) = 0$
 $-2, 34$
 -2

7.2

Answer Key

$$\begin{aligned} \textcircled{1} \quad x^2 &= 36 \\ x^2 - 36 &= 0 \\ (x+6)(x-6) &= 0 \end{aligned}$$

$$\boxed{-6, 6}$$

$$\begin{aligned} \textcircled{2} \quad y^2 &= 64 \\ y^2 - 64 &= 0 \\ (y+8)(y-8) &= 0 \end{aligned}$$

$$\boxed{-8, 8}$$

$$\begin{aligned} \textcircled{3} \quad y^2 &= -5y \\ y^2 + 5y &= 0 \\ y(y+5) &= 0 \end{aligned}$$

$$\boxed{0, -5}$$

$$\begin{aligned} \textcircled{4} \quad \frac{1}{2}y^2 - \frac{1}{4}y &= 0 \\ \frac{1}{2}y(y - \frac{1}{2}) &= 0 \end{aligned}$$

$$\boxed{0, \frac{1}{2}}$$

$$\begin{aligned} \textcircled{5} \quad 3y^2 - \frac{4}{3} &= 0 \\ \frac{1}{3}(9y^2 - 4) &= 0 \\ \frac{1}{3}(3y+2)(3y-2) &= 0 \end{aligned}$$

$$\boxed{-\frac{2}{3}, \frac{2}{3}}$$

$$\begin{aligned} \textcircled{6} \quad \frac{2}{3}y &= \frac{1}{3}y^2 \\ \frac{1}{3}y^2 - \frac{2}{3}y &= 0 \\ \frac{1}{3}y(y-2) &= 0 \end{aligned}$$

$$\boxed{0, 2}$$

$$\begin{aligned} \textcircled{7} \quad m^2 - 24m + 144 &= 0 \\ (m-12)^2 &= 0 \end{aligned}$$

$$\boxed{12}$$

$$\begin{aligned} \textcircled{8} \quad y^2 + 10y &= -25 \\ y^2 + 10y + 25 &= 0 \\ (y+5)^2 &= 0 \end{aligned}$$

$$\boxed{-5}$$

$$\begin{aligned} \textcircled{9} \quad n^2 - 144 &= 0 \\ (n+12)(n-12) &= 0 \end{aligned}$$

$$\boxed{-12, 12}$$

$$\begin{aligned} \textcircled{10} \quad n^2 &= 4 \\ n^2 - 4 &= 0 \\ (n+2)(n-2) &= 0 \end{aligned}$$

$$\boxed{-2, 2} \quad \boxed{2m}$$

$$\begin{aligned} \textcircled{11} \quad n^2 + 6n &= 0 \\ n(n+6) &= 0 \end{aligned}$$

$$\boxed{0, -6}$$

$$\begin{aligned} \textcircled{12} \quad n^2 &= 10n - 25 \\ n^2 - 10n + 25 &= 0 \\ (n-5)^2 &= 0 \end{aligned}$$

$$\boxed{5}$$

$$\begin{aligned} \textcircled{13} \quad \text{Jake } 30-n \\ \text{Jackie } 30+n \\ (30-n)(30+n) &= 884 \\ 900 - n^2 &= 884 \\ n^2 - 16 &= 0 \\ (n+4)(n-4) &= 0 \\ -4, 4 \end{aligned}$$

$$\begin{array}{|l} \text{Jake } 26 & 30-n \\ \text{Jackie } 34 & 30+n \end{array}$$

$$\begin{aligned} \textcircled{14} \quad (n-7)(n+7) &= 51 \\ n^2 - 49 &= 51 \\ n^2 - 100 &= 0 \\ (n-10)(n+10) &= 0 \end{aligned}$$

$$\boxed{10, -10}$$

7.3

Answer Key

$$\begin{aligned} \textcircled{1} \quad p^2 &= 5p + 24 \\ p^2 - 5p - 24 &= 0 \\ (p-8)(p+3) &= 0 \end{aligned}$$

$$\boxed{8, -3}$$

$$\begin{aligned} \textcircled{2} \quad r^2 &= 18 + 7r \\ r^2 - 7r - 18 &= 0 \\ (r-9)(r+2) &= 0 \end{aligned}$$

$$\boxed{9, -2}$$



$$\begin{aligned} \textcircled{3} \quad 2t^2 + 7t &= 15 \\ 2t^2 + 7t - 15 &= 0 \\ 2t^2 + 10t - 3t - 15 &= 0 \\ 2t(t+5) - 3(t+5) &= 0 \\ (t+5)(2t-3) &= 0 \end{aligned}$$

$$\boxed{-5, \frac{3}{2}}$$

$$\begin{aligned} \textcircled{4} \quad 3y^2 - 7y &= 20 \\ 3y^2 - 7y - 20 &= 0 \\ 3y^2 - 12y + 5y - 20 &= 0 \\ 3y(y-4) + 5(y-4) &= 0 \\ (y-4)(3y+5) &= 0 \end{aligned}$$

$$\boxed{4, -5/3}$$

$$\begin{aligned} \textcircled{5} \quad 6z^2 + 5 &= -17z \\ 6z^2 + 17z + 5 &= 0 \\ 6z^2 + 15z + 2z + 5 &= 0 \\ 3z(2z+5) + 1(2z+5) &= 0 \\ (2z+5)(3z+1) &= 0 \end{aligned}$$

$$\boxed{-5/2, -1/3}$$

$$\begin{aligned} \textcircled{6} \quad 12m^2 + 3 &= -20m \\ 12m^2 + 20m + 3 &= 0 \\ 12m^2 + 18m + 2m + 3 &= 0 \\ 6m(2m+3) + 1(2m+3) &= 0 \\ (2m+3)(6m+1) &= 0 \end{aligned}$$

$$\boxed{-3/2, -1/6}$$

$$\begin{aligned} \textcircled{7} \quad r^3 - 6r^2 + 8r &= 0 \\ r(r^2 - 6r + 8) &= 0 \\ r(r-4)(r-2) &= 0 \end{aligned}$$

$$\boxed{0, 4, 2}$$

$$\begin{aligned} \textcircled{8} \quad s^3 + 2s^2 - 35s &= 0 \\ s(s^2 + 2s - 35) &= 0 \\ s(s+7)(s-5) &= 0 \end{aligned}$$

$$\boxed{0, -7, 5}$$

$$\begin{aligned} \textcircled{9} \quad (x+8)(x+1) &= -12 \\ x^2 + 9x + 8 &= -12 \\ x^2 + 9x + 20 &= 0 \\ (x+5)(x+4) &= 0 \end{aligned}$$

$$\boxed{-5, -4}$$

$$\begin{aligned} \textcircled{10} \quad (r-1)(r-1) &= 36 \\ r^2 - 2r + 1 &= 36 \\ r^2 - 2r - 35 &= 0 \\ (r-7)(r+5) &= 0 \end{aligned}$$

$$\boxed{7, -5}$$

$$\begin{aligned} \textcircled{11} \quad (3y+2)(y+3) &= y+4 \\ 3y^2 + 11y + 6 &= y+4 \\ 3y^2 + 10y - 8 &= 0 \\ 3y^2 + 12y - 2y - 8 &= 0 \\ 3y(y+4) - 2(y+4) &= 0 \\ (y+4)(3y-2) &= 0 \end{aligned}$$

$$\boxed{-4, 2/3}$$

$$\begin{aligned} \textcircled{12} \quad (y+4)(3y-2) &= -y-14 \\ 3y^2 + 10y - 8 &= -y-14 \\ 3y^2 + 11y + 6 &= 0 \\ 3y^2 + 9y + 2y + 6 &= 0 \\ 3y(y+3) + 2(y+3) &= 0 \\ (y+3)(3y+2) &= 0 \end{aligned}$$

$$\boxed{-3, -2/3}$$

$$\textcircled{13} \quad \begin{array}{|c|c|} \hline n & -12 \quad 10 \\ \hline n+2 & -10 \quad 12 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n+2) &= 120 \\ n^2 + 2n - 120 &= 0 \\ (n+12)(n-10) &= 0 \\ -12 \quad 10 \end{aligned}$$

$$\textcircled{14} \quad \begin{array}{|c|c|} \hline n & -20 \quad 18 \\ \hline n+2 & -18 \quad 20 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n+2) &= 360 \\ n^2 + 2n - 360 &= 0 \\ (n+20)(n-18) &= 0 \\ -20 \quad 18 \end{aligned}$$

$$\textcircled{15} \quad \begin{array}{|c|c|} \hline n & 6 \\ \hline n+1 & 7 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n+1) &= 42 \\ n^2 + n - 42 &= 0 \\ (n+7)(n-6) &= 0 \\ -7 \quad 6 \end{aligned}$$

$$\textcircled{16} \quad \begin{array}{|c|c|} \hline n & -8 \\ \hline n+1 & -7 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n+1) &= 56 \\ n^2 + n - 56 &= 0 \\ (n+8)(n-7) &= 0 \\ -8 \quad 7 \end{aligned}$$

7.4

Answer Key

$$\textcircled{1} \quad \begin{array}{|c|c|} \hline n & 11 \quad -8 \\ \hline n-3 & 8 \quad -11 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n-3) &= 88 \\ n^2 - 3n - 88 &= 0 \\ (n-11)(n+8) &= 0 \\ 11 \quad -8 \end{aligned}$$

$$\textcircled{2} \quad \begin{array}{|c|c|} \hline n & 15 \quad 8 \\ \hline n-23 & -8 \quad -15 \\ \hline \end{array}$$

$$\begin{aligned} (n)(n-23) &= -120 \\ n^2 - 23n + 120 &= 0 \\ (n-15)(n-8) &= 0 \\ 15 \quad 8 \end{aligned}$$



$$\textcircled{3} \begin{array}{l} n \\ n+2 \end{array} \begin{array}{|c|} \hline 9 \\ \hline 11 \\ \hline \end{array}$$

$$\begin{aligned} (n)^2 + (n+2)^2 &= 202 \\ (n)^2 + (n^2 + 4n + 4) &= 202 \\ 2n^2 + 4n - 198 &= 0 \\ 2(n^2 + 2n - 99) &= 0 \\ 2(n+11)(n-9) &= 0 \\ -11 & \quad 9 \end{aligned}$$

$$\textcircled{4} \begin{array}{l} n \\ n+1 \end{array} \begin{array}{|c|} \hline 7 \\ \hline 8 \\ \hline \end{array}$$

$$\begin{aligned} (n)^2 + (n+1)^2 &= 113 \\ n^2 + (n^2 + 2n + 1) &= 113 \\ 2n^2 + 2n - 112 &= 0 \\ 2(n^2 + n - 56) &= 0 \\ 2(n+8)(n-7) &= 0 \\ -8 & \quad 7 \end{aligned}$$

$$\textcircled{5} \begin{array}{l} n \\ 13-n \end{array} \begin{array}{|c|} \hline 9 \\ \hline 4 \\ \hline \end{array}$$

$$\begin{aligned} (n)^2 + (13-n)^2 &= 97 \\ n^2 + (169 - 26n + n^2) &= 97 \\ 2n^2 - 26n + 72 &= 0 \\ 2(n^2 - 13n + 36) &= 0 \\ 2(n-9)(n-4) &= 0 \\ 9 & \quad 4 \end{aligned}$$

$$\textcircled{6} \begin{array}{l} n \\ 3-n \end{array} \begin{array}{|c|} \hline 11 \\ \hline -8 \\ \hline \end{array}$$

$$\begin{aligned} (n)^2 + (3-n)^2 &= 185 \\ n^2 + (9 - 6n + n^2) &= 185 \\ 2n^2 - 6n - 176 &= 0 \\ 2(n^2 - 3n - 88) &= 0 \\ 2(n-11)(n+8) &= 0 \\ 11 & \quad -8 \end{aligned}$$

$$\textcircled{7} \begin{array}{l} n \\ n+1 \end{array} \begin{array}{|c|c|} \hline -8 & 5 \\ \hline -7 & 6 \\ \hline \end{array}$$

$$\begin{aligned} n + (n+1)^2 &= 41 \\ n + (n^2 + 2n + 1) &= 41 \\ n^2 + 3n + 1 &= 41 \\ n^2 + 3n - 40 &= 0 \\ (n+8)(n-5) &= 0 \\ -8 & \quad 5 \end{aligned}$$

$$\textcircled{8} \begin{array}{l} n \\ n+1 \end{array} \begin{array}{|c|c|} \hline -9 & 6 \\ \hline -8 & 7 \\ \hline \end{array}$$

$$\begin{aligned} n + (n+1)^2 &= 55 \\ n + (n^2 + 2n + 1) &= 55 \\ n^2 + 3n + 1 &= 55 \\ n^2 + 3n - 54 &= 0 \\ (n+9)(n-6) &= 0 \\ -9 & \quad 6 \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad 5b^3 + 34b^2 &= 7b \\ 5b^3 + 34b^2 - 7b &= 0 \\ b(5b^2 + 34b - 7) &= 0 \\ b(5b^2 + 35b - b - 7) &= 0 \\ b[5b(b+7) - 1(b+7)] &= 0 \\ b(b+7)(5b-1) &= 0 \\ 0, -7, \frac{1}{5} & \end{aligned}$$

$$\begin{aligned} \textcircled{10} \quad 2k^3 + 5k^2 &= 42k \\ 2k^3 + 5k^2 - 42k &= 0 \\ k(2k^2 + 5k - 42) &= 0 \\ k(2k^2 + 12k - 7k - 42) &= 0 \\ k[2k(k+6) - 7(k+6)] &= 0 \\ k(k+6)(2k-7) &= 0 \\ 0, -6, \frac{7}{2} & \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad y^4 - 8y^2 + 16 &= 0 \\ (y^2 - 4)(y^2 - 4) &= 0 \\ (y+2)(y-2)(y+2)(y-2) &= 0 \\ -2, 2 & \end{aligned}$$

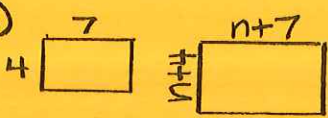
$$\begin{aligned} \textcircled{12} \quad m^4 - 2m^2 + 1 &= 0 \\ (m^2 - 1)(m^2 - 1) &= 0 \\ (m+1)(m-1)(m+1)(m-1) &= 0 \\ -1, 1 & \end{aligned}$$

7.5

Answer Key

$$\begin{aligned} \textcircled{1} \quad n & \begin{array}{|c|} \hline n+3 \\ \hline \end{array} \\ n(n+3) &= 40 \\ n^2 + 3n - 40 &= 0 \\ (n+8)(n-5) &= 0 \\ -8 & \quad 5 \\ 5 \text{ by } 8 \text{ m} & \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad n & \begin{array}{|c|} \hline n+5 \\ \hline \end{array} \\ n(n+5) &= 234 \\ n^2 + 5n - 234 &= 0 \\ (n+18)(n-13) &= 0 \\ -18 & \quad 13 \\ 13 \text{ by } 18 \text{ yds} & \end{aligned}$$

③ 

$$(n+7)(n+4) - (4)(7) = 26$$

$$n^2 + 11n + 28 - 28 = 26$$

$$n^2 + 11n - 26 = 0$$

$$(n+13)(n-2) = 0$$

$\Rightarrow 13, 2$

$n+7$ 9 in
 $n+4$ 6 in

$$(12-2n)(9-2n) = \frac{1}{2}(108)$$

$$108 - 42n + 4n^2 = 54$$

$$4n^2 - 42n + 54 = 0$$

$$2(2n^2 - 21n + 27) = 0$$

$$2(2n^2 - 18n - 3n + 27) = 0$$

$$2[2n(n-9) - 3(n-9)] = 0$$

$$2(n-9)(2n-3)$$

$\Rightarrow 9, \frac{3}{2}$

$\frac{3}{2}$ feet

⑪ n $\begin{matrix} -12 & 6 \\ -10 & 8 \end{matrix}$

$$n+2$$

$$2n + (n+2)^2 = 76$$

$$2n + (n^2 + 4n + 4) = 76$$

$$n^2 + 6n - 72 = 0$$

$$(n+12)(n-6) = 0$$

$-12, 6$

⑫ n $\begin{matrix} -14 & 8 \\ -12 & 10 \end{matrix}$

$$n+2$$

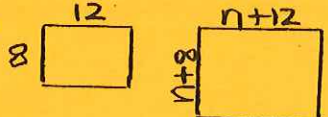
$$2n + (n+2)^2 = 116$$

$$2n + (n^2 + 4n + 4) = 116$$

$$n^2 + 6n - 112 = 0$$

$$(n+14)(n-8) = 0$$

$-14, 8$

④ 

$$(n+12)(n+8) = 2(96)$$

$$n^2 + 20n + 96 = 192$$

$$n^2 + 20n - 96 = 0$$

$$(n+24)(n-4) = 0$$

$\Rightarrow 24, 4$

$n+12, n+8$ 16, 12 in

⑦ $h = vt - 16t^2$

$$0 = 192t - 16t^2$$

$$16t^2 - 192t = 0$$

$$16t(t-12) = 0$$

$\Rightarrow 12$

12 seconds

⑧ $h = vt - 16t^2$

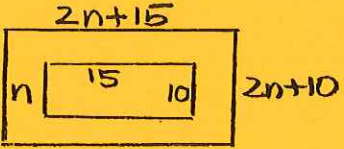
$$0 = 64t - 16t^2$$

$$16t^2 - 64t = 0$$

$$16t(t-4) = 0$$

$\Rightarrow 4$

4 seconds

⑤ 

$$(2n+15)(2n+10) = 2(150)$$

$$4n^2 + 50n + 150 = 300$$

$$4n^2 + 50n - 150 = 0$$

$$2(2n^2 + 25n - 75) = 0$$

$$2(2n^2 + 30n - 5n - 75) = 0$$

$$2[2n(n+15) - 5(n+15)] = 0$$

$$2(n+15)(2n-5)$$

$\Rightarrow 15, \frac{5}{2}$

$\frac{5}{2}$ feet

⑨ $816 = 1640t - 16t^2$

$$16t^2 - 1640t + 816 = 0$$

$$8(2t^2 - 205t + 102) = 0$$

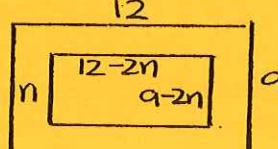
$$8(2t^2 - 204t - t + 102) = 0$$

$$8[2t(t-102) - 1(t-102)] = 0$$

$$8(t-102)(2t-1)$$

$102, \frac{1}{2}$

$\frac{1}{2}$ and 102 seconds

⑥ 

⑩ $0 = 128t - 16t^2$

$$16t^2 - 128t = 0$$

$$16t(t-8) = 0$$

$\Rightarrow 8$

8 sec.

Unit 7 REVIEW Answer Key

① $(4x-3)(2x+\frac{1}{2}) = 0$

$\frac{3}{4}, -\frac{1}{4}$

② $(x + \frac{2}{3})(3x-5) = 0$

$-\frac{2}{3}, \frac{5}{3}$

③ $n^2 = 81$

$$n^2 - 81 = 0$$

$$(n+9)(n-9) = 0$$

$-9, 9$



$$\textcircled{4} \quad y^2 - 100 = 0$$

$$(y+10)(y-10) = 0$$

$$\boxed{-10, 10}$$

$$\textcircled{5} \quad 2x^2 + 5x = 12$$

$$2x^2 + 5x - 12 = 0$$

$$2x^2 + 8x - 3x - 12 = 0$$

$$2x(x+4) - 3(x+4) = 0$$

$$(x+4)(2x-3) = 0$$

$$\boxed{-4, \frac{3}{2}}$$

$$\textcircled{6} \quad 4n^2 - 5n = 6$$

$$4n^2 - 5n - 6 = 0$$

$$4n^2 - 8n + 3n - 6 = 0$$

$$4n(n-2) + 3(n-2) = 0$$

$$\boxed{2, -\frac{3}{4}}$$

$$\textcircled{7} \quad (x+3)(x-5) = 9$$

$$x^2 - 2x - 15 = 9$$

$$x^2 - 2x - 24 = 0$$

$$(x-6)(x+4) = 0$$

$$\boxed{6, -4}$$

$$\textcircled{8} \quad (x-3)^2 = 16$$

$$x^2 - 6x + 9 = 16$$

$$x^2 - 6x - 7 = 0$$

$$(x-7)(x+1) = 0$$

$$\boxed{7, -1}$$

$$\textcircled{9} \quad 2n^3 - 5n = 9n^2$$

$$2n^3 + 9n^2 - 5n = 0$$

$$n(2n^2 + 9n - 5) = 0$$

$$n(2n^2 + 10n - n - 5) = 0$$

$$n[2n(n+5) - 1(n+5)] = 0$$

$$n(n+5)(2n-1) = 0$$

$$\boxed{0, -5, \frac{1}{2}}$$

$$\textcircled{10} \quad 6x^3 - 2x = -x^2$$

$$6x^3 + x^2 - 2x = 0$$

$$x(6x^2 + x - 2) = 0$$

$$x(6x^2 + 4x - 3x - 2) = 0$$

$$x[2x(3x+2) - 1(3x+2)] = 0$$

$$x(3x+2)(2x-1) = 0$$

$$\boxed{0, -\frac{2}{3}, \frac{1}{2}}$$

$$\textcircled{11} \quad n^4 - 5n^2 + 4 = 0$$

$$(n^2)^2 - 5n^2 + 4 = 0$$

$$(n^2 - 4)(n^2 - 1) = 0$$

$$(n+2)(n-2)(n+1)(n-1) = 0$$

$$\boxed{-2, 2, -1, 1}$$

$$\textcircled{12} \quad x^4 - 17x^2 + 16 = 0$$

$$(x^2)^2 - 17x^2 + 16 = 0$$

$$(x^2 - 16)(x^2 - 1) = 0$$

$$(x+4)(x-4)(x+1)(x-1) = 0$$

$$\boxed{-4, 4, -1, 1}$$



$$\textcircled{13} \quad n \quad \begin{array}{|c|} \hline -5 \\ \hline \end{array}$$

$$n+1 \quad \begin{array}{|c|} \hline -4 \\ \hline \end{array}$$

$$n(n+1) = 20$$

$$n^2 + n - 20 = 0$$

$$(n+5)(n-4) = 0$$

$$\quad -5 \quad 4$$

$$\textcircled{14} \quad n \quad \begin{array}{|c|} \hline 9 \\ \hline \end{array} \quad \begin{array}{|c|} \hline -5 \\ \hline \end{array}$$

$$n-4 \quad \begin{array}{|c|} \hline 5 \\ \hline \end{array} \quad \begin{array}{|c|} \hline -9 \\ \hline \end{array}$$

$$n(n-4) = 45$$

$$n^2 - 4n - 45 = 0$$

$$(n-9)(n+5) = 0$$

$$\quad 9 \quad -5$$

$$\textcircled{15} \quad n \quad \begin{array}{|c|} \hline 8 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 3 \\ \hline \end{array}$$

$$11-n \quad \begin{array}{|c|} \hline 3 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 8 \\ \hline \end{array}$$

$$n(11-n) = 24$$

$$11n - n^2 = 24$$

$$n^2 - 11n + 24 = 0$$

$$(n-8)(n-3) = 0$$

$$\quad 8 \quad 3$$

$$\textcircled{16} \quad n \quad \begin{array}{|c|} \hline 7 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 3 \\ \hline \end{array}$$

$$10-n \quad \begin{array}{|c|} \hline 3 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 7 \\ \hline \end{array}$$

$$n^2 + (10-n) = 58$$

$$n^2 + (100 - 20n + n^2) = 58$$

$$2n^2 - 20n + 42 = 0$$

$$2(n^2 - 10n + 21) = 0$$

$$2(n-7)(n-3) = 0$$

$$\quad 7 \quad 3$$

$$\textcircled{17} \quad n \quad \begin{array}{|c|} \hline 4 \\ \hline \end{array}$$

$$n+2 \quad \begin{array}{|c|} \hline 6 \\ \hline \end{array}$$

$$n + (n+2)^2 = 40$$

$$n + (n^2 + 4n + 4) = 40$$

$$n^2 + 5n - 36 = 0$$

$$(n+9)(n-4) = 0$$

$$\quad -9 \quad 4$$

$$\textcircled{18} \quad n \quad \begin{array}{|c|} \hline 3 \\ \hline \end{array}$$

$$n+2 \quad \begin{array}{|c|} \hline 5 \\ \hline \end{array}$$

$$2n + (n+2)^2 = 31$$

$$2n + (n^2 + 4n + 4) = 31$$

$$n^2 + 6n - 27 = 0$$

$$(n+9)(n-3) = 0$$

$$\quad -9 \quad 3$$

$$\begin{aligned} (19) \quad h &= vt - 16t^2 \\ 0 &= 80t - 16t^2 \\ 0 &= 16t(5-t) \\ &\quad \cancel{16} \quad 5 \end{aligned}$$

