Friendship Junior High School
Sixth Grade Accelerated Math Program

Room 102A (Mr. Lavine)

4

4th Quarter Units of Study

Graphing Linear Equations
Interest & Radicals
Properties

UNIT 12

Graphing Linear Equations

1. NUMBER LINE GRAPHING

① $x = -3$

② $x - 5 = 2$ (+5 +5)
$x = 7$

③ $3n - 4 = 8$ (+4 +4)
$3n = 12$
$(\frac{1}{3})(3n) = (\frac{1}{3})(12)$
$n = 4$

④ $3 - 2n = 4n - 9$ (−3 −3)
$-2n = 4n - 12$ (−4n −4n)
$-6n = -12$
$(\frac{-1}{6})(-6n) = (\frac{-1}{6})(-12)$
$n = 2$

⑤ $3(2a-2) = 2a+8$
$6a - 6 = 2a + 8$ (+6 +6)
$6a = 2a + 14$ (−2a −2a)
$4a = 14$
$(\frac{1}{4})(4a) = (\frac{1}{4})(14)$
$a = \frac{14}{4}$
$a = \frac{7}{2}$

⑥ $2(3a-1) = 6a+5$
$6a - 2 = 6a + 5$ (−6a −6a)
$-2 = 5$
False Equation
No Solutions

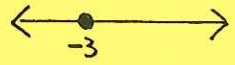
⑦ $2x - 4 = 2(x-2)$
$2x - 4 = 2x - 4$ (−2x −2x)
$-4 = -4$
Identity
All Solutions

⑧ $x > -2$

⑨ $x \leq 4$

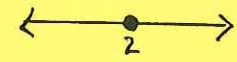
⑩ $5n - 3 < n + 13$ (+3 +3)
$5n < n + 16$ (−n −n)
$4n < 16$
$(\frac{1}{4})(4n) < (\frac{1}{4})(16)$
$n < 4$

⑪ $2(n+3) \geq 6$
$2n + 6 \geq 6$ (−6 −6)
$2n \geq 0$
$n \geq 0$

① $x = -3$ 

② $x = 7$ 

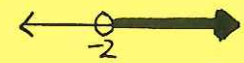
③ $n = 4$ 

④ $n = 2$ 

⑤ $a = 7/2$ 

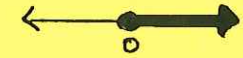
⑥ No Sol. 

⑦ All Sol. 

⑧ $x > -2$ 

⑨ $x \leq 4$ 

⑩ $n < 4$ 

⑪ $n \geq 0$ 

⑫ $4n - 3 > 2(2n-1)$

$4n - 3 > 4n - 2$ (subtracting $4n$ from both sides)

$-3 > -2$

False Inequality

No Solutions

⑬ $2a - 1 < 4a - 7$ (adding $+1$ to both sides)

$2a < 4a - 6$ (subtracting $4a$ from both sides)

$-2a < -6$

$(-\frac{1}{2})(-2a) > (-\frac{1}{2})(-6)$

$a > 3$

⑭ $15 + 2a \leq 2(a+9)$

$15 + 2a \leq 2a + 18$ (subtracting $2a$ from both sides)

$15 \leq 18$

Identity

All Solutions

⑮ $a - 5 \geq 3(a-2)$

$a - 5 \geq 3a - 6$ (adding $+5$ to both sides)

$a \geq 3a - 1$ (subtracting $3a$ from both sides)

$-2a \geq -1$

$(-\frac{1}{2})(-2a) \leq (-\frac{1}{2})(-1)$

$a \leq \frac{1}{2}$

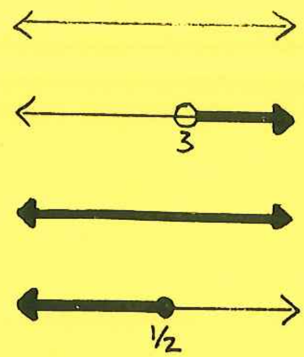
Don't forget to "flip" the inequality sign (problems 13 and 15) when you multiply both sides by a negative

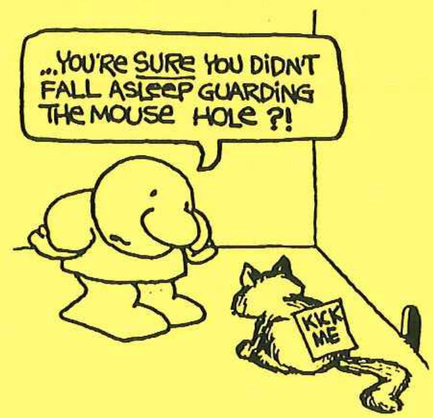
⑫ No Sol.