5 seconds

$$\begin{aligned} (20) \quad h &= vt - 16t^2 \\ 784 &= 800t - 16t^2 \\ 16t^2 - 800t + 784 &= 0 \\ 16(t^2 - 50t + 49) &= 0 \\ 16(t-49)(t-1) &= 0 \\ &\quad 49 \quad 1 \end{aligned}$$

after 1 second on the way up and after 49 seconds on the way down

$$\begin{aligned} (21) \quad & \begin{array}{|c|} \hline x+3 \\ \hline \end{array} \\ & \times \begin{array}{|c|} \hline x \\ \hline \end{array} \\ & \times(x+3) = 70 \\ & x^2 + 3x - 70 = 0 \\ & (x+10)(x-7) = 0 \\ & \quad \cancel{10} \quad 7 \end{aligned}$$

7 by 10 feet

$$(22) \quad \begin{array}{|c|} \hline 5 \\ \hline \end{array} \quad \begin{array}{|c|} \hline x+5 \\ \hline \end{array}$$

$$\begin{aligned} (x+3)(x+5) &= (3)(5) + 48 \\ x^2 + 8x + 15 &= 63 \\ x^2 + 8x - 48 &= 0 \\ (x+12)(x-4) &= 0 \\ &\quad \cancel{12} \quad 4 \end{aligned}$$

7 by 9 inches



$$(23) \quad \begin{array}{|c|} \hline 2x+12 \\ \hline \begin{array}{|c|} \hline 12 \\ \hline \end{array} \\ \hline \end{array} \quad \begin{array}{|c|} \hline 2x+8 \\ \hline \end{array}$$

$$\begin{aligned} (2x+12)(2x+8) &= 2(8)(12) \\ 4x^2 + 40x + 96 &= 192 \\ 4x^2 + 40x - 96 &= 0 \\ 4(x^2 + 10x - 24) &= 0 \\ 4(x+12)(x-2) &= 0 \\ &\quad \cancel{4} \quad 2 \end{aligned}$$

2 feet

$$(24) \quad \begin{array}{|c|} \hline 10 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 10-2x \\ \hline \end{array}$$

$$\begin{aligned} (6-2x)(10-2x) &= (6)(10) - 28 \\ 60 - 32x + 4x^2 &= 32 \\ 4x^2 - 32x + 28 &= 0 \\ 4(x^2 - 8x + 7) &= 0 \\ 4(x-7)(x-1) &= 0 \\ &\quad \cancel{4} \quad 1 \end{aligned}$$

$$\begin{aligned} 10-2x &= 8\text{cm} \\ 6-2x &= 4\text{cm} \end{aligned}$$

$$(25) \quad \begin{array}{|c|} \hline 2x+6 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 2x+2 \\ \hline \end{array} \quad \begin{array}{|c|} \hline x+4 \\ \hline \end{array}$$

$$\begin{aligned} (2x+6)(x+4) - x(2x+2) &= 96 \\ (2x^2 + 14x + 24) - (2x^2 + 2x) &= 96 \\ 2x^2 + 14x + 24 - 2x^2 - 2x &= 96 \\ 12x + 24 &= 96 \\ 12x &= 72 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} 2x+6 &= 18\text{ in} \\ x+4 &= 10\text{ in} \end{aligned}$$

$$(26) \quad \begin{array}{|c|} \hline 2x+1 \\ \hline \end{array} \quad \begin{array}{|c|} \hline 2x-2 \\ \hline \end{array} \quad \begin{array}{|c|} \hline x \\ \hline \end{array} \quad \begin{array}{|c|} \hline x+3 \\ \hline \end{array}$$

$$\begin{aligned} (2x+1)(x+3) - (x)(2x-2) &= 48 \\ (2x^2 + 7x + 3) - (2x^2 - 2x) &= 48 \\ 2x^2 + 7x + 3 - 2x^2 + 2x &= 48 \\ 9x + 3 &= 48 \\ 9x &= 45 \\ x &= 5 \end{aligned}$$

$$2x-2 = 8$$

5 by 8 cm

Unit 7 SKILL CHECK - KEY

$$\begin{aligned} (1) \quad n^2 &= 121 \\ n^2 - 121 &= 0 \\ (n+11)(n-11) &= 0 \\ &\quad \cancel{n} \quad 11 \end{aligned}$$

$$\begin{aligned} (2) \quad (3x-5)(2x+7) &= 0 \\ &\quad \cancel{3} \quad -7/2 \end{aligned}$$

$$\begin{aligned} (3) \quad a^2 + 4a &= 12 \\ a^2 + 4a - 12 &= 0 \\ (a+6)(a-2) &= 0 \\ &\quad \cancel{a} \quad 2 \end{aligned}$$

$$\begin{aligned} (4) \quad 6x^3 - 6x &= 5x^2 \\ 6x^3 - 5x^2 - 6x &= 0 \\ x(6x^2 - 5x - 6) &= 0 \\ x(6x^2 - 9x + 4x - 6) &= 0 \\ x[3x(2x-3) + 2(2x-3)] &= 0 \\ x(2x-3)(3x+2) &= 0 \end{aligned}$$

$$\begin{array}{|c|} \hline 0 \\ \hline 3/2 \\ \hline -2/3 \\ \hline \end{array}$$



⑤ $(x+3)(x-7) = 11$
 $x^2 - 4x - 21 = 11$
 $x^2 - 4x - 32 = 0$
 $(x-8)(x+4) = 0$
8, -4

⑥ $n^4 - 26n^2 + 25 = 0$
 $(n^2)^2 - 26n^2 + 25 = 0$
 $(n^2 - 25)(n^2 - 1) = 0$
 $(n+5)(n-5)(n+1)(n-1) = 0$
-5, 5, -1, 1

⑦ n

12	-7
7	-12

 $n(n-5) = 84$
 $n^2 - 5n - 84 = 0$
 $(n-12)(n+7) = 0$
 12 -7

⑧ n

-8	6
-6	8

 $n^2 + (n+2)^2 = 100$
 $n^2 + (n^2 + 4n + 4) = 100$
 $2n^2 + 4n - 96 = 0$
 $2(n^2 + 2n - 48) = 0$
 $2(n+8)(n-6) = 0$
 -8 6

⑨ n

-9
-7

 $3n + (n+2)^2 = 22$
 $3n + (n^2 + 4n + 4) = 22$
 $n^2 + 7n - 18 = 0$
 $(n+9)(n-2) = 0$
 -9 2

⑩ $h = vt - 16t^2$
 $0 = 128t - 16t^2$
 $0 = 16t(8-t)$
 8
8 seconds

⑪ $x+6$
 x

--

 $x(x+6) = 55$
 $x^2 + 6x - 55 = 0$
 $(x+11)(x-5) = 0$
 -11 5
5 by 11 cm

⑫ 6 $x+6$
 3

--

--

 $(x+3)(x+6) = (3)(6) + 70$
 $x^2 + 9x + 18 = 88$
 $x^2 + 9x - 70 = 0$
 $(x+14)(x-5) = 0$
 -14 5
8 by 11 feet

⑬ 12
 10

12-2x
10-2x

 $(12-2x)(10-2x) = 80$
 $120 - 44x + 4x^2 = 80$
 $4x^2 - 44x + 40 = 0$
 $4(x^2 - 11x + 10) = 0$
 $4(x-10)(x-1) = 0$
~~10~~ 1
1 foot wide



Unit 7 REMEDICATION - KEY

① $x^2 = 49$
 $x^2 - 49 = 0$
 $(x+7)(x-7) = 0$
-7, 7

② $(4n-5)(3n+2) = 0$
5/4, -2/3

③ $n^2 - n = 30$
 $n^2 - n - 30 = 0$
 $(n-6)(n+5) = 0$
6, -5

④ $8n^3 - 5n = 18n^2$
 $8n^3 - 18n^2 - 5n = 0$
 $n(8n^2 - 18n - 5) = 0$
 $n(8n^2 - 20n + 2n - 5) = 0$
 $n[4n(2n-5) + 1(2n-5)] = 0$
 $n(2n-5)(4n+1) = 0$
0, 5/2, -1/4

⑤ $(n+4)(n-9) = 14$
 $n^2 - 5n - 36 = 14$
 $n^2 - 5n - 50 = 0$
 $(n-10)(n+5) = 0$
10, -5



$$\begin{aligned} \textcircled{6} \quad x^4 - 13x^2 + 36 &= 0 \\ (x^2)^2 - 13x^2 + 36 &= 0 \\ (x^2 - 9)(x^2 - 4) &= 0 \\ (x+3)(x-3)(x+2)(x-2) &= 0 \end{aligned}$$

$$\boxed{-3, 3, -2, 2}$$

$$\textcircled{7} \quad \begin{array}{|c|c|} \hline x & 9 \\ \hline x-6 & 3 \\ \hline \end{array} \begin{array}{|c|c|} \hline -3 & \\ \hline -9 & \\ \hline \end{array}$$

$$\begin{aligned} x(x-6) &= 27 \\ x^2 - 6x - 27 &= 0 \\ (x-9)(x+3) &= 0 \\ 9 \quad -3 \end{aligned}$$

$$\textcircled{8} \quad \begin{array}{|c|c|} \hline n & -7 \\ \hline n+2 & -5 \\ \hline \end{array} \begin{array}{|c|c|} \hline 5 & \\ \hline 7 & \\ \hline \end{array}$$

$$\begin{aligned} n^2 + (n+2)^2 &= 74 \\ n^2 + (n^2 + 4n + 4) &= 74 \\ 2n^2 + 4n - 70 &= 0 \\ 2(n^2 + 2n - 35) &= 0 \\ 2(n+7)(n-5) &= 0 \\ -7 \quad 5 \end{aligned}$$

$$\textcircled{9} \quad \begin{array}{|c|c|} \hline n & 6 \\ \hline n+2 & 8 \\ \hline \end{array}$$

$$\begin{aligned} 4n + (n+2)^2 &= 88 \\ 4n + (n^2 + 4n + 4) &= 88 \\ n^2 + 8n - 84 &= 0 \\ (n+14)(n-6) &= 0 \\ -14 \quad 6 \end{aligned}$$

$$\textcircled{10} \quad \begin{aligned} h &= vt - 16t^2 \\ 0 &= 160t - 16t^2 \\ 0 &= 16t(10-t) \\ 0 \quad 10 \end{aligned}$$

$$\boxed{10 \text{ seconds}}$$

$$\textcircled{11} \quad \begin{aligned} x(x+9) &= 70 \\ x^2 + 9x - 70 &= 0 \\ (x+14)(x-5) &= 0 \\ -14 \quad 5 \end{aligned}$$

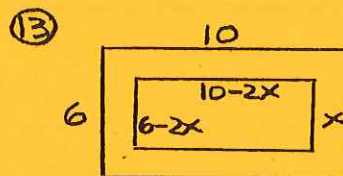


$$\boxed{5 \text{ by } 14 \text{ feet}}$$



$$\begin{aligned} (9-x)(12-x) &= 40 \\ 108 - 21x + x^2 &= 40 \\ x^2 - 21x + 68 &= 0 \\ (x-17)(x-4) &= 0 \\ -17 \quad 4 \end{aligned}$$

$$\begin{aligned} 9-x &= \boxed{5 \text{ feet}} \\ 12-x &= \boxed{8 \text{ feet}} \end{aligned}$$



$$\begin{aligned} (10-2x)(6-2x) &= 45 \\ 60 - 32x + 4x^2 &= 45 \\ 4x^2 - 32x + 15 &= 0 \\ 4x^2 - 30x - 2x + 15 &= 0 \\ 2x(2x-15) - 1(2x-15) &= 0 \\ (2x-15)(2x-1) &= 0 \\ -15/2 \quad 1/2 \end{aligned}$$

$$\boxed{1/2 \text{ cm wide}}$$

Unit 7

EXTRA PRACTICE - ANSWER KEY

$$\textcircled{1} \quad \begin{aligned} n^2 - 9 &= 40 \\ n^2 - 49 &= 0 \\ (n+7)(n-7) &= 0 \\ -7, 7 \end{aligned}$$

$$\textcircled{2} \quad (4x-1)(3x+5)=0$$

$$\boxed{1/4, -5/3}$$

$$\textcircled{3} \quad \begin{aligned} n^2 - 9n + 20 &= 0 \\ (n-5)(n-4) &= 0 \\ 5, 4 \end{aligned}$$

$$\textcircled{4} \quad (x-5)^2 = 0 \quad \boxed{5}$$

$$\textcircled{5} \quad \begin{aligned} 3x^2 + 5x - 2 &= 0 \\ 3x^2 + 6x - x - 2 &= 0 \\ 3x(x+2) - 1(x+2) &= 0 \\ (x+2)(3x-1) &= 0 \\ -2, 1/3 \end{aligned}$$

$$\textcircled{6} \quad \begin{aligned} (x+3)(x-2) &= 14 \\ x^2 + x - 6 &= 14 \\ x^2 + x - 20 &= 0 \\ (x+5)(x-4) &= 0 \quad \boxed{-5, 4} \end{aligned}$$

$$\textcircled{7} \quad \begin{aligned} n^2 - 2n - 15 &= 0 \\ (n-5)(n+2) &= 0 \quad \boxed{5, -2} \end{aligned}$$

$$\textcircled{8} \quad \begin{aligned} 2n^3 - 7n^2 + 3n &= 0 \\ n(2n^2 - 7n + 3) &= 0 \\ n(2n^2 - 6n - n + 3) &= 0 \\ n[2n(n-3) - 1(n-3)] &= 0 \\ n(n-3)(2n-1) &= 0 \quad \boxed{0, 3, 1/2} \end{aligned}$$

$$\textcircled{9} \quad \begin{aligned} x^2 - 64 &= 0 \\ (x+8)(x-8) &= 0 \\ -8, 8 \end{aligned}$$

$$(10) (n+4)(3n-2) = 0$$

$$\boxed{-4, 2/3}$$

$$(11) 2x^2 + x = 15$$

$$2x^2 + x - 15 = 0$$

$$2x^2 + 6x - 5x - 15 = 0$$

$$2x(x+3) - 5(x+3) = 0$$

$$(x+3)(2x-5) = 0$$

$$\boxed{-3, 5/2}$$

$$(12) n^4 - 17n^2 + 16 = 0$$

$$(n^2)^2 - 17n^2 + 16 = 0$$

$$(n^2 - 16)(n^2 - 1) = 0$$

$$(n+4)(n-4)(n+1)(n-1) = 0$$

$$\boxed{4, -4, 1, -1}$$

$$(13) \begin{matrix} n & \boxed{-6} \\ n+1 & \boxed{-5} \end{matrix}$$

$$n(n+1) = 30$$

$$n^2 + n - 30 = 0$$

$$(n+6)(n-5) = 0$$

$$-6 \quad 5$$

$$(14) \begin{matrix} n & \boxed{9} & \boxed{-6} \\ n-3 & \boxed{6} & \boxed{-9} \end{matrix}$$

$$n(n-3) = 54$$

$$n^2 - 3n - 54 = 0$$

$$(n-9)(n+6) = 0$$

$$9 \quad -6$$

$$(15) \begin{matrix} n & \boxed{6} & \boxed{-8} \\ n+2 & \boxed{8} & \boxed{-6} \end{matrix}$$

$$n^2 + (n+2)^2 = 100$$

$$n^2 + n^2 + 4n + 4 = 100$$

$$2n^2 + 4n - 96 = 0$$

$$n^2 + 2n - 48 = 0$$

$$(n-6)(n+8) = 0$$

$$6 \quad -8$$

$$(16) n = vt - 16t^2$$

$$0 = 80t - 16t^2$$

$$0 = 16t(5-t)$$

$$0 \quad 5$$

$$\boxed{5 \text{ seconds}}$$

$$(17) x(x+5) = 84$$

$$x^2 + 5x - 84 = 0$$

$$(x+12)(x-7) = 0$$

$$-12 \quad 7$$

$$(18) (x+4)(x+7) - (4)(7) = 42$$

$$x^2 + 11x + 28 - 28 = 42$$

$$x^2 + 11x - 42 = 0$$

$$(x+14)(x-3) = 0$$

$$-14 \quad 3$$

$$\boxed{7 \text{ by } 10 \text{ inches}}$$

$$(19) \begin{matrix} n & -1 & \boxed{-7} \\ n+2 & 1 & \boxed{-5} \end{matrix}$$

$$4n + (n+2)^2 = -3$$

$$4n + n^2 + 4n + 4 = -3$$

$$n^2 + 8n + 7 = 0$$

$$(n+1)(n+7) = 0$$

$$-1 \quad -7$$

$$(20) (9)(10) - (9-2x)(10-2x) = 18$$

$$90 - (90 - 38x + 4x^2) = 18$$

$$90 - 90 + 38x - 4x^2 = 18$$

$$90 - 90 + 38x - 4x^2 - 18 = 0$$

$$-4x^2 + 38x - 18 = 0$$

$$2x^2 - 19x + 9 = 0$$

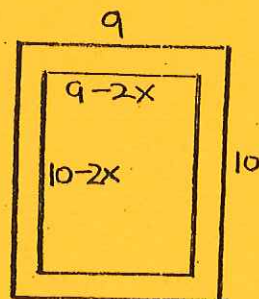
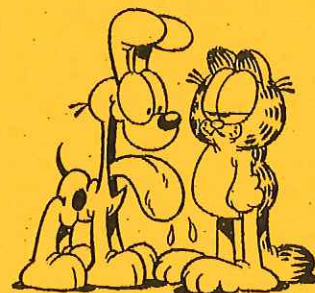
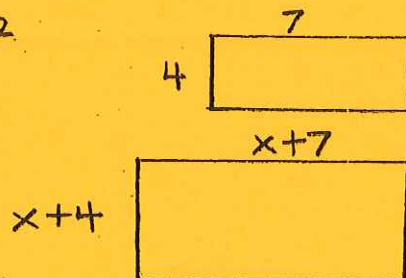
$$2x^2 - 18x - x + 9 = 0$$

$$2x(x-9) - 1(x-9) = 0$$

$$(x-9)(2x-1) = 0$$

$$9 \quad 1/2$$

$$\boxed{1/2 \text{ cm}}$$



8.1

Answer Key

① II ⑤ origin

② III ⑥ II

③ I ⑦ III

④ IV ⑧ I

⑨ (2, -1) (3, -3)
(5, 2) (8, 6)

⑩ (4, 2) (5, 1)
(-3, 6) (-3, 0)

⑪ {2, 3, 5, 8}

⑫ {2, 1, 6, 0}

⑬ yes ⑱ no

⑭ yes ⑲ yes

⑮ yes ⑳ no

⑯ no ㉑ no

㉒ yes ㉔ yes

㉓ yes ㉖ yes

㉔ no ㉗ yes

㉕ no ㉘ no

㉖ yes ㉚ no

㉗ yes ㉛ yes

③② $f(x) = 3x - 5$
 $f(-3) = 3(-3) - 5$
 $\boxed{-14}$

③③ $f(x) = 2x - 1$
 $f(-1) = 2(-1) - 1$
 $\boxed{-3}$

③④ $f(x) = x^2 - x$
 $f(-1) = (-1)^2 - (-1)$
 $\boxed{2}$

③⑤ $f(x) = x^2 - 2x$
 $f(2n) = (2n)^2 - 2(2n)$
 $\boxed{4n^2 - 4n}$

③⑥ $f(x) = 3x^2 - x$
 $f(a+1) = 3(a+1)^2 - (a+1)$
 $3(a^2 + 2a + 1) - (a+1)$
 $3a^2 + 6a + 3 - a - 1$
 $\boxed{3a^2 + 5a + 2}$



③⑦ $g(x) = 2x + x$
 $g(-3) = 2(-3) + (-3) = -9$
 $f(x) = x^2 + 3x$
 $f(-9) = (-9)^2 + 3(-9)$
 $\boxed{54}$

③⑧ $g(x) = x^2 - x$
 $g(-2) = (-2)^2 - (-2) = 6$
 $f(x) = 2x - x$
 $f(6) = 2(6) - (6)$
 $\boxed{6}$

8.2

Answer Key

① $-\frac{15}{8}$ ⑨ 0

② -7 ⑩ $-\frac{4}{5}$

③ 2 ⑪ $-\frac{1}{10}$

④ $\frac{3}{8}$ ⑫ 0

⑤ $\frac{4}{5}$ ⑬ 1

⑥ undef.

⑦ $\frac{3}{4}$ ⑭ 4

⑧ $\frac{1}{2}$ ⑮ undef.

⑯ (-3, -5) (-8, +5)

$$\frac{(-5) - (+5)}{(-3) - (-8)} = \frac{-10}{5} = \boxed{-2}$$

⑰ (0, -3) (-7, +3)

$$\frac{(-3) - (+3)}{(0) - (-7)} = \frac{-6}{7}$$

⑱ (-2, -4) (-2, -8)

$$\frac{(-4) - (-8)}{(-2) - (-2)} = \frac{4}{0}$$

$\boxed{\text{undefined}}$

⑲ (6, 8) (-4, -3)

$$\frac{(8) - (-3)}{(6) - (-4)} = \frac{11}{10}$$

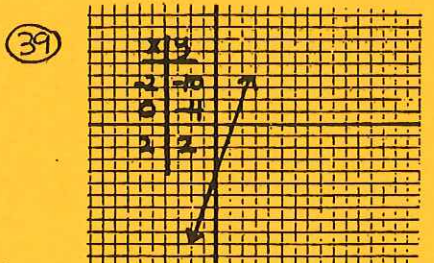
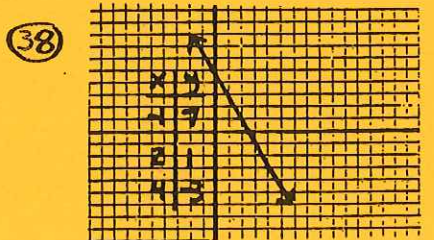
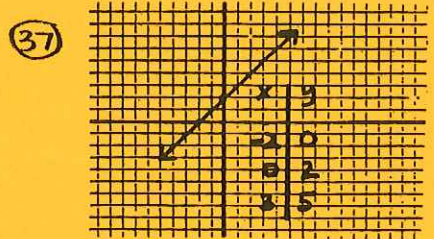
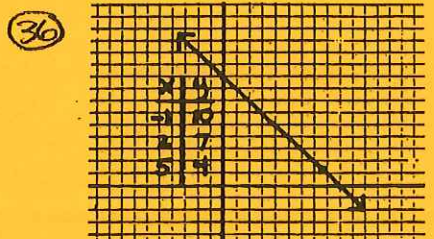
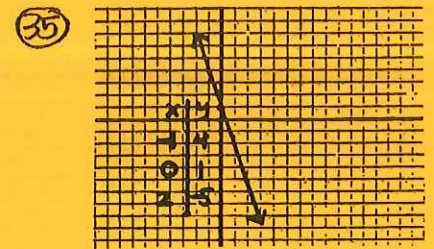
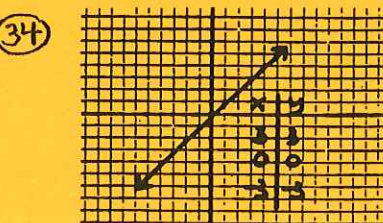
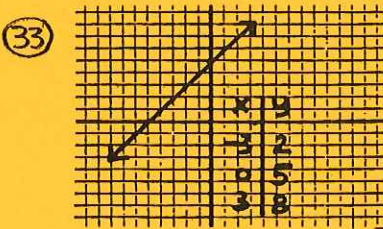
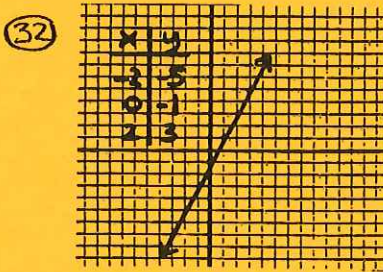
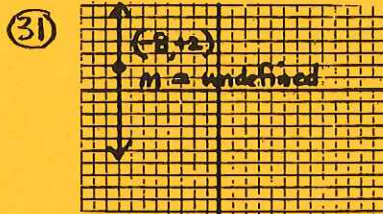
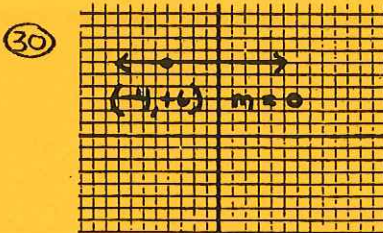
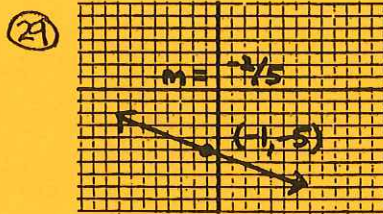
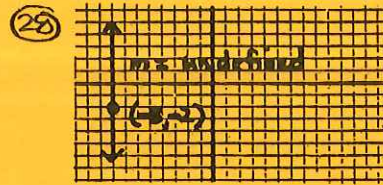
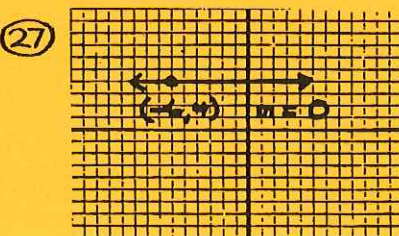
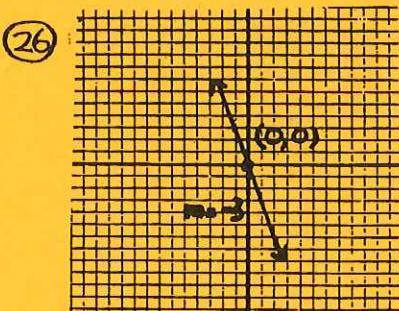
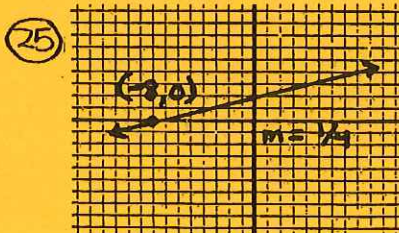
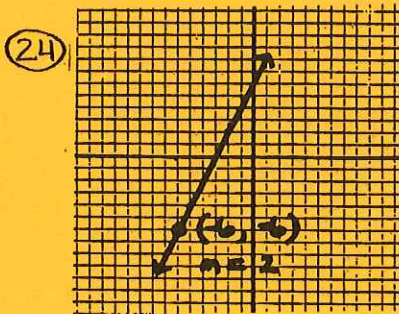
⑳ (-4, 2) (-9, 2)

$$\frac{(2) - (2)}{(-4) - (-9)} = \frac{0}{5} = \boxed{0}$$

21) $(-6, -1)$ $(0, -9)$
 $\frac{(-1) - (-9)}{(-6) - (0)} = \frac{8}{-6} = \boxed{-\frac{4}{3}}$

22) $(-3, 4)$ $(-3, -3)$
 $\frac{(4) - (-3)}{(-3) - (-3)} = \frac{7}{0}$
undefined

23) $(4, -1)$ $(6, -1)$
 $\frac{(-1) - (-1)}{(4) - (6)} = \frac{0}{-2} = \boxed{0}$



40) **Quadrant III**

④ Not a function

Domain:

$$\{-2, 0, 2, 5\}$$

Range:

$$\{-3, 1, 4, 6, 9\}$$

I THINK I'LL TAKE A NAP



④ $3x=9$ yes

$x^2+y=1$ no

$y=\frac{x}{3}$ yes

THEN DOZE AWHILE... AND THEN TOP IT ALL OFF WITH A NICE SNOOZE



④ $g(x)=x^2$

$$g(n+1)=(n+1)^2$$

$$n^2+2n+1$$

$$f(x)=2x-3$$

$$f(n^2+2n+1)=$$

$$2(n^2+2n+1)-3$$

$$2n^2+4n+2-3$$

$$2n^2+4n-1$$

NAP ATTACK!



REMEMBER, KIDS, FOR WELL-BALANCED REST, YOU MUST HAVE SOMETHING FROM THE THREE BASIC SLEEP GROUPS EACH DAY



8.3

Answer Key

① Standard

$$y=3x-9$$

$$-3x+y=-9$$

$$3x-y=9$$

$$-A/B=3 \quad \text{slope} \quad m=3 \quad \boxed{3}$$

$$C/B=-9 \quad \text{y-int} \quad b=-9 \quad \boxed{(0,-9)}$$

$$C/A=3 \quad \text{x-int} \quad -b/m=3 \quad \boxed{(3,0)}$$

Slope-Int

$$y=3x-9$$

⑤ Standard

$$1/3x-y=2$$

$$x-3y=6$$

$$-A/B=1/3 \quad \text{slope} \quad m=1/3 \quad \boxed{1/3}$$

$$C/B=-2 \quad \text{y-int} \quad b=-2 \quad \boxed{(0,-2)}$$

$$C/A=6 \quad \text{x-int} \quad -b/m=6 \quad \boxed{(6,0)}$$

Slope-Int

$$y=-2x+8$$

② Standard

$$y=-2x+8$$

$$2x+y=8$$

$$-A/B=-2 \quad \text{slope} \quad m=-2 \quad \boxed{-2}$$

$$C/B=8 \quad \text{y-int} \quad b=8 \quad \boxed{(0,8)}$$

$$C/A=4 \quad \text{x-int} \quad -b/m=4 \quad \boxed{(4,0)}$$

③ Standard

$$6x-2y=4$$

$$3x-y=2$$

Slope-Int

$$6x-2y=4$$

$$-2y=-6x+4$$

$$y=3x-2$$

$$-A/B=3 \quad \text{slope} \quad m=3 \quad \boxed{3}$$

$$C/B=-2 \quad \text{y-int} \quad b=-2 \quad \boxed{(0,-2)}$$

$$C/A=2/3 \quad \text{x-int} \quad -b/m=2/3 \quad \boxed{(2/3,0)}$$

④ Standard

$$-8x-4y=12$$

$$8x+4y=-12$$

$$2x+y=-3$$

Slope-Int

$$-8x-4y=12$$

$$-4x=8x+12$$

$$y=-2x-3$$

$$-A/B=-2 \quad \text{slope} \quad m=-2 \quad \boxed{-2}$$

$$C/B=-3 \quad \text{y-int} \quad b=3 \quad \boxed{(0,3)}$$

$$C/A=-3/2 \quad \text{x-int} \quad -b/m=3/2 \quad \boxed{(3/2,0)}$$

Slope-Int

$$1/3x-y=2$$

$$-y=-1/3x+2$$

$$y=1/3x-2$$

⑥ Standard

$$\frac{2x}{5} + y = 4$$

$$2x + 5y = 20$$

$$\begin{aligned} -A/B &= -2/5 \text{ slope} \\ C/B &= 4 \text{ y-int} \\ C/A &= 10 \text{ x-int} \end{aligned}$$

Slope-Int

$$\frac{2x}{5} + y = 4$$

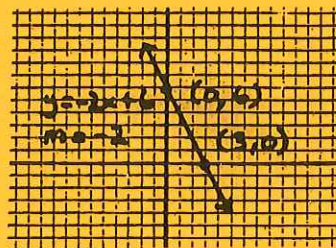
$$y = -\frac{2}{5}x + 4$$

$$\begin{aligned} m &= -2/5 \\ b &= 4 \\ -b/m &= 10 \end{aligned} \quad \begin{array}{l} \frac{2}{5} \\ (0, 4) \\ (10, 0) \end{array}$$

⑥ $y - 9 = 5(x - 4)$ or $y + 1 = 5(x - 2)$

⑦ $2x = 6 - y$

$$y = -2x + 6$$



$$\begin{aligned} m &= -2 \\ b &= (0, 6) \\ -b/m &= (3, 0) \end{aligned}$$

⑦ Standard

$$3x = 9 - 6y$$

$$3x + 6y = 9$$

$$x + 2y = 3$$

$$\begin{aligned} -A/B &= -1/2 \text{ slope} \\ C/B &= 3/2 \text{ y-int} \\ C/A &= 3 \text{ x-int} \end{aligned}$$

Slope-Int

$$3x = 9 - 6y$$

$$6y = -3x + 9$$

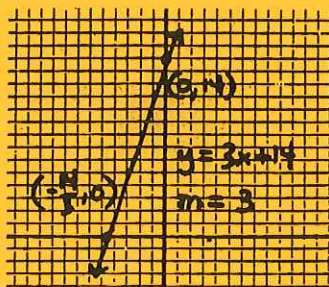
$$y = -\frac{1}{2}x + \frac{3}{2}$$

$$\begin{aligned} m &= -1/2 \\ b &= 3/2 \\ -b/m &= 3 \end{aligned} \quad \begin{array}{l} -1/2 \\ (0, 3/2) \\ (3, 0) \end{array}$$

⑧ $y - 2 = 3(x + 4)$

$$y - 2 = 3x + 12$$

$$y = 3x + 14$$



$$\begin{aligned} m &= 3 \\ b &= (0, 14) \\ -b/m &= (-14/3, 0) \end{aligned}$$

⑧ Standard

$$-x = 12 - 2y$$

$$-x + 2y = 12$$

$$x - 2y = -12$$

$$\begin{aligned} -A/B &= 1/2 \text{ slope} \\ C/B &= 6 \text{ y-int} \\ C/A &= -12 \text{ x-int} \end{aligned}$$

Slope-Int

$$-x = 12 - 2y$$

$$2y = x + 12$$

$$y = 1/2x + 6$$

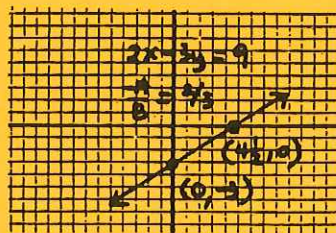
$$\begin{aligned} m &= 1/2 \\ b &= 6 \\ -b/m &= -12 \end{aligned} \quad \begin{array}{l} 1/2 \\ (0, 6) \\ (-12, 0) \end{array}$$

⑨ $y = \frac{2}{3}x - 3$

$$3y = 2x - 9$$

$$-2x + 3y = -9$$

$$2x - 3y = 9$$



$$\begin{aligned} -A/B &= 2/3 \\ C/B &= (0, -3) \\ C/A &= (9/2, 0) \end{aligned}$$

8.4

Answer Key

① $y - 2 = -4(x - 3)$

② $y - 3 = 2(x + 1)$

③ $y + 5 = \frac{2}{3}(x - 2)$

④ $y + 4 = -\frac{1}{2}(x - \frac{1}{2})$

⑤ $y + 8 = 7(x + 3)$ or $y - 6 = 7(x + 1)$



$$\textcircled{10} \quad y + \frac{5}{2} = \frac{1}{2}(x-2)$$

$$y + \frac{5}{2} = \frac{1}{2}x - 1$$

$$2y + 5 = x - 2$$

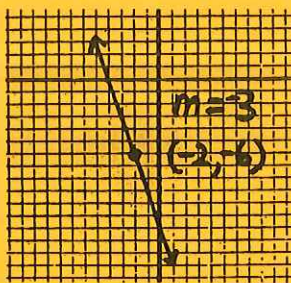
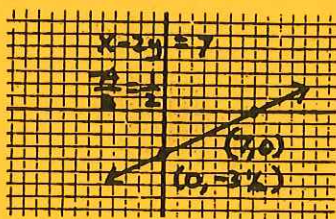
$$-x + 2y = -7$$

$$\boxed{x - 2y = 7}$$

$$\boxed{\frac{-A}{B} = \frac{1}{2}}$$

$$\boxed{\frac{C}{B} = (0, \frac{-7}{2})}$$

$$\boxed{\frac{C}{A} = (7, 0)}$$



$$\textcircled{13} \quad \text{IV}$$

$$\textcircled{14} \quad \text{II}$$

$\textcircled{15}$ It is a function

Domain:

$$\{-2, -3, -4\}$$

$$\text{Range: } \{0, 1\}$$

$$\textcircled{16} \quad y = 0 \quad \text{yes}$$

$$\textcircled{17} \quad 2x - 3xy = 4 \quad \text{no}$$

$$\textcircled{18} \quad (7, -2) (9, -2)$$

$$\frac{(-2) - (-2)}{(7) - (9)} = \frac{0}{-2} = \boxed{0}$$

$$\textcircled{19} \quad (6, -3) (6, -8)$$

$$\frac{(-3) - (-8)}{(6) - (6)} = \frac{5}{0} \quad \boxed{\text{undef.}}$$

$$\textcircled{20} \quad g(x) = 2x - x^2$$

$$g(n+2) = 2(n+2) - (n+2)^2$$

$$2n+4 - (n^2+4n+4)$$

$$2n+4 - n^2 - 4n - 4$$

$$-n^2 - 2n$$

$$f(x) = -2x$$

$$f(-n^2 - 2n) = -2(2n^2 + 4n)$$

$$\boxed{2n^2 + 4n}$$



8.5

Answer Key

$$\textcircled{1} \quad \frac{\text{rise}}{\text{run}} = \frac{2}{1}$$

$$y = 2x + b$$

$$(-5) = 2(-3) + b$$

$$-5 = -6 + b$$

$$1 = b$$

$$\boxed{y = 2x + 1}$$

$$\textcircled{2} \quad \frac{\text{rise}}{\text{run}} = \frac{4}{1}$$

$$y = 4x + b$$

$$(-3) = 4(-2) + b$$

$$-3 = -8 + b$$

$$5 = b$$

$$\boxed{y = 4x + 5}$$

$$\textcircled{3} \quad \frac{\text{rise}}{\text{run}} = \frac{8}{2} = 4$$

$$y = 4x + b$$

$$(-13) = 4(-4) + b$$

$$-13 = -16 + b$$

$$3 = b$$

$$\boxed{y = 4x + 3}$$

$$\textcircled{4} \quad \frac{\text{rise}}{\text{run}} = \frac{12}{2} = 6$$

$$y = 6x + b$$

$$(5) = 6(1) + b$$

$$5 = 6 + b$$

$$-1 = b$$

$$\boxed{y = 6x - 1}$$

$$\textcircled{11} \quad y - 3 = 2(x - 4)$$

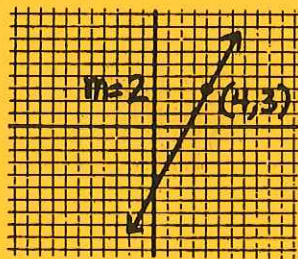
$$y - 3 = 2x - 8$$

$$\boxed{y = 2x - 5}$$

$$\boxed{m = 2}$$

$$\boxed{b = (0, -5)}$$

$$\boxed{\frac{-b}{m} = (\frac{5}{2}, 0)}$$



$$\textcircled{12} \quad y + 6 = -3(x + 2)$$

$$y + 6 = -3x - 6$$

$$\boxed{y = -3x - 12}$$

$$\boxed{m = -3}$$

$$\boxed{b = (0, -12)}$$

$$\boxed{\frac{-b}{m} = (-4, 0)}$$

$$\textcircled{5} \frac{\text{rise}}{\text{run}} = \frac{4}{1}$$

$$y = 4x + b$$

$$(4) = 4(1) + b$$

$$4 = 4 + b$$

$$0 = b$$

$$\boxed{y = 4x}$$

$$\textcircled{6} \frac{\text{rise}}{\text{run}} = \frac{-3}{1}$$

$$y = -3x + b$$

$$(-3) = -3(1) + b$$

$$-3 = -3 + b$$

$$0 = b$$

$$\boxed{y = -3x}$$

$$\textcircled{7} \frac{\text{rise}}{\text{run}} = \frac{-10}{2} = -5$$

$$y = -5x + b$$

$$(28) = -5(-5) + b$$

$$28 = 25 + b$$

$$3 = b$$

$$\boxed{y = -5x + 3}$$

$$\textcircled{8} \frac{\text{rise}}{\text{run}} = \frac{-4}{2} = -2$$

$$y = -2x + b$$

$$(26) = -2(-4) + b$$

$$26 = 8 + b$$

$$18 = b$$

$$\boxed{y = -2x + 18}$$



$$\textcircled{9} (-6, -3) m = -\frac{1}{2}$$

$$y = -\frac{1}{2}x + b$$

$$(-3) = -\frac{1}{2}(-6) + b$$

$$-3 = 3 + b$$

$$-6 = b$$

$$\boxed{y = -\frac{1}{2}x - 6}$$

$$\textcircled{10} (9, 1) m = \frac{2}{3}$$

$$y = \frac{2}{3}x + b$$

$$(1) = \frac{2}{3}(9) + b$$

$$1 = 6 + b$$

$$-5 = b$$

$$\boxed{y = \frac{2}{3}x - 5}$$

$$\textcircled{11} (5, 7) m = 0$$

horizontal

$$\boxed{y = 7}$$

$$\textcircled{12} (-2, 3) m = \text{undef.}$$

vertical

no slope-int form

$$\boxed{x = -2}$$

$$\textcircled{13} (9, 1) (8, 2)$$

$$\frac{(1) - (2)}{(9) - (8)} = -1$$

$$y = -x + b$$

$$(1) = -(9) + b$$

$$10 = b$$

$$\boxed{y = -x + 10}$$

$$\textcircled{14} (6, -1) (4, -2)$$

$$\frac{(-1) - (-2)}{(6) - (4)} = \frac{1}{2}$$

$$y = \frac{1}{2}x + b$$

$$(-1) = \frac{1}{2}(6) + b$$

$$-1 = 3 + b$$

$$-4 = b$$

$$\boxed{y = \frac{1}{2}x - 4}$$

$$\frac{-A}{B} = \frac{-1}{2} \quad A = 1 \quad B = 2$$

$$x + 2y = C$$

$$(-6) + 2(-3) = C$$

$$(-6) + (-6) = C$$

$$-12 = C$$

$$\boxed{x + 2y = -12}$$

$$\frac{A}{-B} = \frac{2}{3} \quad A = 2 \quad B = -3$$

$$2x - 3y = C$$

$$2(9) - 3(1) = C$$

$$18 - 3 = C$$

$$15 = C$$

$$\boxed{2x - 3y = 15}$$

$$\boxed{y = 7}$$

$$\boxed{x = -2}$$

$$\frac{-A}{B} = \frac{-1}{1} \quad A = 1 \quad B = 1$$

$$x + y = C$$

$$(9) + (1) = C$$

$$10 = C$$

$$\boxed{x + y = 10}$$

$$\frac{A}{-B} = \frac{1}{2} \quad A = 1 \quad B = -2$$

$$x - 2y = C$$

$$(6) - 2(-1) = C$$

$$6 + 2 = C$$

$$8 = C$$

$$\boxed{x - 2y = 8}$$

⑮ $(-5, 1) (-7, 9)$

$$\frac{(1) - (9)}{(-5) - (-7)} = \frac{-8}{2} = -4 \quad \frac{-A}{B} = \frac{-4}{1} \quad A=4 \quad B=1$$

$$y = -4x + b$$

$$(1) = -4(-5) + b$$

$$1 = 20 + b$$

$$-19 = b$$

$$\boxed{y = -4x - 19}$$

$$4x + y = c$$

$$4(-5) + (1) = c$$

$$-20 + 1 = c$$

$$-19 = c$$

$$\boxed{4x + y = -19}$$

⑯ $(6, 2) (3, 3)$

$$\frac{(2) - (3)}{(6) - (3)} = \frac{-1}{3} \quad \frac{-A}{B} = \frac{-1}{3} \quad A=1 \quad B=3$$

$$y = -\frac{1}{3}x + b$$

$$(2) = -\frac{1}{3}(6) + b$$

$$2 = -2 + b$$

$$4 = b$$

$$\boxed{y = -\frac{1}{3}x + 4}$$

$$x + 3y = c$$

$$(6) + 3(2) = c$$

$$6 + 6 = c$$

$$12 = c$$

$$\boxed{x + 3y = 12}$$

⑰ $(-4, -3) (-7, 3)$

$$\frac{(-3) - (3)}{(-4) - (-7)} = \frac{-6}{3} = -2$$

$$\boxed{y + 3 = -2(x + 4) \text{ or } y - 3 = -2(x + 7)}$$

⑱ $(-2, 4) (-5, 5)$

$$\frac{(4) - (5)}{(-2) - (-5)} = \frac{-1}{3}$$

$$\boxed{y - 4 = -\frac{1}{3}(x + 2) \text{ or } y - 5 = -\frac{1}{3}(x + 5)}$$



8.6

Answer Key

- ① slope $-\frac{2}{3}, -\frac{2}{3}$ parallel
 ② slope $\frac{1}{2}, -2$ perpendicular
 ③ slope $3, \frac{1}{3}$ neither
 ④ slope $\frac{4}{3}, -\frac{3}{4}$ perpendicular
 ⑤ slope $-3, \frac{1}{3}$ perpendicular
 ⑥ slope undef, 0 perpendicular
 ⑦ slope $\frac{1}{4}, \frac{1}{4}$ parallel
 ⑧ slope $2, -\frac{1}{2}$ perpendicular
 ⑨ slope $\frac{2}{3}, -\frac{3}{2}$ perpendicular
 ⑩ slope $2, 2$ parallel

⑪ $6x + y = 4$ slope $= -6$
 $6(-2) + (3) = c \quad c = -9$
 $\boxed{6x + y = -9}$

⑫ $5x - 2y = 7$ slope $= \frac{5}{2}$
 $5(0) - 2(-4) = c \quad c = 8$
 $\boxed{5x - 2y = 8}$

⑬ $y = -\frac{3}{5}x + 4$ slope $= -\frac{3}{5}$
 $(-1) = -\frac{3}{5}(0) + b \quad b = -1$
 $\boxed{y = -\frac{3}{5}x - 1}$

⑭ $y = \frac{3}{4}x - 1$ slope $= \frac{3}{4}$
 $(0) = \frac{3}{4}(0) + b \quad b = 0$
 $\boxed{y = \frac{3}{4}x}$

⑮ $5x - 3y = 7$ \perp slope $= -\frac{3}{5}$
 $\frac{-A}{B} = \frac{-3}{5} \quad A=3 \quad B=5$
 $3x + 5y = c$
 $3(8) + 5(-2) = c \quad c = 14 \quad \boxed{3x + 5y = 14}$

$$\textcircled{16} \quad 3x+8y=4 \perp \text{slope} = 8/3$$

$$\frac{A}{-B} = \frac{8}{3} \quad A=8$$

$$8x-3y=C$$

$$8(0)-3(4)=C \quad C=-12$$

$$\boxed{8x-3y=-12}$$

$$\textcircled{17} \quad y=3x-2 \perp \text{slope} = -1/3$$

$$y = -1/3x + b$$

$$(1) = -1/3(6) + b \quad b=1$$

$$\boxed{y = -1/3x + 1}$$

$$\textcircled{18} \quad y = -3x + 7 \perp \text{slope} = 1/3$$

$$y = 1/3x + b$$

$$(1) = 1/3(-3) + b \quad b=2$$

$$\boxed{y = 1/3x + 2}$$

$$\textcircled{19} \quad y-2 = \frac{2}{3}(x-3) \parallel \text{slope} = \frac{2}{3}$$

$$\boxed{y+2 = \frac{2}{3}(x-5)}$$

$$\textcircled{20} \quad y+3 = -2(x+1/2) \parallel \text{slope} = -2$$

$$\boxed{y+1 = -2(x+1)}$$

$$\textcircled{21} \quad y-4 = \frac{1}{2}(x+1) \perp \text{slope} = -2$$

$$\boxed{y+2 = -2(x+4)}$$

$$\textcircled{22} \quad y+3 = -4(x-1) \perp \text{slope} = 1/4$$

$$\boxed{y-3 = 1/4(x-3)}$$

$$\textcircled{23} \quad 3x-6y=2 \quad \text{slope} = 1/2$$

$$y = 1/2x + b$$

$$(2) = 1/2(1) + b \quad b = 3/2$$

$$\boxed{y = 1/2x + 3/2}$$

$$\textcircled{24} \quad 2x+y=5 \perp \text{slope} = 1/2$$

$$y = 1/2x + b$$

$$(-3) = 1/2(-1) + b \quad b = -5/2$$

$$\boxed{y = 1/2x - 5/2}$$

$$\textcircled{25} \quad y=5x-3 \perp \text{slope} = -1/5$$

$$\frac{-A}{B} = \frac{-1}{5} \quad A=1$$

$$x+5y=C$$

$$(0)+5(-1)=C \quad C=-5$$

$$\boxed{x+5y=-5}$$

$$\textcircled{26} \quad y=x \quad \text{slope} = 1$$

$$\frac{A}{-B} = \frac{1}{1} \quad A=1$$

$$x-y=C$$

$$(7)-(-2)=C \quad C=9$$

$$\boxed{x-y=9}$$

$$\textcircled{27} \quad y=4$$

horizontal

$$\boxed{y=-5}$$

$$\textcircled{29} \quad y=5$$

horizontal

$$\boxed{x=0}$$

$$\textcircled{28} \quad x=-2$$

vertical

$$\boxed{y=7}$$

$$\textcircled{30} \quad x=-1$$

vertical

$$\boxed{x=-3}$$

WHAT IS THAT SNOWMAN DOING IN THE LIVING ROOM?



MELTING



8.7

Answer Key

$$\textcircled{1} \quad (3,5) (11,7)$$
$$\frac{3+11}{2}, \frac{5+7}{2}$$
$$\boxed{(7,6)}$$

$$\textcircled{2} \quad (5,9) (-7,3)$$
$$\frac{5+(-7)}{2}, \frac{9+3}{2}$$
$$\boxed{(-1,6)}$$

$$\textcircled{3} (6, -7) (4, -11)$$

$$\frac{6+4}{2}, \frac{(-7)+(-11)}{2}$$

$$\boxed{(5, -9)}$$

$$\textcircled{4} (4, -7) (-8, 1)$$

$$\frac{4+(-8)}{2}, \frac{(-7)+1}{2}$$

$$\boxed{(-2, -3)}$$

$$\textcircled{5} (3, 5) (5, -7)$$

$$3 \rightarrow 5 \text{ add } 2$$

$$5 \rightarrow -7 \text{ sub } 12$$

$$5+2, -7-12$$

$$\boxed{(7, -19)}$$

$$\textcircled{6} (7, 4) (9, -3)$$

$$7 \rightarrow 9 \text{ add } 2$$

$$4 \rightarrow -3 \text{ sub } 7$$

$$9+2, -3-7$$

$$\boxed{(11, -10)}$$

$$\textcircled{7} (5, 7) (5, 6)$$

$$5 \rightarrow 5 \text{ add } 0$$

$$7 \rightarrow 6 \text{ sub } 1$$

$$5+0, 6-1$$

$$\boxed{(5, 5)}$$

$$\textcircled{8} (3, -5) (-3, 8)$$

$$3 \rightarrow -3 \text{ sub } 6$$

$$-5 \rightarrow 8 \text{ add } 13$$

$$-3-6, 8+13$$

$$\boxed{(-9, 21)}$$

$$\textcircled{9} 3x - y = 4 \text{ slope} = 3$$

$$y = 3x + b$$

$$(-4) = 3(2) + b \quad b = -10$$

$$\boxed{y = 3x - 10}$$

$$\textcircled{10} y = 2x + 1 \perp \text{slope} = -\frac{1}{2}$$

$$\frac{-A}{B} = -\frac{1}{2} \quad A = 1$$

$$B = 2 \quad B = 2$$

$$x + 2y = C$$

$$(4) + 2(3) = C \quad C = 10$$

$$\boxed{x + 2y = 10}$$

$$\textcircled{11} 2x - y = 5 \perp \text{slope} = -\frac{1}{2}$$

$$\boxed{y - 2 = -\frac{1}{2}(x + 1)}$$

$$\textcircled{12} y = 2$$

horizontal

$$\boxed{y = -1}$$

$$\textcircled{13} \frac{\text{rise}}{\text{run}} \frac{6}{-3} = -2$$

$$y = -2x + b$$

$$(2) = -2(-4) + b$$

$$2 = 8 + b \quad b = -6$$

$$\boxed{y = -2x + 6}$$

$$\textcircled{14} (-2, 3) (-5, 12)$$

$$\frac{(3) - (12)}{(-2) - (-5)} = \frac{-9}{3} = -3$$

$$\frac{-A}{B} = \frac{-3}{1} \quad A = 3$$

$$B = 1 \quad B = 1$$

$$3x + y = C$$

$$3(-2) + (3) = C$$

$$C = -3$$

$$\boxed{3x + y = -3}$$

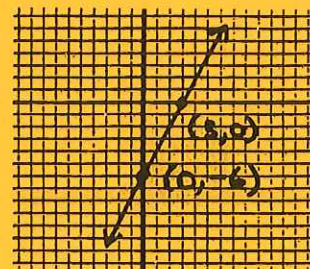


$$\textcircled{15} \boxed{y - 5 = -\frac{1}{2}(x + 1)}$$

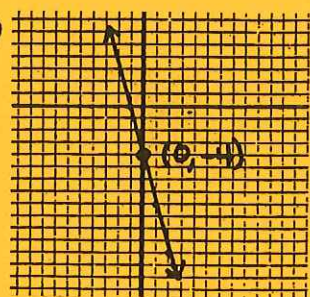
$$\textcircled{16} 2x - y = 6$$

$$y\text{-int } \frac{C}{B} \quad (0, -6)$$

$$x\text{-int } \frac{C}{A} \quad (3, 0)$$



$\textcircled{17}$



Unit 8 REVIEW Answer Key

$\textcircled{1}$ II

$\textcircled{2}$ IV

$\textcircled{3}$ $\{(-2, -3) (3, -1) (4, 0) (4, 5)\}$

domain
 $\{-2, 3, 4\}$

range

$\{-3, -1, 0, 5\}$

$\textcircled{4}$ no

⑤ yes

⑥ yes

⑦ no

⑧ yes



$$\begin{aligned} \textcircled{9} \quad f(x) &= 2x^2 - 3x \\ f(-2) &= 2(-2)^2 - 3(-2) \\ &= 2(4) - (-6) \end{aligned}$$

14

$$\begin{aligned} \textcircled{10} \quad g(x) &= 2x - 3 \\ g(n+2) &= 2(n+2) - 3 \\ &= 2n + 4 - 3 \\ &= 2n + 1 \end{aligned}$$

$$\begin{aligned} f(x) &= 3x - x^2 \\ f(2n+1) &= 3(2n+1) - (2n+1)^2 \\ &= (6n+3) - (4n^2+4n+1) \\ &= 6n+3-4n^2-4n-1 \end{aligned}$$

$$\boxed{-4n^2 + 2n + 2}$$

$$\textcircled{11} \quad \frac{-6}{2} = \boxed{-3}$$

$$\textcircled{12} \quad \boxed{0}$$

$$\textcircled{13} \quad \frac{3}{9} = \boxed{\frac{1}{3}}$$

⑭ **undefined**

⑮ (-6, 3) (-6, 5)

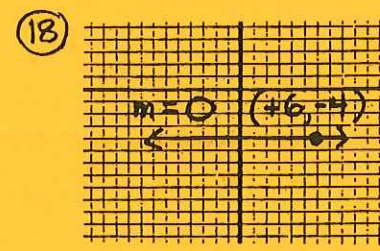
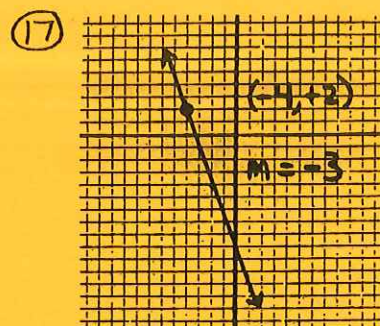
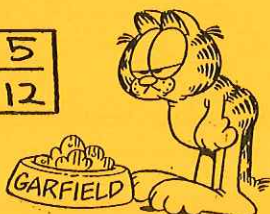
$$\frac{(3) - (5)}{(-6) - (-6)} = \frac{-2}{0}$$

undefined

⑯ (-2, -9) (10, -4)

$$\frac{(-9) - (-4)}{(-2) - (10)} = \frac{-5}{-12}$$

$$\boxed{\frac{5}{12}}$$



$$\begin{aligned} \textcircled{19} \quad 3x &= 12 + 6y \\ -6y &= -3x + 12 \end{aligned}$$

$$\begin{aligned} y &= \frac{1}{2}x - 2 \\ \text{slope (m)} &= \frac{1}{2} \\ y\text{-int (b)} &= (0, -2) \\ x\text{-int (}\frac{-b}{m}\text{)} &= (4, 0) \end{aligned}$$

$$\begin{aligned} \textcircled{20} \quad 4x - 2y &= 6 \\ -2y &= -4x + 6 \end{aligned}$$

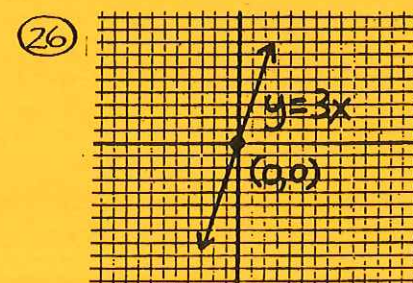
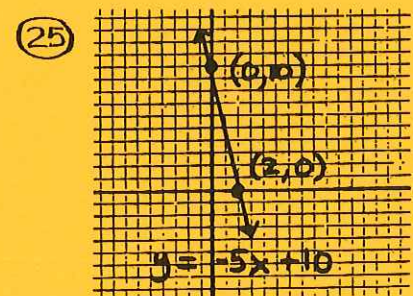
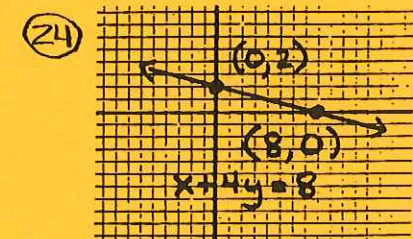
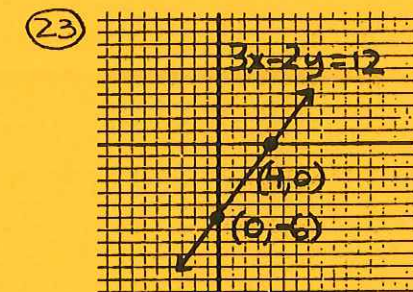
$$\begin{aligned} y &= 2x - 3 \\ \text{slope (m)} &= 2 \\ y\text{-int (b)} &= (0, -3) \\ x\text{-int (}\frac{-b}{m}\text{)} &= (\frac{3}{2}, 0) \end{aligned}$$

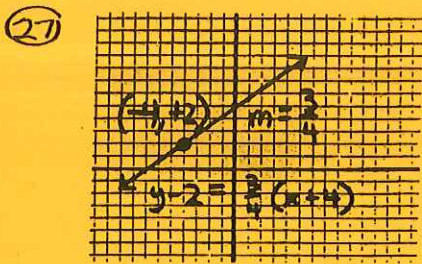
$$\begin{aligned} \textcircled{21} \quad y &= \frac{3}{4}x - 2 \\ 4y &= 3x - 8 \\ -3x + 4y &= -8 \end{aligned}$$

$$\begin{aligned} 3x - 4y &= 8 \\ \text{slope (}\frac{A}{B}\text{)} &= \frac{3}{4} \\ y\text{-int (}\frac{C}{B}\text{)} &= (0, -2) \\ x\text{-int (}\frac{C}{A}\text{)} &= (\frac{8}{3}, 0) \end{aligned}$$

$$\begin{aligned} \textcircled{22} \quad 6y - 8 &= 12x + 10 \\ -12x + 6y &= 18 \\ 12x - 6y &= -18 \end{aligned}$$

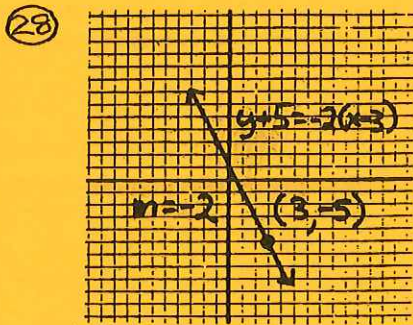
$$\begin{aligned} 2x - y &= -3 \\ \text{slope (}\frac{-A}{B}\text{)} &= 2 \\ y\text{-int (}\frac{C}{B}\text{)} &= (0, 3) \\ x\text{-int (}\frac{C}{A}\text{)} &= (\frac{3}{2}, 0) \end{aligned}$$





32 $(-8, 4)(0, 4)$
 $\frac{(4) - (4)}{(-8) - (0)} = \frac{0}{-8} = 0$
 $y = 0x + b$
 $y = b$ $\boxed{y = 4}$

38 slope $-4, \frac{1}{4}$
 $\boxed{\text{perpendicular}}$



33 $\frac{A}{-B} = \frac{4}{1} \quad A = 4$
 $-B = 1 \quad B = -1$
 $4x - y = C$
 $4(-9) - (-3) = C$
 $-36 + 3 = C$
 $-33 = C$
 $\boxed{4x - y = -33}$

39 $3x - 2y = 4$
 $3(-6) - 2(2) = C$
 $-18 - 4 = C$
 $-22 = C$
 $\boxed{3x - 2y = -22}$

29 $\frac{\text{rise}}{\text{run}} = \frac{6}{-4} = \frac{-3}{2}$
 $y = \frac{-3}{2}x + b$
 $(-8) = \frac{-3}{2}(-2) + b$
 $-8 = 3 + b$
 $-11 = b$
 $\boxed{y = \frac{-3}{2}x - 11}$

34 $(6, -10)(8, -6)$
 $\frac{(-10) - (-6)}{(6) - (8)} = \frac{-4}{-2} = 2$
 $\frac{A}{-B} = \frac{2}{1} \quad A = 2$
 $-B = 1 \quad B = -1$
 $2x - y = C$
 $2(6) - (-10) = C$
 $12 + 10 = C$
 $22 = C$
 $\boxed{2x - y = 22}$

40 $y = \frac{-2}{3}x + 1$
 $\perp \text{ slope} = \frac{3}{2}$
 $y = \frac{3}{2}x + b$
 $(-4) = \frac{3}{2}(6) + b$
 $-4 = 9 + b$
 $-13 = b$
 $\boxed{y = \frac{3}{2}x - 13}$

30 $\frac{\text{rise}}{\text{run}} = \frac{8}{2} = 4$
 $y = 4x + b$
 $(-2) = 4(3) + b$
 $-12 = -12 + b$
 $0 = b$
 $\boxed{y = 4x}$

35 $(-3, -5) \quad m = \frac{-2}{3}$
 $\boxed{y + 5 = \frac{-2}{3}(x + 3)}$

41 $2x - 3y = 7$
 $\text{slope} = \frac{2}{3}$
 $\perp \text{ slope} = \frac{-3}{2}$
 $y = \frac{-3}{2}x + b$
 $(-3) = \frac{-3}{2}(4) + b$
 $-3 = -6 + b$
 $3 = b$
 $\boxed{y = \frac{-3}{2}x + 3}$

31 $y = -2x + b$
 $(3) = -2(-6) + b$
 $3 = 12 + b$
 $-9 = b$
 $\boxed{y = -2x - 9}$

36 $(4, -5)(8, -13)$
 $\frac{(-5) - (-13)}{(4) - (8)} = \frac{8}{-4} = -2$
 $\boxed{y + 5 = -2(x - 4) \text{ or } y + 13 = -2(x - 8)}$

42 $y = \frac{1}{2}x + 8$
 $\text{slope} = \frac{1}{2}$
 $\frac{-A}{B} = \frac{-1}{2} \quad A = 1$
 $B = 2 \quad B = 2$
 $x + 2y = C$
 $(6) + 2(2) = C$
 $6 + 4 = C$
 $2 = C$
 $\boxed{x + 2y = 2}$

37 slope $\frac{3}{5}, \frac{-3}{5}$ $\boxed{\text{neither}}$

43) $y = -4$ horizontal
through $(-1, 2)$
(all y -coordinates are
the same on a
horizontal line)

$$\boxed{y = -4}$$

44) $x = 4$ vertical
 \perp through $(5, 7)$
all y -coordinates 7

$$\boxed{y = 7}$$

45) $(-6, 11)$ $(-12, 15)$
 $\frac{(-6) + (-12)}{2}, \frac{11 + 15}{2}$

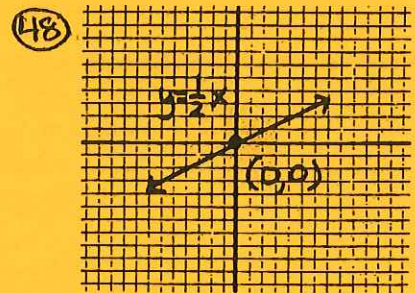
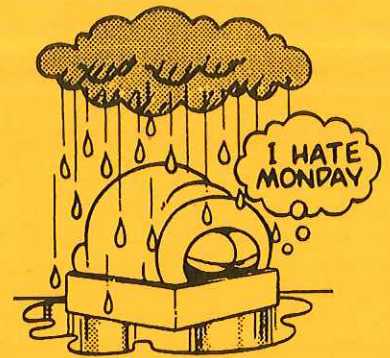
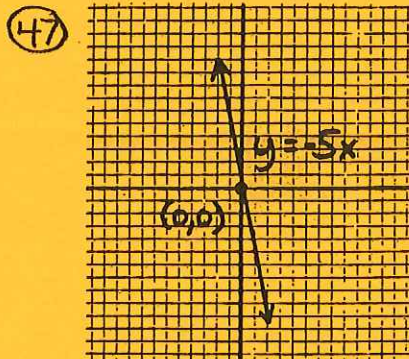
$$\boxed{(-9, 13)}$$

46) $A(-2, 7)$ $P(-5, 9)$

$-2 \rightarrow -5$ sub 3
 $7 \rightarrow 9$ add 2
 $-5 - 3, 9 + 2$

$$\boxed{(-8, 11)}$$

end point



Unit 8

SKILL CHECK - ANSWER KEY

① III

② no

③ yes

④ $f(x) = 2x^3 - x^2$
 $f(-2) = 2(-2)^3 - (-2)^2$
 $2(-8) - (4)$
 $(-16) + (-4)$

$$\boxed{-20}$$

⑤ $\frac{\text{rise}}{\text{run}} = \frac{6}{2} = \boxed{3}$

⑥ $(-4, 2)$ $(-4, 9)$

$$\frac{(2) - (9)}{(-4) - (-4)} = \frac{-7}{0}$$

$\boxed{\text{undefined}}$

⑦ $2x - 4y = 8$
 $-4y = -2x + 8$

$$\boxed{\begin{array}{l} y = \frac{1}{2}x - 2 \\ \text{slope (m)} \quad \frac{1}{2} \\ \text{y-int (b)} \quad (0, -2) \\ \text{x-int (}\frac{b}{m}\text{)} \quad (4, 0) \end{array}}$$

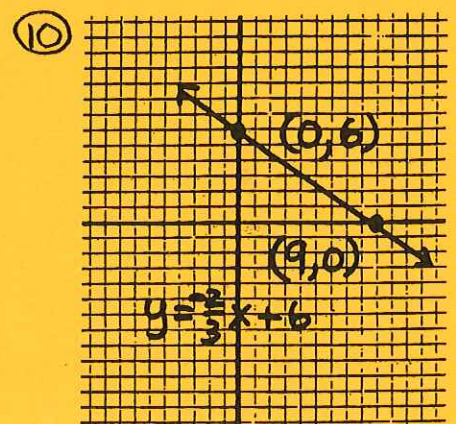
⑧ $4y = \frac{1}{3}x - 2$
 $12y = 4x - 6$
 $-4x + 12y = -6$
 $4x - 12y = 6$

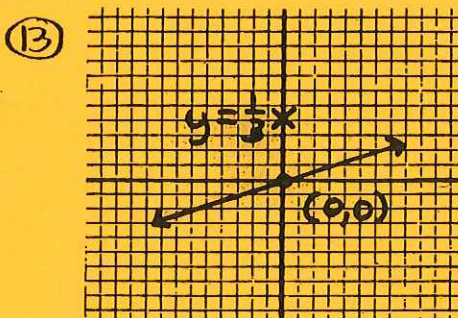
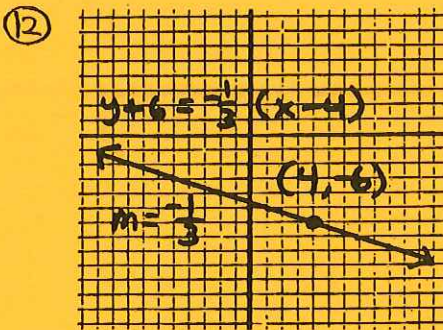
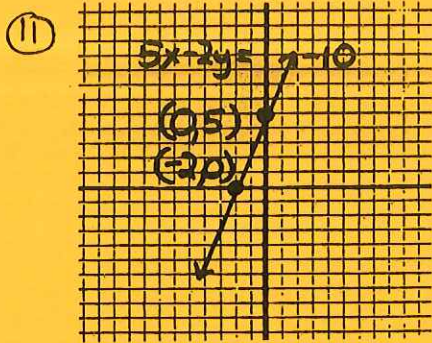
$$\boxed{\begin{array}{l} 2x - 6y = 3 \\ \text{slope (}\frac{A}{B}\text{)} \quad \frac{1}{3} \\ \text{y-int (}\frac{C}{B}\text{)} \quad (0, \frac{1}{2}) \\ \text{x-int (}\frac{C}{A}\text{)} \quad (\frac{3}{2}, 0) \end{array}}$$

⑨ $\frac{\text{rise}}{\text{run}} = \frac{6}{-3} = -2$

$y = -2x + b$
 $(-4) = -2(-7) + b$
 $-4 = 14 + b$
 $-18 = b$

$$\boxed{y = -2x - 18}$$





⑭ $(4, -3)$ $(5, -7)$
 $\frac{(-3) - (-7)}{(4) - (5)} = \frac{4}{-1} \quad A = 4$
 $4x + y = C$
 $4(4) + (-3) = C$
 $13 = C$
 $4x + y = 13$

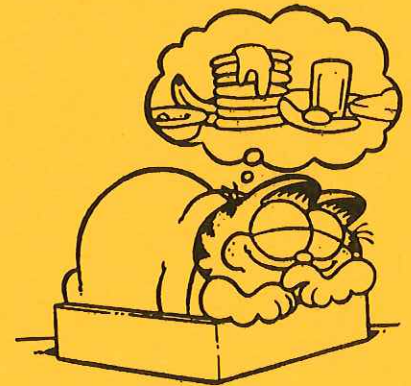
⑮ $(2, -3)$ $(4, -3)$
 $\frac{(-3) - (-3)}{(2) - (4)} = \frac{0}{-2} = 0$
 $y = -3$

⑯ $y + 5 = \frac{2}{5}(x - 2)$

⑰ $y = -\frac{1}{3}x + 5$
 \perp slope = 3
 $\frac{A}{-B} = \frac{3}{-1} \quad A = 3$
 $\frac{-B}{A} = -1 \quad B = -1$
 $3x - y = C$
 $3(-6) - (-3) = C \quad C = -21$
 $3x - y = -21$

⑱ $A(4, -7)$ $B(-2, 5)$
 $\frac{4 + (-2)}{2}, \frac{-7 + 5}{2}$
 $(1, -1)$ midpoint

⑲ $g(x) = 6 - x$
 $g(3n + 2) = 6 - (3n + 2)$
 $4 - 3n$
 $f(x) = 2x - 3x^2$
 $f(4 - 3n) = 2(4 - 3n) - 3(4 - 3n)^2$
 $(8 - 6n) - 3(16 - 24n + 9n^2)$
 $8 - 6n - 48 + 72n - 27n^2$
 $-27n^2 + 66n - 40$



Unit 8 REMEDICATION - ANSWER KEY

① I

② yes

③ no

④ $f(x) = 3x^2 - x^3$
 $f(-3) = 3(-3)^2 - (-3)^3$
 $3(9) - (-27)$

54

⑤ undefined

⑥ $(5, -2)$ $(-7, -5)$
 $\frac{(-2) - (-5)}{(5) - (-7)} = \frac{3}{12} = \frac{1}{4}$

⑦ $x + 3y = -9$
 $3y = -x - 9$
 $y = -\frac{1}{3}x - 3$
 slope (m) $-\frac{1}{3}$
 y-int (b) $(0, -3)$
 x-int $(-\frac{9}{m})$ $(-9, 0)$

⑧ $6y = -\frac{3}{4}x + 9$
 $24y = -3x + 36$
 $3x + 24y = 36$

$x + 8y = 12$
 slope $(-\frac{A}{B})$ $-\frac{1}{8}$
 y-int $(\frac{C}{B})$ $(0, \frac{3}{2})$
 x-int $(\frac{C}{A})$ $(12, 0)$

⑨ $\frac{\text{rise}}{\text{run}} = \frac{-10}{5} = -2$
 continued \rightarrow

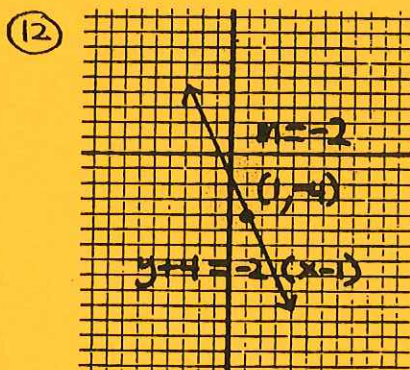
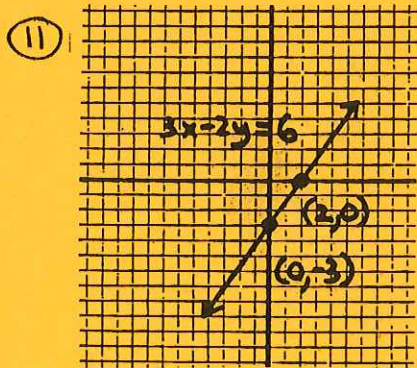
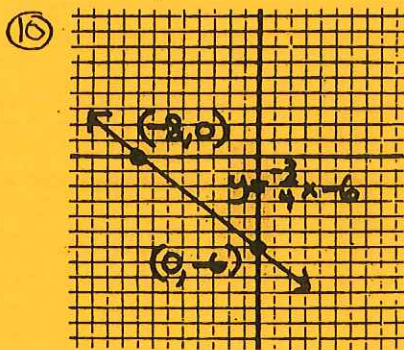
$$y = -2x + b$$

$$(7) = -2(4) + b$$

$$7 = -8 + b$$

$$15 = b$$

$$\boxed{y = -2x + 15}$$



⑭ (4, -1) (6, -13)

$$\frac{(-1) - (-13)}{(4) - (6)} = \frac{12}{-2} = -6$$

$$\frac{-6}{1} = \frac{-A}{B} \quad A = 6 \quad B = 1$$

$$6x + y = C$$

$$6(4) + (-1) = C$$

$$23 = C$$

$$\boxed{6x + y = 23}$$

⑮ (7, -1) (7, 0)

$$\frac{(-1) - (0)}{(7) - (7)} = \frac{-1}{0}$$

undefined

$$\boxed{x = 7}$$

⑯ $y + 6 = -\frac{1}{2}(x - 2)$

⑰ $y = -3x + 6$

⊥ slope = $\frac{1}{3}$

$$\frac{A}{-B} = \frac{1}{3} \quad A = 1 \quad B = -3$$

$$x - 3y = C$$

$$(12) - 3(12) = C$$

$$-24 = C$$

$$\boxed{x - 3y = -24}$$

⑱ A(-1, 7)

B(-5, 21)

$$\frac{(-1) + (-5)}{2}, \frac{7 + 21}{2}$$

$$\frac{-6}{2}, \frac{28}{2}$$

$$\boxed{(-3, 14)}$$

⑲ $g(x) = 2x + 2$

$$g(2a - 3) = 2(2a - 3) + 2$$

$$4a - 6 + 2$$

$$4a - 4$$

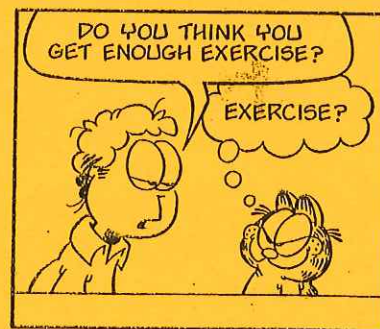
$$f(x) = 5x - 2x^2$$

$$f(4a - 4) = 5(4a - 4) - 2(4a - 4)^2$$

$$(20a - 20) - 2(16a^2 - 32a + 16)$$

$$20a - 20 - 32a^2 + 64a - 32$$

$$\boxed{-32a^2 + 84a - 52}$$



Unit 8

EXTRA PRACTICE - KEY

① A. III
B. IV

② A. yes
B. no

③ A. yes
B. yes

④ A. -6
B. 28

⑤ A. $9/2$
B. -1

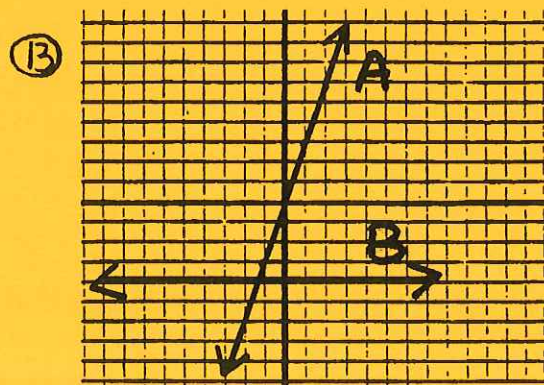
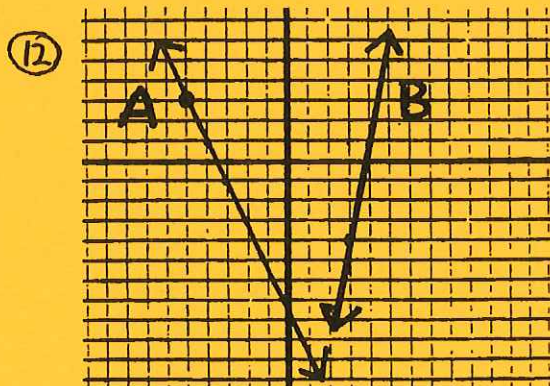
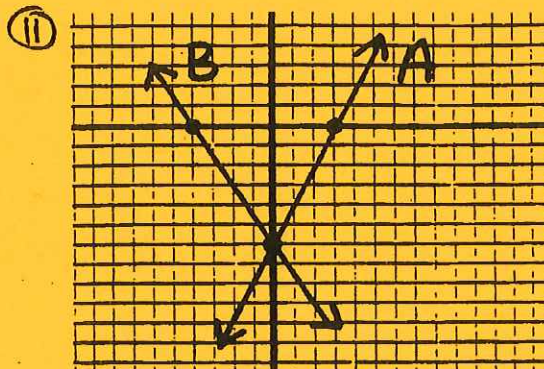
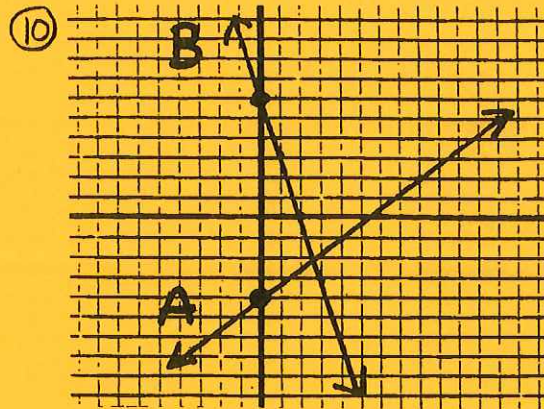
⑥ A. -2
B. 0

⑦ A. $y = -4x + 3$
y-int (0,3)
x-int ($3/4, 0$)
 $m = -4$
B. $y = -1/2x + 3$
y-int (0,3)
x-int (6,0)
 $m = -1/2$

⑧ A. $x - 6y = -9$
y-int (0, $3/2$)
x-int (-9, 0)
 $-A/B = 1/6$
B. $3x + y = 9$
y-int (0, 9)
x-int (3, 0)
 $-A/B = -3$

⑨ A. $y = -2/3x + 8/3$

B. $y = -2/7x - 17/7$



Answer Key (AB)

⑭ A. $9x - y = -22$
B. $x + 2y = 9$

⑮ A. $x = -5$
B. $y = 7$

⑯ A. $y + 5 = 2/3(x - 4)$
B. $y + 6 = -5(x + 3)$

⑰ A. $x + 2y = 2$
B. $x + 3y = -1$

⑱ A. (-5, 8)
B. (-16, 22)

⑲ A. $-18n^2 - 45n - 28$
B. $2n^2 - 8n + 3$

⑳ A. $y - 7 = -10/9(x + 4)$
-or-
 $y + 3 = -10/9(x - 5)$
B. $y = 3/10(x + 4)$
-or-
 $y - 3 = 3/10(x - 6)$



Unit 8

EXTRA PRACTICE - KEY

Answer Key (CD)

- ① C. II
D. I

- ② C. yes
D. no

- ③ C. yes
D. no

- ④ C. 32
D. 4

- ⑤ C. undefined
D. $\frac{1}{3}$

- ⑥ C. $-\frac{1}{2}$
D. undefined

- ⑦ C. $y = 2x - 4$
y-int (0, -4)
x-int (2, 0)
 $m = 2$

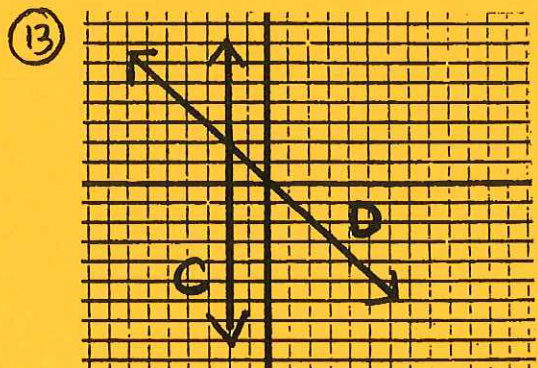
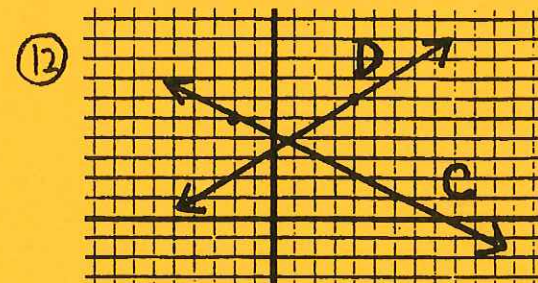
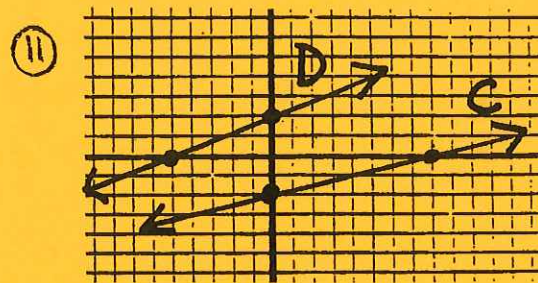
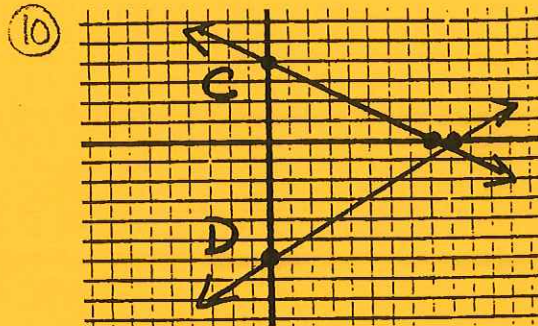
- D. $y = \frac{1}{3}x + 3$
y-int (0, 3)
x-int (-9, 0)
 $m = \frac{1}{3}$

- ⑧ C. $2x - y = -3$
y-int (0, 3)
x-int ($-\frac{3}{2}$, 0)
 $-\frac{A}{B} = 2$

- D. $4x - 8y = 1$
y-int (0, $-\frac{1}{8}$)
x-int ($\frac{1}{4}$, 0)
 $-\frac{A}{B} = \frac{1}{2}$

- ⑨ C. $y = -\frac{1}{3}x + \frac{32}{3}$

D. $y = \frac{3}{4}x + 11$



- ⑭ C. $3x + 2y = 2$
D. $x + 3y = 0$

- ⑮ C. $y = 3$
D. $y = -1$

- ⑯ C. $y - 7 = \frac{1}{4}(x + 4)$
D. $y - 2 = 3(x + 3)$

- ⑰ C. $x + 5y = 25$
D. $3x - y = 2$

- ⑱ C. $(-\frac{3}{2}, 4)$
D. (11, -3)

- ⑲ C. $16n^2 + 36n + 18$
D. $4n^2 - 28n + 48$

- ⑳ C. $y + 6 = x + 2$
-or-
 $y - 1 = x - 5$

- D. $y - 4 = -\frac{12}{5}(x + 2)$
-or-
 $y + 8 = -\frac{12}{5}(x - 3)$



9.1

Answer Key



① $3x + y = 6$ $m = -3$
 $x - y = 2$ $m = 1$

independent, consistent, 1

② $x + 2y = 5$ $m = -\frac{1}{2}$ $(0, \frac{5}{2})$
 $2x + 4y = 1$ $m = -\frac{1}{2}$ $(0, \frac{1}{4})$

independent, inconsistent, 0

③ $2x - 3y = -5$ $m = \frac{2}{3}$
 $x = 2$ $m = \text{undefined}$

independent, consistent, 1

④ $2x + 3y = 4$ $m = -\frac{2}{3}$ $(0, \frac{4}{3})$
 $4x + 6y = 8$ $m = -\frac{2}{3}$ $(0, \frac{4}{3})$

dependent, consistent, inf

⑤ $x + 2y = 6$ $m = -\frac{1}{2}$
 $y = \frac{1}{2}x + 3$ $m = -\frac{1}{2}$

dependent, consistent, inf

⑥ $x + y = 6$ $m = -1$
 $x - y = 2$ $m = 1$

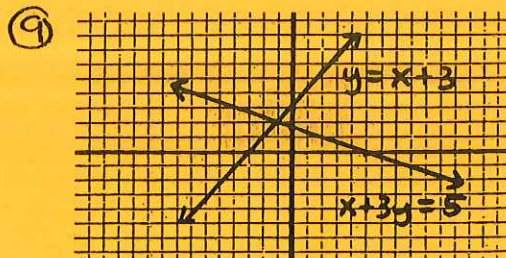
independent, consistent, 1

⑦ $9x - 4y = 2$ $m = \frac{9}{4}$
 $y = -x + 6$ $m = -1$

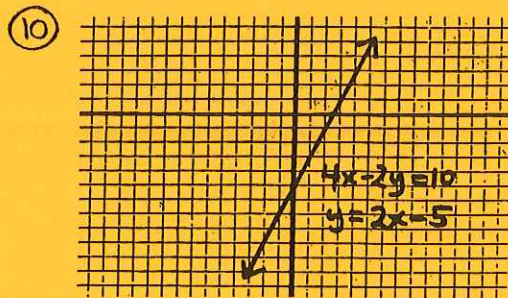
independent, consistent, 1

⑧ $y = -\frac{1}{2}x + 4$ $m = -\frac{1}{2}$ $(0, 4)$
 $3x + 6y = 24$ $m = -\frac{1}{2}$ $(0, 4)$

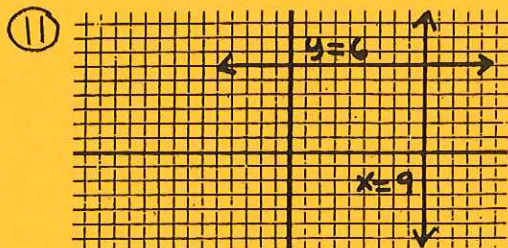
dependent, consistent, inf



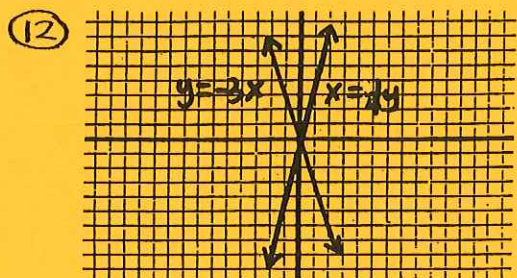
independent, consistent, 1



dependent, consistent, inf

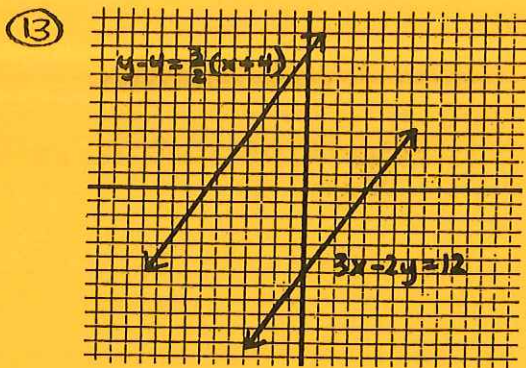


independent, consistent, 1



independent, consistent, 1





independent, inconsistent, 0

⑬

$$3x + y = 2$$

$$y = -3x + 2$$

$$2x - y = 1/2$$

$$2x - (-3x + 2) = 1/2$$

$$2x + 3x - 2 = 1/2$$

$$5x = 5/2$$

$$x = 1/2$$

$$y = -3x + 2$$

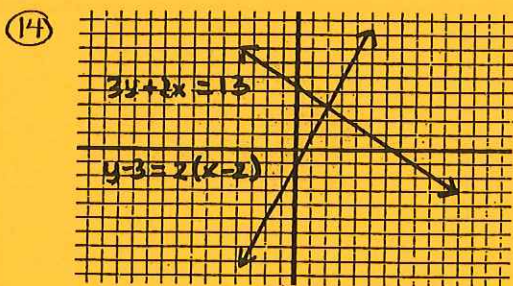
$$y = -3(1/2) + 2$$

$$y = -3/2 + 2$$

$$y = 1/2$$

$(1/2, 1/2)$

independent, consistent, 1



independent, consistent, 1

⑭

$$3x + y = 7$$

$$y = -3x + 7$$

$$10x - 3y = -2$$

$$10x - 3(-3x + 7) = -2$$

$$10x + 9x - 21 = -2$$

$$19x = 19$$

$$x = 1$$

$$y = -3x + 7$$

$$y = -3(1) + 7$$

$$y = -3 + 7$$

$$y = 4$$

$(1, 4)$

independent, consistent, 1

9.2

Answer Key

①

$$y = 3x$$

$$x + 2y = -21$$

$$x + 2(3x) = -21$$

$$x + 6x = -21$$

$$7x = -21$$

$$x = -3$$

$$y = 3x$$

$$y = 3(-3)$$

$$y = -9$$

$(-3, -9)$

independent, consistent, 1

②

$$y = 2x$$

$$x + 2y = 8$$

$$x + 2(2x) = 8$$

$$x + 4x = 8$$

$$5x = 8$$

$$x = 8/5$$

$$y = 2x$$

$$y = 2(8/5)$$

$$y = 16/5$$

$(8/5, 16/5)$

independent, consistent, 1

⑤

$$x + \frac{2}{3}y = 4$$

$$x = -\frac{2}{3}y + 4$$

$$3x + 2y = 14$$

$$3(-\frac{2}{3}y + 4) + 2y = 14$$

$$-2y + 12 + 2y = 14$$

$$12 = 14$$

false equation

no solutions:
parallel
independent
inconsistent

⑥

$$x + 2y = 3$$

$$x = -2y + 3$$

$$2x + 4y = 6$$

$$2(-2y + 3) + 4y = 6$$

$$-4y + 6 + 4y = 6$$

$$6 = 6$$

identity

inf. solutions:
one line
dependent, consistent



$$\begin{aligned} \textcircled{7} \quad & y-4=3(x+2) \\ & y-4=3x+6 \\ & y=3x+10 \\ & 6x-2y=12 \\ & 6x-2(3x+10)=12 \\ & 6x-6x-20=12 \\ & -20=12 \\ & \text{False equation} \end{aligned}$$

no solutions:
parallel
independent
inconsistent

$$\begin{aligned} y &= -2x+6 \\ x+y &= 2 \\ x+(-2x+6) &= 2 \\ x-2x+6 &= 2 \\ -x &= -4 \\ x &= 4 \end{aligned}$$

$$\begin{aligned} y &= -2x+6 \\ y &= -2(4)+6 \\ y &= -8+6 \\ y &= -2 \\ \boxed{(4, -2)} \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad & y = -2x+8 \\ x+\frac{1}{2}y &= 4 \\ x+\frac{1}{2}(-2x+8) &= 4 \\ x-x+4 &= 4 \\ 4 &= 4 \\ \text{identity} \end{aligned}$$

inf.
Solutions:
one line
dependent
consistent

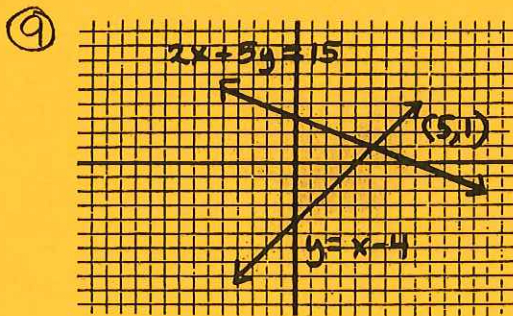
9.3

Answer Key



$$\begin{aligned} \textcircled{1} \quad & x+y=7 \\ & x-y=9 \\ \hline & 2x = 16 \\ & x=8 \end{aligned}$$

$$\begin{aligned} x+y &= 7 \\ (8)+y &= 7 \\ y &= -1 \\ \boxed{(8, -1)} \end{aligned}$$



$$\begin{aligned} y &= x-4 \\ 2x+5y &= 15 \\ 2x+5(x-4) &= 15 \\ 2x+5x-20 &= 15 \\ 7x-20 &= 15 \\ 7x &= 35 \\ x &= 5 \end{aligned}$$

$$\begin{aligned} y &= x-4 \\ y &= (5)-4 \\ y &= 1 \\ \boxed{(5, 1)} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & 2x-3y=-4 \\ x &= 7-3y \quad \text{mult by } -2 \end{aligned}$$

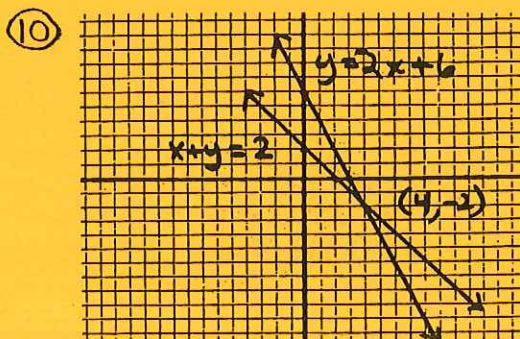
$$\begin{aligned} 2x-3y &= -4 \\ -2x+6y &= -4 \\ \hline -9y &= -18 \\ y &= 2 \end{aligned}$$

$$\begin{aligned} x &= 7-3y \\ x &= 7-3(2) \\ x &= 1 \\ \boxed{(1, 2)} \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & 3x+3y=6 \\ 2x-y &= 1 \quad \text{mult by } 3 \end{aligned}$$

$$\begin{aligned} 3x+3y &= 6 \\ 6x-3y &= 3 \\ \hline 9x &= 9 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 2x-y &= 1 \\ 2(1)-y &= 1 \\ y &= 1 \\ \boxed{(1, 1)} \end{aligned}$$



$$\begin{aligned} \textcircled{4} \quad & x-5y=0 \\ 2x-3y &= 7 \quad \text{mult by } -2 \end{aligned}$$

$$\begin{aligned} -2x+10y &= 0 \\ 2x-3y &= 7 \\ \hline 7y &= 7 \\ y &= 1 \end{aligned}$$

$$\begin{aligned} x-5(1) &= 0 \\ x-5 &= 0 \\ x &= 5 \\ \boxed{(5, 1)} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad 5x+3y &= 10 && \text{mult by 3} \\ 6x-9y &= 12 \\ \hline 15x+9y &= 30 \\ 6x-9y &= 12 \\ \hline 21x &= 42 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} 5x+3y &= 10 \\ 5(2)+3y &= 10 \\ 3y &= 0 \\ y &= 0 \\ \boxed{(2,0)} \end{aligned}$$

$$\begin{aligned} \textcircled{10} \quad x &= 2y \\ x+18 &= 4y-4 \\ (2y)+18 &= 4y-4 \\ -2y &= -22 \\ y &= 11 \end{aligned}$$

$$\begin{aligned} x &= 2y \\ x &= 2(11) \\ x &= 22 \\ \boxed{(22,11)} \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad 9x+8y &= 7 && \text{mult by -2} \\ 18x-14 &= 16y \\ -18x-16y &= -14 \\ \hline 18x-16y &= 14 \\ -32y &= 0 \\ y &= 0 \end{aligned}$$

$$\begin{aligned} 9x+8y &= 7 \\ 9x+8(0) &= 7 \\ 9x &= 7 \\ x &= 7/9 \\ \boxed{(7/9, 0)} \end{aligned}$$

	now	in 10
Layla	x	x+10
Diana	y	y+10

$$\begin{aligned} x &= 3y \\ x+10 &= 2(y+10) \\ (3y)+10 &= 2y+20 \\ y &= 10 \end{aligned}$$

$$\begin{aligned} x &= 3y \\ x &= 3(10) \\ x &= 30 \\ \boxed{\text{Layla is 30 yrs old}} \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad \frac{1}{3}x-y &= 0 && \text{mult by 3} \\ \frac{1}{5}x+\frac{2}{5}y &= 1 && \text{mult by -5} \\ \hline x-3y &= 0 \\ -x-2y &= -5 \\ \hline -5y &= -5 \\ y &= 1 \end{aligned}$$

$$\begin{aligned} x-3y &= 0 \\ x-3(1) &= 0 \\ x &= 3 \\ \boxed{(3,1)} \end{aligned}$$

$$\textcircled{12} \quad \begin{array}{|c|} \hline y \\ \hline x \end{array}$$

$$\begin{aligned} y &= 2x-1 \\ 2x+2y &= 40 \\ 2x+2(2x-1) &= 40 \\ 2x+4x-2 &= 40 \\ 6x &= 42 \\ x &= 7 \quad y = 13 \end{aligned}$$

$$\boxed{7 \text{ by } 13 \text{ cm}}$$

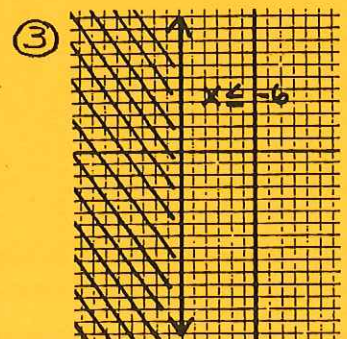
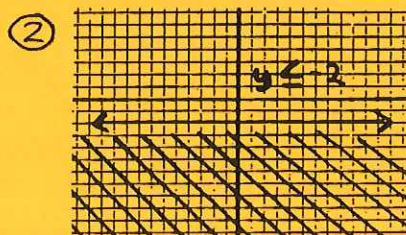
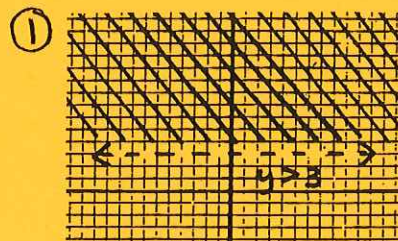
$$\begin{aligned} \textcircled{8} \quad \frac{1}{8}(x+y) &= 1 && \text{mult by 8} \\ x-y &= 4 \\ x+y &= 8 \\ \hline x-y &= 4 \\ 2x &= 12 \\ x &= 6 \end{aligned}$$

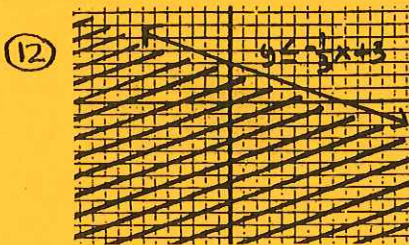
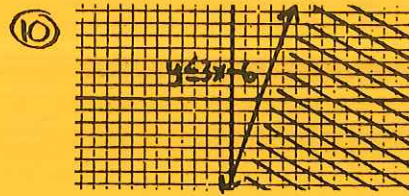
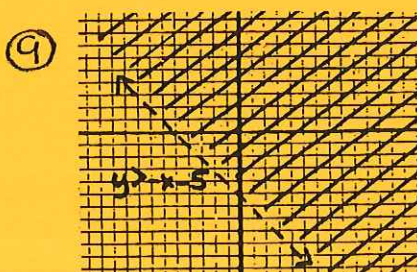
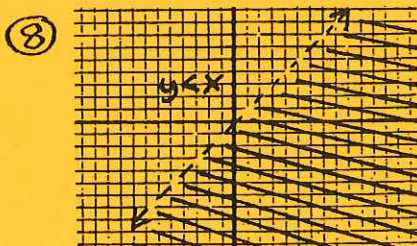
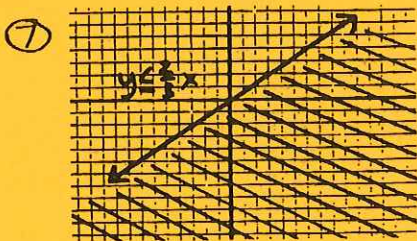
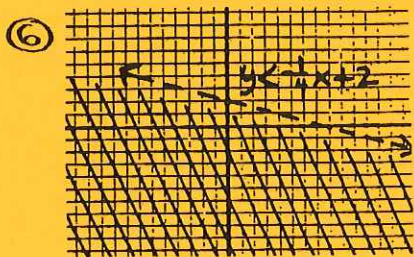
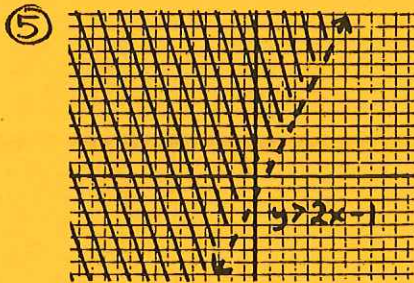
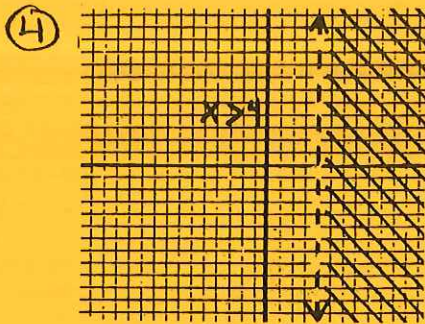
$$\begin{aligned} x-y &= 4 \\ (6)-y &= 4 \\ -y &= -2 \\ y &= 2 \\ \boxed{(6,2)} \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad x-y &= 4 \longrightarrow x = 4+y \\ 2x &= 3(y+2) \\ 2(4+y) &= 3(y+2) \\ 8+2y &= 3y+6 \\ -y &= -2 \\ y &= 2 \\ x &= 4+y \\ x &= 4+(2) \\ x &= 6 \\ \boxed{(6,2)} \end{aligned}$$

9.4

Answer Key





⑬ $y = \frac{1}{4}x - 3$ $m = \frac{1}{4}$ $(0, -3)$
 $x - 4y = 12$ $m = \frac{1}{4}$ $(0, -3)$

dependent,
consistent, inf

⑭ $y - 3 = 2(x + 4)$ $m = 2$ $(0, 11)$
 $2x - y = 6$ $m = 2$ $(0, -6)$
 $\rightarrow y = 2(x + 4) + 3$ $y = 11$

independent,
inconsistent, 0

⑮ $x + 2y = 3$ $m = -\frac{1}{2}$
 $y = \frac{2}{3}x + 4$ $m = \frac{2}{3}$

independent,
consistent, 1

⑯ $2x - 3y = 15$
 $3x - y = 12$ mult by -3
 $2x - 3y = 15$
 $-9x + 3y = -36$
 $\hline -7x = -21$
 $x = 3$

$3x - y = 12$
 $3(3) - y = 12$
 $9 - y = 12$
 $y = -3$
 $(3, -3)$

⑰ $2x + 6y = 12$
 $y = -\frac{1}{3}x + 2$ $\frac{1}{3}x + y = 2$ mult by -6
 $2x + 6y = 12$
 $-2x - 6y = -12$
 $\hline 0 = 0$ same line

infinite number
of solutions

I COULD BE KING
OF THE JUNGLE

IF I WANTED
TO BE



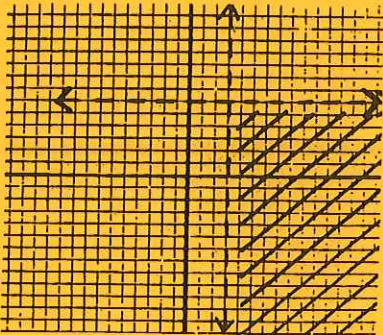
AND IF THE JUNGLE
HAD AIR CONDITIONING



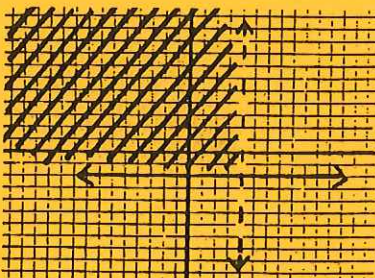
9.5

Answer Key

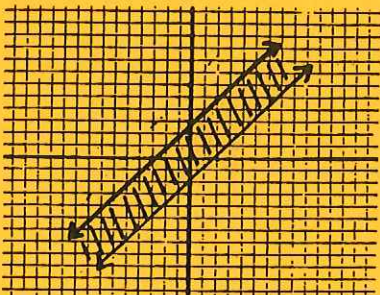
① $x > 3$
 $y < 6$



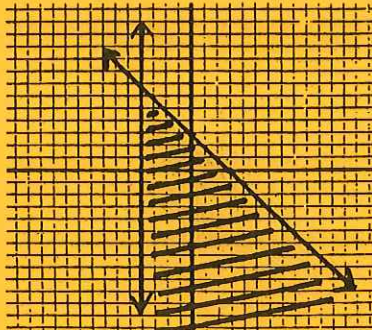
② $y \geq -2$
 $x < 4$



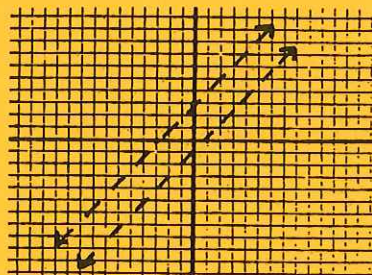
③ $y \leq x + 3$
 $y \geq x - 2$



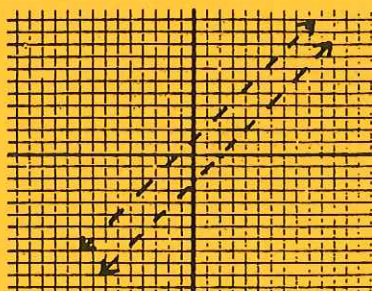
④ $x \geq -4$
 $y \leq -x + 3$



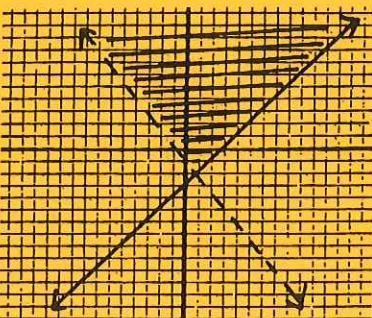
⑤ $y > x + 3$
 $y < x - 1$ no solutions



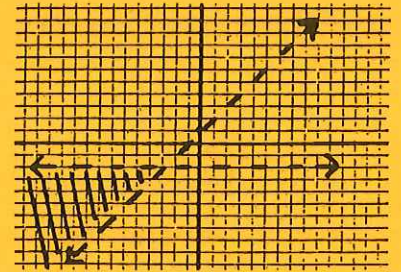
⑥ $y > x + 3/2$
 $y < x - 2$ no solutions



⑦ $y \geq x - 3$
 $y > -x - 1$



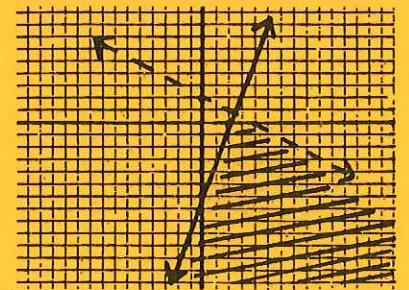
⑧ $y - x > 1 \rightarrow y > x + 1$
 $y < -2$



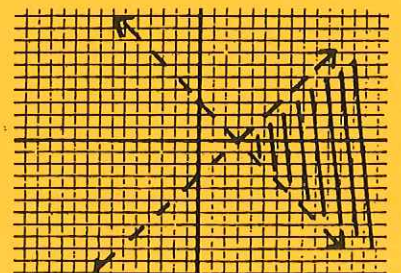
9.6

Answer Key

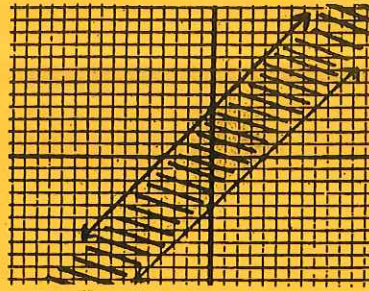
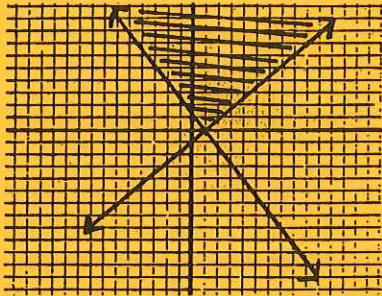
① $y < -1/2x + 2$
 $y \leq 3x - 6$



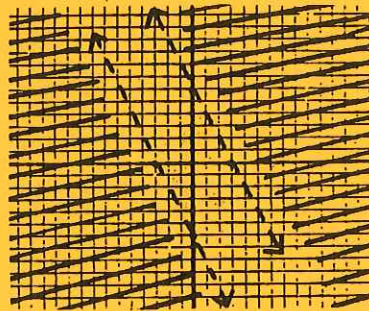
② $|y| + 3 < x$
 $|y| < x - 3$
 $y < x - 3$ and $y > -x + 3$



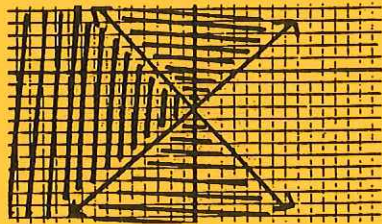
③ $|x-1| \leq y$
 $x-1 \leq y$ and $x-1 \geq -y$
 $y \geq x-1$ and $-y \leq x-1$
 $y \geq x-1$ and $y \geq -x+1$



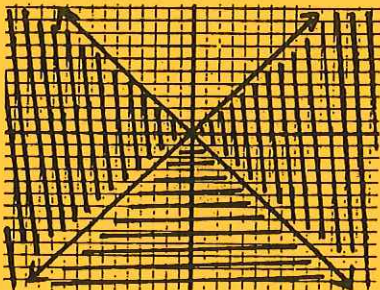
⑦ $|2x+y| > 6$
 $2x+y > 6$ or $2x+y < -6$
 $y > -2x+6$ or $y < -2x-6$



④ $|y+3| \geq x$
 $y+3 \geq x$ or $y+3 \leq -x$
 $y \geq x-3$ or $y \leq -x-3$



⑤ $|x| \geq y$
 $x \geq y$ or $x \leq -y$
 $y \leq x$ or $-y \geq x$
 $y \leq x$ or $y \leq -x$



⑥ $|y-x| \leq 4$
 $y-x \leq 4$ and $y-x \geq -4$
 $y \leq x+4$ and $y \geq x-4$



⑧ $y \geq 3$
 $x \leq -2$

⑨ $x \leq -4$
 $y \leq -\frac{1}{2}x - 5$

⑩ $x < -2$
 $y < x$

⑪ $y < \frac{1}{2}x + 3$
 $y > \frac{1}{2}x - 3$

OR MAYBE NOT...



9.7

Answer Key

① 2 digit number = tu
 $t+u=13$ $t=13-u$
 $2t=5u-2$
 $2(13-u)=5u-2$ ←
 $26-2u=5u-2$
 $-7u=-28$
 $u=4$
 $t=13-u$
 $t=13-(4)$
 $t=9$ **94**

② 2 digit number = tu
 $t=u+6$
 $10t+u=8(t+u)+2$
 $10t+u=8t+8u+2$
 $2t-7u=2$
 $2(u+6)-7u=2$
 $2u+12-7u=2$
 $-5u=-10$
 $u=2$
 $t=u+6$ $t=8$ **82**

③ 2 digit number = tu

$$t + u = 12$$

$$u = 2t$$

$$t + (2t) = 12$$

$$3t = 12$$

$$t = 4$$

$$u = 2(4)$$

$$u = 8 \quad \boxed{48}$$

④ 2 digit number = tu

$$u = 2t + 1$$

$$t + u = 7$$

$$t + (2t + 1) = 7$$

$$3t + 1 = 7$$

$$3t = 6$$

$$t = 2$$

$$u = 2(2) + 1$$

$$u = 5 \quad \boxed{25}$$

⑤ 2 digit number = tu

$$t + u = 12 \quad t = 12 - u$$

$$10u + t = 10t + u - 18$$

$$9u - 9t = -18$$

$$u - t = -2$$

$$u - (12 - u) = -2$$

$$2u = 10$$

$$u = 5$$

$$t = 12 - (5)$$

$$t = 7 \quad \boxed{75}$$

⑥ 2 digit number = tu

$$t + u = 7 \quad t = 7 - u$$

$$10u + t = 4(10t + u) - 3$$

$$10u + t = 40t + 4u - 3$$

$$6u - 39t = -3$$

$$6u - 39(7 - u) = -3$$

$$6u - 273 + 39u = -3$$

$$45u = 270$$

$$u = 6$$

$$t = 7 - (6)$$

$$t = 1 \quad \boxed{16}$$

⑦ 2 digit number = tu

$$10t + u = 7u$$

$$(10t + u) + 18 = 10u + t$$

$$9t - 9u = -18$$

$$t - u = -2$$

$$t = u - 2$$

$$10(u - 2) + u = 7u$$

$$10u - 20 + u = 7u$$

$$4u = 20$$

$$u = 5$$

$$t = (5) - 2$$

$$t = 3 \quad \boxed{35}$$

⑧ 2 digit number = tu

$$t + u = 9 \quad t = 9 - u$$

$$(10t + u) - 45 = 10u + t$$

$$9t - 9u = 45$$

$$t - u = 5$$

$$(9 - u) - u = 5$$

$$9 - 2u = 5$$

$$-2u = -4$$

$$u = 2$$

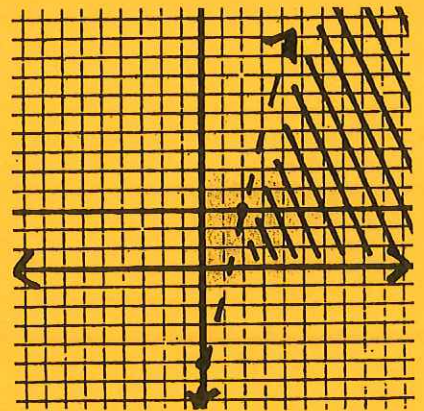
$$t = 9 - (2)$$

$$t = 7 \quad \boxed{72}$$

⑨ $4x - y > 8$

$$-y > -4x + 8$$

$$y < 4x - 8 \quad \text{and} \quad y \geq -3$$



⑩ $|2x - y| < 4$

$$2x - y < 4 \quad \text{and} \quad 2x - y > -4$$

$$-y < -2x + 4 \quad \text{and} \quad -y > -2x - 4$$

$$y > 2x - 4 \quad \text{and} \quad y < 2x + 4$$



9.8

Answer Key

① with wind $\frac{R}{rtw} \cdot \frac{I}{\frac{2}{3}} = \frac{D}{300}$
 against $r - w \quad \frac{3}{4} \quad 300$

$$\frac{2}{3}r + \frac{2}{3}w = 300 \quad \div \frac{2}{3}$$

$$\frac{3}{4}r - \frac{3}{4}w = 300 \quad \div \frac{3}{4}$$

plane	425 mph
wind	25 mph

CLICK!



$$r + w = 450$$

$$r - w = 400$$

$$2r = 850$$

$$r = 425$$

$$w = 25$$

② $\frac{R}{\text{with wind } r+w} \cdot \frac{T}{3} = \frac{D}{1800}$
 $\frac{R}{\text{against } r-w} \cdot \frac{T}{4} = \frac{D}{2000}$

$$3r+3w = 1800 \div 3 \quad r+w=600$$

$$4r-4w = 2000 \div 4 \quad r-w=500$$

$$2r = 1100$$

$$r = 550$$

$$w = 50$$

Plane 550 mph
wind 50 mph

③ $x = \text{pounds of } \$.80 \text{ candy}$
 $y = \text{pounds of } \$1.50 \text{ candy}$

$$x+y=20$$

$$x=20-y$$

$$.8x+1.5y=20(1.01)$$

$$8x+15y=202$$

$$8(20-y)+15y=202$$

$$160-8y+15y=202$$

$$7y=42$$

$$y=6$$

$$x=20-(6)=14$$

14 pounds @ \$.80

④ $x = \text{small ones}$
 $y = \text{large ones}$

$$x+y=30$$

$$x=30-y$$

$$20x+35y=750$$

$$20(30-y)+35y=750$$

$$600-20y+35y=750$$

$$15y=150$$

$$y=10$$

$$x=30-(10)=20$$

20 small, 10 large

⑤ $\frac{R}{\text{walking } x} \cdot \frac{T}{4} = \frac{D}{4x}$
 $\frac{R}{\text{riding } y} \cdot \frac{T}{1} = \frac{D}{y}$

$$y=x+6$$

$$y=4x$$

$$(x+6)=4x \quad y=4(2)=8$$

$$-3x=-6$$

$$x=2$$

rides 8 mph

⑥ $x = \text{investment @ 10\%}$
 $y = \text{investment @ 12\%}$

$$x+y=4000$$

$$x=4000-y$$

$$.10x+.12y=460$$

$$10x+12y=46000$$

$$10(4000-y)+12y=46000$$

$$40000-10y+12y=46000$$

$$2y=6000$$

$$y=3000$$

$$x=4000-(3000)=1000$$

\$1000 @ 10%, \$3000 @ 12%

⑦ 2 digit number = tu

$$t=u+4$$

$$(10t+u)+(10u+t)=154$$

$$11t+11u=154$$

$$11(u+4)+11u=154$$

$$11u+44+11u=154$$

$$22u=110$$

$$u=5$$

$$t=(5)+4=9$$

95

⑧ $4x-y=6$ slope $-\frac{A}{B}=4$
 $y=-4x+3$ slope $m=-4$

independent, consistent, 1

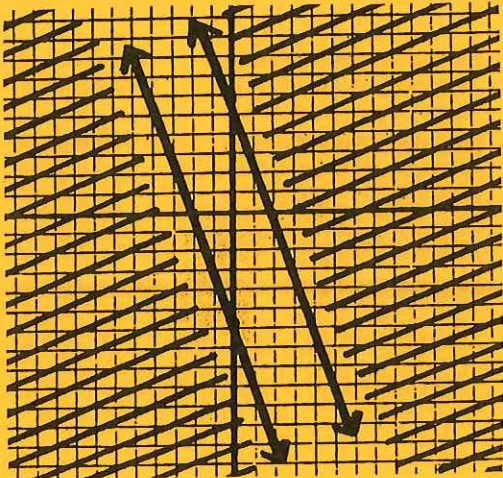


⑨ $|3x+y| + 1 \geq 7$

$3x+y \geq 6$

$3x+y \geq 6$ or $3x+y \leq -6$

$y \geq -3x+6$ or $y \leq -3x-6$



⑬ $p =$ pounds of peanuts
 $a =$ pounds of almonds

$p+a=30$

$p=30-a$

$1.65p+2.10a=1.83(30)$

$1.65p+2.1a=54.9$

$165p+210a=5490$

$165(30-a)+210a=5490$

$45a=540$

$a=12$

$p=30-(12)=18$

12 lbs almonds
 18 lbs peanuts

⑩ $y \leq 6$ and $y \geq 2x+6$

⑪ $\frac{R}{\text{with wind}} \cdot \frac{T}{r+w} = \frac{D}{3/4} = 300$
 against $r-w \cdot \frac{1}{2} = 150$

$3/4 r + 3/4 w = 300 \div 3/4$

$1/2 r - 1/2 w = 150 \div 1/2$

$r+w=400$

$r-w=300$

$2r=700$

$r=350$

$w=50$

Plane
 350 mph
 wind
 50 mph

⑫ $\frac{R}{\text{downstream}} \cdot \frac{T}{r+c} = \frac{D}{4} = 48$
 upstream $r-c \cdot 6 = 48$

$4r+4c=48 \div 4$

$6r-6c=48 \div 6$

$r+c=12$

$r-c=8$

$2r=20$

$r=10$

$c=2$

boat
 10 mph
 current
 2 mph

⑭ $a =$ apples
 $\sigma =$ oranges

$a+\sigma=35$

$a=35-\sigma$

$.60a+.45\sigma=18$

$60a+45\sigma=1800$

$60(35-\sigma)+45\sigma=1800$

$2100-60\sigma+45\sigma=1800$

$-15\sigma=-300$

$\sigma=20$

$a=35-(20)=15$



20 oranges
 15 apples

⑮ $\frac{R}{\text{run}} \cdot \frac{T}{r} = \frac{D}{2} = 2r$
 skate $s \cdot 3/2 = 3/2 s$

$s=r+2$

$2r=3/2 s$

$2r=3/2 (r+2)$

$2r=3/2 r+3$

$4r=3r+6$

$r=6$

run
 6 mph



⑩ $x = \$ \text{invested @ 8\%}$
 $y = \$ \text{invested @ 12\%}$

$x + y = 6000$
 $x = 6000 - y$

$x(.08) + y(.12) = 640$
 $8x + 12y = 64,000$

$8(6000 - y) + 12y = 64,000$

$48,000 - 8y + 12y = 64,000$

$4y = 16,000$

$y = 4000$

$x = 6000 - (4000) = 2000$

$\$2000 @ 8\%$, $\$4000 @ 12\%$

⑪ 2 digit number = tu

$t = u + 3$

$(10u + t) + (10t + u) = 99$

$11u + 11t = 99$

$11u + 11(u + 3) = 99$

$11u + 11u + 33 = 99$

$22u = 66$

$u = 3$

$t = (3) + 3 = 6$

$\boxed{63}$

⑫ $y = \frac{2}{3}x + 3$ slope $\frac{2}{3}$ $(0, 3)$

$2x + 3y = 5$ slope $\frac{2}{3}$ $(0, \frac{5}{3})$

parallel lines

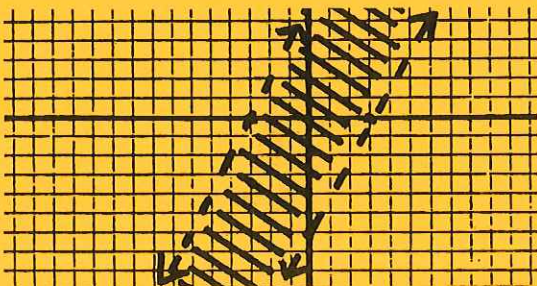
$\boxed{\text{independent, inconsistent, } 0}$

⑬ $|2x - y| < 6$

$2x - y < 6$ and $2x - y > -6$

$-y > -2x + 6$ and $-y > -2x - 6$

$y > 2x - 6$ and $y < 2x + 6$



⑭ $x < -3$ and $y > \frac{1}{2}x + 3$

Unit 9 REVIEW Answer Key



① $y = \frac{2}{3}x + 4$ slope $\frac{2}{3}$

$2x + 3y = 6$ slope $-\frac{2}{3}$

$\boxed{\text{independent, consistent, } 1}$

② $x - 4y = 8$ slope $\frac{1}{4}$ $(0, -2)$

$y = \frac{1}{4}x - 2$ slope $\frac{1}{4}$ $(0, -2)$

Same line

$\boxed{\text{dependent, consistent, inf}}$

③ $y = -3x + 5$ slope -3 $(0, 5)$

$3x + y = 7$ slope -3 $(0, 7)$

parallel lines

$\boxed{\text{independent, inconsistent, } 0}$

④ $y - 2 = 3(x + 2)$ slope 3

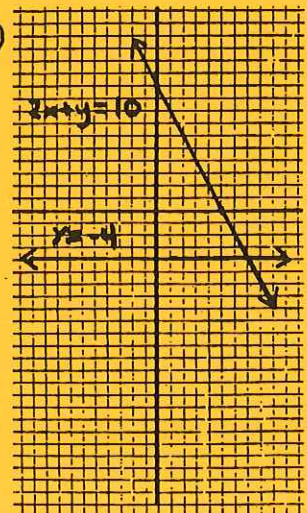
$y = \frac{1}{3}x + 1$ slope $\frac{1}{3}$

$\boxed{\text{independent, consistent, } 1}$

⑤



⑥



$$\begin{aligned} \textcircled{7} \quad y &= 2x + 1 \\ 3x - y &= -4 \\ 3x - (2x + 1) &= -4 \\ 3x - 2x - 1 &= -4 \\ x - 1 &= -4 \\ x &= -3 \\ y &= 2(-3) + 1 = -5 \\ \boxed{(-3, -5)} \end{aligned}$$

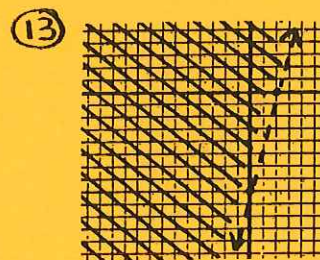
$$\begin{aligned} \textcircled{8} \quad 2x &= 4y \\ x &= 2y \\ 3x - 2y &= 8 \\ 3(2y) - 2y &= 8 \\ 6y - 2y &= 8 \\ 4y &= 8 \\ y &= 2 \\ x &= 2(2) = 4 \\ \boxed{(4, 2)} \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad 3x + y &= -2 \quad \times 3 \\ 4x + 3y &= 4 \\ -9x - 3y &= 6 \\ 4x + 3y &= 4 \\ \hline -5x &= 10 \\ x &= -2 \\ 3(-2) + y &= -2 \\ y &= 4 \\ \boxed{(-2, 4)} \end{aligned}$$

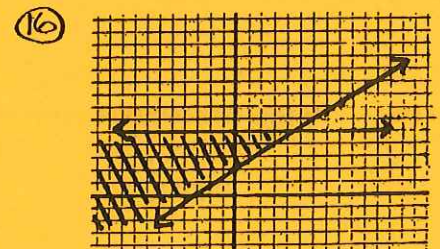
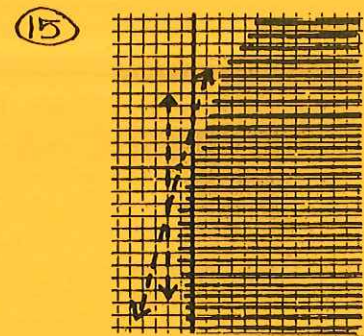
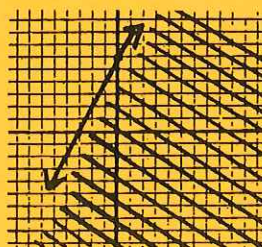
$$\begin{aligned} \textcircled{10} \quad 2x - 5y &= 16 \quad \times -3 \\ 3x + 2y &= 5 \quad \times 2 \\ -6x + 15y &= -48 \\ 6x + 4y &= 10 \\ \hline 19y &= -38 \\ y &= -2 \\ 3x + 2(-2) &= 5 \\ 3x - 4 &= 5 \\ 3x &= 9 \\ x &= 3 \\ \boxed{(3, -2)} \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad \frac{1}{3}x + \frac{1}{3}y &= 5 \quad \times 6 \\ \frac{2}{3}x - \frac{2}{3}y &= -2 \quad \times 3 \\ 2x + 2y &= 30 \\ 2x - 2y &= -6 \\ \hline 4x &= 24 \\ x &= 6 \\ 2(6) + 2y &= 30 \\ 12 + 2y &= 30 \\ 2y &= 18 \\ y &= 9 \\ \boxed{(6, 9)} \end{aligned}$$

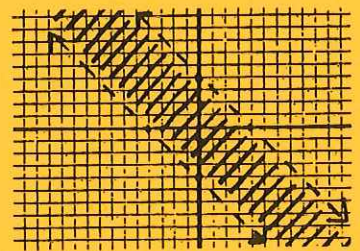
$$\begin{aligned} \textcircled{12} \quad \frac{1}{2}x + 2y &= -10 \quad \times 2 \\ \frac{1}{4}x - \frac{1}{4}y &= 5 \quad \times -4 \\ x + 4y &= -20 \\ -x + y &= -20 \\ \hline 5y &= -40 \\ y &= -8 \\ x + 4(-8) &= -20 \\ x - 32 &= -20 \\ x &= 12 \\ \boxed{(12, -8)} \end{aligned}$$



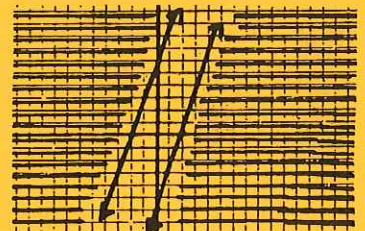
$$\begin{aligned} \textcircled{14} \quad 2x - y &\geq -6 \\ -y &\geq -2x - 6 \\ y &\leq 2x + 6 \end{aligned}$$



$$\begin{aligned} \textcircled{17} \quad |x + y| &< 4 \\ x + y &< 4 \quad \text{and} \quad x + y > -4 \\ y &< -x + 4 \quad \text{and} \quad y > -x - 4 \end{aligned}$$



$$\begin{aligned} \textcircled{18} \quad |3x - y| &\geq 6 \\ 3x - y &\geq 6 \quad \text{or} \quad 3x - y \leq -6 \\ y &\leq 3x - 6 \quad \text{or} \quad y \geq 3x + 6 \end{aligned}$$



$$\textcircled{19} \quad \begin{cases} y \geq -2x + 6 \\ y \geq -3 \end{cases}$$

$$\textcircled{20} \quad \begin{cases} y < -\frac{1}{4}x - 2 \\ x < -4 \end{cases}$$

②1 2 digit number = tu

$$t + u = 11$$

$$u = 4t + 1$$

$$t + (4t + 1) = 11$$

$$5t = 10$$

$$t = 2$$

$$u = 4(2) + 1 = 9$$

29

②2 2 digit number = tu

$$t + u = 9$$

$$t = 2u - 3$$

$$(2u - 3) + u = 9$$

$$3u - 3 = 9$$

$$3u = 12$$

$$u = 4$$

$$t = 2(4) - 3 = 5$$

54

②3 2 digit number = tu

$$u = 2t - 12$$

$$10u + t = (10t + u) - 45$$

$$9u - 9t = -45 \div 9$$

$$u - t = -5$$

$$(2t - 12) - t = -5$$

$$t - 12 = -5$$

$$t = 7$$

$$u = 2(7) - 12 = 2$$

72

②4 2 digit number = tu

$$u = 2t$$

$$10u + t = 2(10t + u) - 9$$

$$10u + t = 20t + 2u - 9$$

$$8u - 19t = -9$$

$$8(2t) - 19t = -9$$

$$-3t = -9$$

36

$$t = 3 \quad u = 2(3) = 6$$

②5

	$\frac{R}{r+c}$	\times	$\frac{T}{3}$	$=$	$\frac{D}{60}$
downstream	$r+c$	\times	3	$=$	60
upstream	$r-c$	\times	6	$=$	60

$$3r + 3c = 60 \div 3$$

$$r + c = 20$$

$$6r - 6c = 60 \div 6$$

$$r - c = 10$$

$$2r = 30$$

$$r = 15$$

$$c = 5$$

**boat 15 mph
current 5 mph**

②6

	$\frac{R}{r+w}$	\times	$\frac{T}{3\frac{1}{2}}$	$=$	$\frac{D}{600}$
with wind	$r+w$	\times	$3\frac{1}{2}$	$=$	600
against wind	$r-w$	\times	2	$=$	600

$$3\frac{1}{2}r + 3\frac{1}{2}w = 600 \div 3\frac{1}{2}$$

$$r + w = 400$$

$$2r - 2w = 600 \div 2$$

$$r - w = 300$$

$$2r = 700$$

$$r = 350$$

$$w = 50$$

**plane 350 mph
wind 50 mph**

②7

$$x = \$ \text{ invested @ } 6\%$$

$$y = \$ \text{ invested @ } 10\%$$

$$x + y = 12,000$$

$$x = 12,000 - y$$

$$.06x = .10y + 80$$

$$6x = 10y + 8000$$

$$6(12,000 - y) = 10y + 8000$$

$$72,000 - 6y = 10y + 8000$$

$$-16y = -64,000$$

$$y = 4000$$

$$x = 12,000 - (4000)$$

**\$4000 @ 10%
\$8000 @ 6%**



②8

$$x = \$ \text{ invested @ } 8\%$$

$$y = \$ \text{ invested @ } 12\%$$

$$x + y = 6400 \rightarrow x = 6400 - y$$

$$.08x + .12y = 712$$

$$8x + 12y = 71,200$$

$$8(6400 - y) + 12y = 71,200$$

$$51,200 - 8y + 12y = 71,200$$

$$4y = 20,000$$

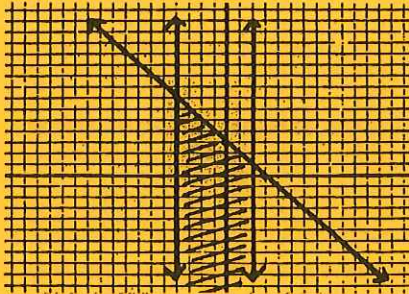
$$y = 5000$$

$$x = 6400 - (5000)$$

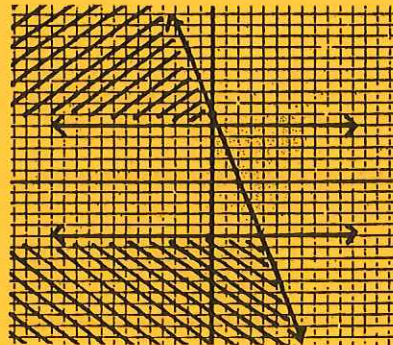
$$x = 1400$$

**\$5000 @ 12%
\$1400 @ 8%**

②⑨ $|x+1| \leq 3$
 $x+1 \leq 3$ and $x+1 \geq -3$
 $x \leq 2$ and $x \geq -4$
 $(-4 \leq x \leq 2)$ and $x+y \leq 3$
 $(-4 \leq x \leq 2)$ and $(y \leq -x+3)$



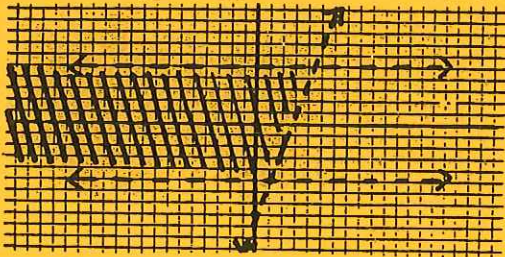
③⑩ $|y| \geq 5$
 $(y \geq 5$ or $y \leq -5)$ and $3x+y \leq 6$
 $(y \geq 5$ or $y \leq -5)$ and $(y \leq -3x+6)$



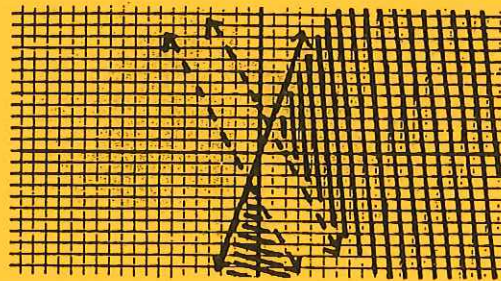
AB. VALUE GRAPHING



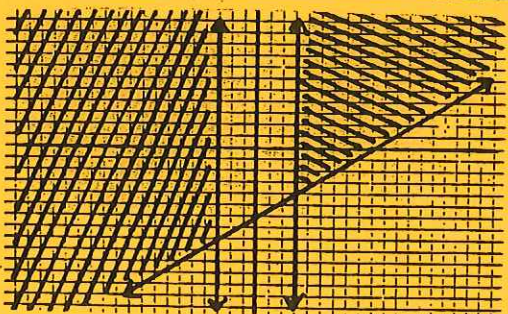
① $|y-3| < 2$
 $|y| < 5$
 $(y < 5$ and $y > -5)$ and $(y > 3x-8)$
 $(-5 < y < 5)$ and $(y > 3x-8)$



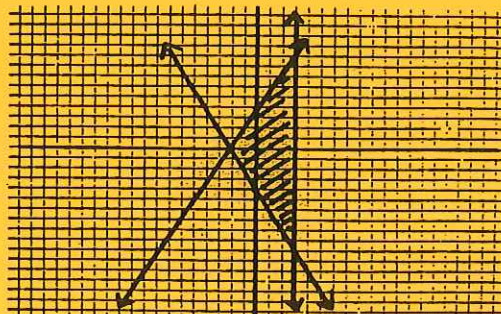
③ $|2x+y| > 4$
 $2x+y > 4$ or $2x+y < -4$
 $(y > -2x+4$ or $y < -2x-4)$ and $(y \leq 3x)$



② $|x|+4 \geq 7$
 $|x| \geq 3$
 $(x \geq 3$ or $x \leq -3)$ and $(y \geq \frac{2}{3}x-6)$

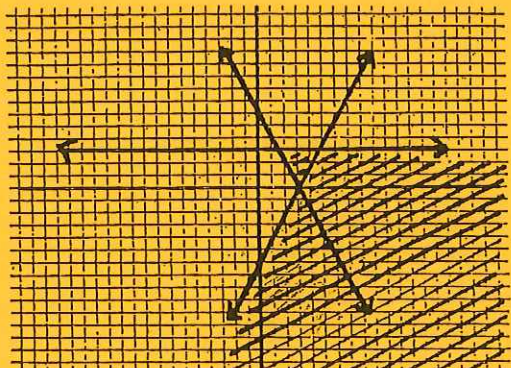


④ $|y| \leq 2x+4$
 $(y \leq 2x+4$ and $y \geq -2x-4)$ and $(x \leq 3)$



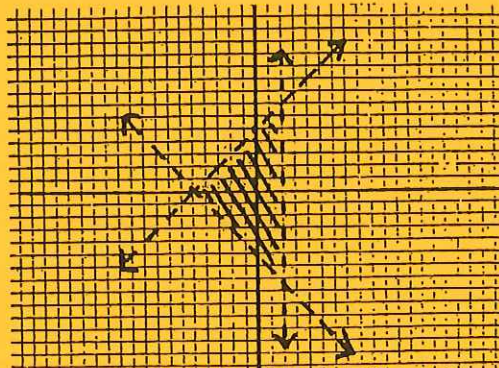
$$\textcircled{5} |y| \geq -2x + 6$$

$$(y \geq -2x + 6 \text{ or } y \leq 2x - 6) \text{ and } (y \leq 3)$$



$$\textcircled{6} |y| < x + 5$$

$$(y < x + 5 \text{ and } y > -x - 5) \text{ and } (x < 2)$$



Unit 9

SKILL CHECK - ANSWER KEY

$$\textcircled{1} y = \frac{2}{5}x - 4 \quad \text{slope } \frac{2}{5} \quad (0, -4)$$

$$2x - 5y = 20 \quad \text{slope } \frac{2}{5} \quad (0, -4)$$

Same line

dependent, consistent, inf

$$\textcircled{2} 3x - 2y = 4 \quad \text{slope } \frac{3}{2}$$

$$y = \frac{2}{3}x + 1 \quad \text{slope } \frac{2}{3}$$

independent, consistent, 1

$$\textcircled{3} y = 3x + 1 \quad y = 3(3) + 1$$

$$5x - 2y = 1 \quad y = -8$$

$$5x - 2(3x + 1) = 1$$

$$5x - 6x - 2 = 1$$

$$x = -3$$

(-3, -8)

$$\textcircled{4} 4x - 3y = 3 \quad \times 3$$

$$3x - 5y = 16 \quad \times -4$$

$$12x - 9y = 9$$

$$-12x + 20y = -64$$

$$\hline 11y = -55$$

$$y = -5$$

$$4x - 3(-5) = 3$$

$$4x + 15 = 3$$

$$4x = -12$$

(-3, -5)

$$\textcircled{5} \frac{4}{5}x + \frac{1}{5}y = 12 \quad \times 5$$

$$\frac{3}{2}x - \frac{1}{2}y = 5 \quad \times 2$$

$$4x + y = 60$$

$$3x - y = 10$$

$$7x = 70$$

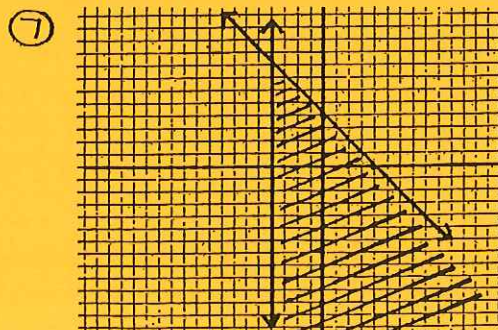
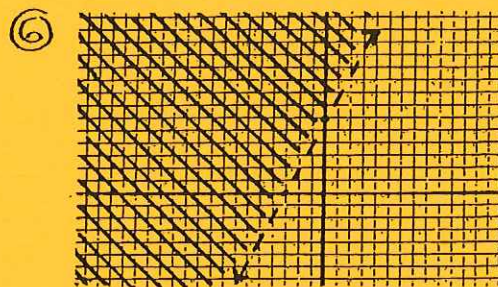
$$x = 10$$

$$3(10) - y = 10$$

$$30 - y = 10$$

$$y = 20$$

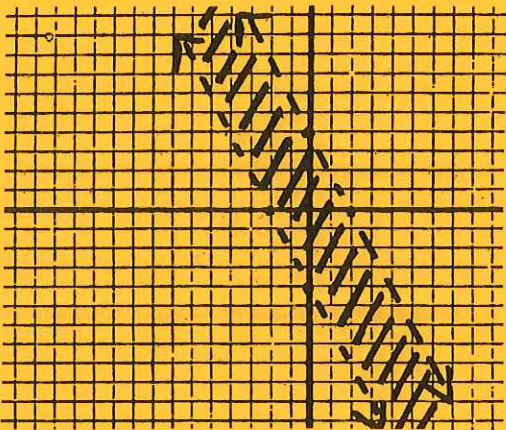
(10, 20)



⑧ $|2x+y| < 4$

$2x+y < 4$ and $2x+y > -4$

$(y < -2x+4)$ and $(y > -2x-4)$



⑨ $x < -6$ and $y < x+3$

⑩ 2 digit number = tu

$t = 2u$

$10t+u = 2(10u+t) - 12$

$10t+u = 20u+2t-12$

$8t-19u = -12$

$8(2u)-19u = -12$

$16u-19u = -12$

$-3u = -12$

$u = 4$

$t = 2(4) = 8$

84

⑪ $R \times T = D$

upstream $r-c \times 5 = 30$

downstream $r+c \times 2 = 28$

$5r-5c = 30 \quad \div 5$

$2r+2c = 28 \quad \div 2$

$r-c = 6$

$r+c = 14$

$2r = 20$

$r = 10$

$c = 4$

boat 10 mph
current 4 mph

⑫ $x = \$$ invested @ 8%
 $y = \$$ invested @ 9%

$x+y = 10,000$

$y = 10,000 - x$

$.08x + .09y = 860$

$8x + 9y = 86,000$

$8x + 9(10,000 - x) = 86,000$

$8x + 90,000 - 9x = 86,000$

$-x = -4,000$

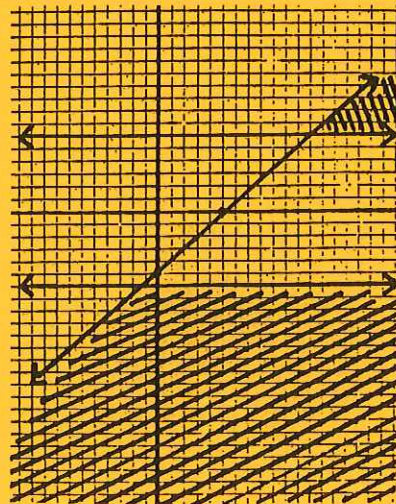
$x = 4,000$

$y = 10,000 - (4,000) = 6,000$

$\$4,000$ @ 8%, $\$6,000$ @ 9%

⑬ $|y| \geq 6$

$(y \geq 6$ or $y \leq -6)$ and $(y \leq x-5)$



Unit 9

REMEDICATION - ANSWER KEY

① $4x - y = 6$ slope 4
 $y = -\frac{3}{2}x + 1$ slope $-\frac{3}{2}$

independent, consistent, 1

② $6x - 2y = 3$ slope 3 $(0, \frac{3}{2})$
 $y = 3x + 6$ slope 3 $(0, 6)$
 parallel lines

independent, inconsistent, 0

③ $y = -3x + 2$
 $5x + 2y = 6$
 $5x + 2(-3x + 2) = 6$
 $5x - 6x + 4 = 6$
 $-x = 2$
 $x = -2$
 $y = -3(-2) + 2 = 8$

$(-2, 8)$

④ $5x - 4y = -11$ $\times 3$
 $3x + 3y = -12$ $\times 4$

$15x - 12y = -33$
 $12x + 12y = -48$

$27x = -81$
 $x = -3$

$5(-3) - 4y = -11$
 $y = -1$

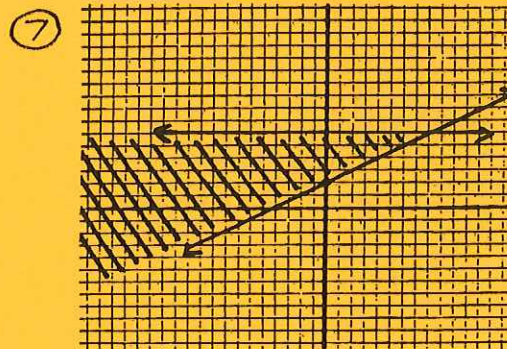
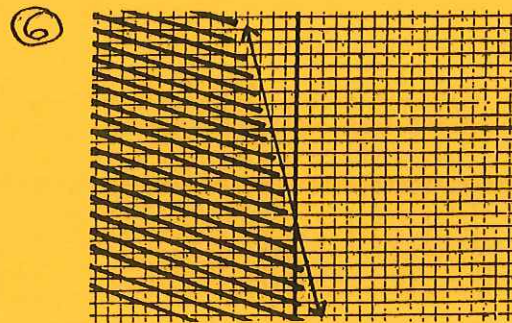
$(-3, -1)$

⑤ $\frac{2}{3}x - \frac{1}{3}y = 14$ $\times 3$
 $\frac{1}{6}x + \frac{1}{6}y = -1$ $\times 6$

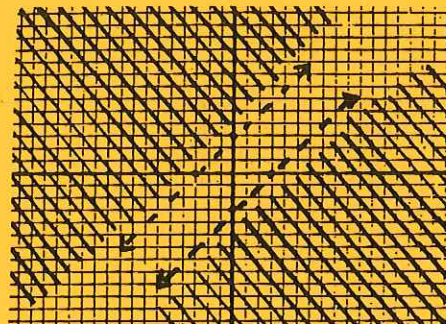
$2x - y = 42$
 $x + y = -6$

$3x = 36$
 $x = 12$

$(12) + y = -6$
 $y = -18$ **$(12, -18)$**



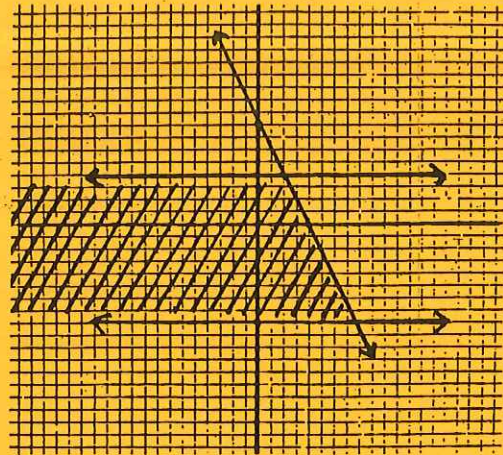
⑧ $|x - y| > 3$
 $x - y > 3$ or $x - y < -3$
 $-y > -x + 3$ or $-y < -x - 3$
 $(y < x - 3$ or $y > x + 3)$



⑨ **$y < 2$**
 $y > -\frac{1}{2}x + 2$



⑩ 2 digit number = tu
 $t = 2u - 3$
 $(10u + t) + 2(10t + u) = 153$
 $10u + t + 20t + 2u = 153$
 $12u + 21t = 153$
 $12u + 21(2u - 3) = 153$
 $12u + 42u - 63 = 153$
 $54u = 216$
 $u = 4$
 $t = 2(4) - 3 = 5$ 54



⑪ $R \times T = D$
with wind $r+w \times 2 = 600$
against $r-w \times 2 = 520$

$2r + 2w = 600$	plane 280 mph wind 20 mph
$2r - 2w = 520$	
$4r = 1120$	
$r = 280$	
$w = 20$	

⑫ $x = \$$ invested @ 10%
 $y = \$$ invested @ 7%

 $x + y = 7000$
 $y = 7000 - x$
 $.10x + .07y = 550$
 $10x + 7y = 55,000$
 $10x + 7(7000 - x) = 55,000$
 $10x + 49,000 - 7x = 55,000$
 $3x = 6000$
 $x = 2000$
 $y = 7000 - (2000) = 5000$
\$2000 @ 10%, \$5000 @ 7%

⑬ $|y + 2| \leq 6$
 $y + 2 \leq 6$ and $y + 2 \geq -6$
 $(y \leq 4$ and $y \geq -8)$ and $(2x + y \leq 8)$
 $(-8 \leq y \leq 4)$ and $(y \leq -2x + 8)$
graph in next column

Unit 9 EXTRA PRACTICE ANSWER KEY

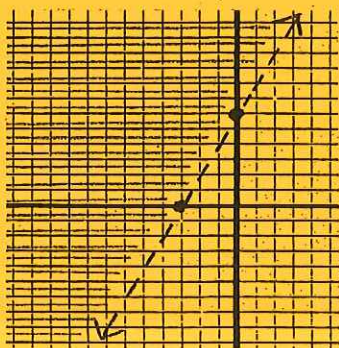
- ① $3x - y = 6$ slope = 3 y-int -6
 $y = 3x + 6$ slope = 3 y-int 6
independent, inconsistent, 0
- ② $x - 2y = 8$ slope = $\frac{1}{2}$ y-int -4
 $y = \frac{1}{2}x - 4$ slope = $\frac{1}{2}$ y-int -4
dependent, consistent, inf
- ③ $2x + 3y = 12$ slope = $-\frac{2}{3}$ y-int 4
 $y = -\frac{2}{3}x + 4$ slope = $-\frac{2}{3}$ y-int 4
dependent, consistent, inf
- ④ $y - 2 = -\frac{3}{4}(6x - 1)$ slope = $-\frac{3}{4}$
 $4x + 3y = 10$ slope = $-\frac{4}{3}$
independent, consistent, 1
- ⑤ $x = 3y$
 $2x - y = 10$
 $2(3y) - y = 10$ $x = 3(2)$
 $6y - y = 10$ $x = 6$
 $5y = 10$
 $y = 2$ (6, 2)

$$\begin{aligned} \textcircled{6} \quad y &= -3x - 5 \\ 2x + 3y &= 6 \\ 2x + 3(-3x - 5) &= 6 \\ 2x - 9x - 15 &= 6 \\ -7x &= 21 \\ x &= -3 \\ y &= -3(-3) - 5 \\ y &= 4 \\ \boxed{(-3, 4)} \end{aligned}$$

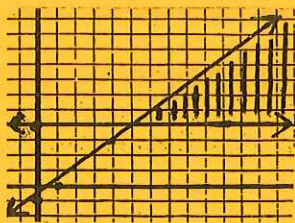
$$\begin{aligned} \textcircled{7} \quad 3x - y &= 17 \quad \times 5 \\ 2x + 5y &= 0 \\ 15x - 5y &= 85 \\ \underline{2x + 5y} &= 0 \\ 17x &= 85 \\ x &= 5 \\ 3(5) - y &= 17 \\ -y &= 2 \quad y = -2 \\ \boxed{(5, -2)} \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad 4x + 3y &= 13 \quad \times -3 \\ 3x + 4y &= 22 \quad \times 4 \\ -12x - 9y &= -39 \\ \underline{12x + 16y} &= 88 \\ 7y &= 49 \\ y &= 7 \\ 4x + 3(7) &= 13 \\ 4x &= -8 \\ x &= -2 \\ \boxed{(-2, 7)} \end{aligned}$$

$$\textcircled{9} \quad y > 2x + 6$$



$$\textcircled{10} \quad y \geq 4 \quad y \leq x - 1$$



$$\begin{aligned} \textcircled{11} \quad |2x - y| &> 4 \\ 2x - y &> 4 \quad \text{or} \quad 2x - y < -4 \\ -y &> -2x + 4 \quad \text{or} \quad -y < -2x - 4 \\ y &> 2x - 4 \quad \text{or} \quad y > 2x + 4 \end{aligned}$$



$$\textcircled{12} \quad \begin{cases} y < -2 \\ y < 2x + 4 \end{cases}$$

$$\begin{aligned} \textcircled{13} \quad \text{number} &= tu \\ t + u &= 9 \quad u = 9 - t \\ 3u &= 2t - 3 \\ 3(9 - t) &= 2t - 3 \\ 27 - 3t &= 2t - 3 \\ -5t &= -30 \\ t &= 6 \\ u &= 9 - (6) = 3 \\ \boxed{63} \end{aligned}$$

$$\textcircled{14} \quad \text{number} = tu$$

$$\begin{aligned} u &= 4t - 1 \\ 10u + t &= 10t + u + 45 \\ 9u - 9t &= 45 \\ u - t &= 5 \\ (4t - 1) - t &= 5 \\ 3t - 1 &= 5 \\ 3t &= 6 \\ t &= 2 \\ u - (2) &= 5 \\ u &= 7 \quad \boxed{27} \end{aligned}$$

$$\textcircled{15} \quad \begin{matrix} R & T & D \\ \text{down (r+c)} \cdot 3 &= & 42 \\ \text{up (r-c)} \cdot 7 &= & 42 \end{matrix}$$

$$\begin{aligned} 3r + 3c &= 42 \\ 7r - 7c &= 42 \end{aligned}$$

$$r + c = 14$$

$$r - c = 6$$

$$2r = 20$$

$$r = 10$$

$$c = 4$$

boat 10mph
current 4mph

$$\textcircled{16} \quad \begin{aligned} x &= 8\% \text{ investment} \\ y &= 6\% \text{ investment} \end{aligned}$$

$$x + y = 9000$$

$$.08x + .06y = 612$$

$$x = 9000 - y$$

$$.08(9000 - y) + .06y = 612$$

$$720 - .08y + .06y = 612$$

$$720 - .02y = 612$$

$$-.02y = -108$$

$$y = \$5400 @ 6\%$$

$$x = \$3600 @ 8\%$$

$$\textcircled{17} \quad \frac{3}{5}x + \frac{2}{5}y = -2 \quad \times 5$$

$$3x - \frac{1}{2}y = -35 \quad \times 4$$

$$3x + 2y = -10$$

$$12x - 2y = -140$$

$$15x = -150$$

$$x = -10$$

$$3(-10) + 2y = -10$$

$$-30 + 2y = -10$$

$$2y = 20$$

$$y = 10$$

$\boxed{(-10, 10)}$

$$\textcircled{18} \quad |y| \geq 4 \quad y \geq 4 \quad \text{or} \quad y \leq -4$$

$$y \geq -2x + 4$$