⑬ $a > 3$

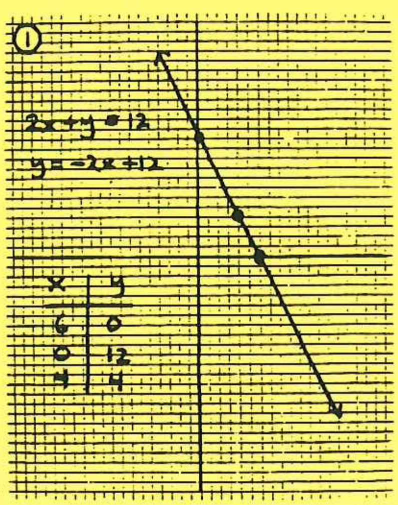
⑭ All Sol.

⑮ $a \leq \frac{1}{2}$

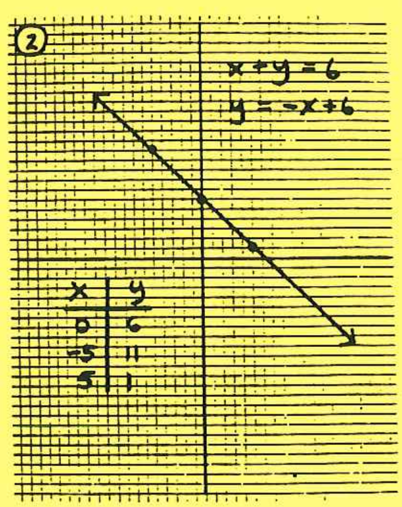




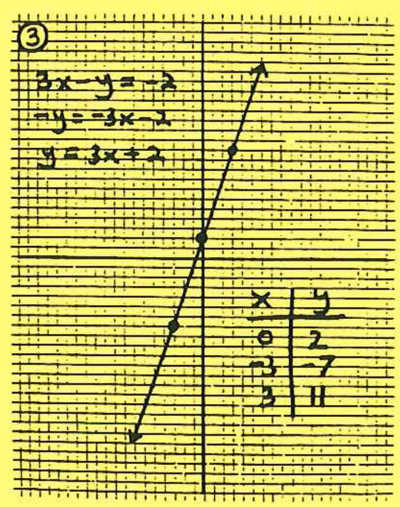
2. THE CHART METHOD



$y = -2x + 12$



$y = -x + 6$



$y = 3x + 2$

④

$5x - 2y = 0$

$-2y = -5x$

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

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

x	y
0	0
-2	-5
2	5

$y = 5/2\,x$

⑤

$3x + y = 3$

$y = -3x + 3$

x	y
0	3
-3	12
3	-6

$y = -3x + 3$

⑥

$2y = 8$

$(2y)(\frac{1}{2}) = (8)(\frac{1}{2})$

$y = 4$

x	y

no "x" horizontal

$y = 4$

⑦

$4x - y = 6$

$-y = -4x + 6$

$y = 4x - 6$

x	y
0	-6
2	2
-3	-18

$y = 4x - 6$

⑧

$4x = -16$

$(4x)(\frac{1}{4}) = (-16)(\frac{1}{4})$

$x = -4$

x	y

no "y" vertical

$x = -4$

⑨

$x - y = 3$

$-y = -x + 3$

$y = x - 3$

x	y
0	-3
10	7
-4	-7

$y = x - 3$

⑩

$x = 4 - 2y$

$x - 4 = -2y$

$-2y = x - 4$

$2y = -x + 4$

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

x	y
0	2
8	-2
-10	7

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

⑪ $3x - 1 < 6x + 5$

$+1 \quad +1$

$3x < 6x + 6$

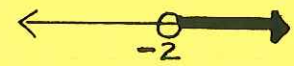
$-6x \quad -6x$

$-3x < 6$

$(-\frac{1}{3})(-3x) > (-\frac{1}{3})(6)$

$x > -2$

⑪ $x > -2$



⑫ $4x = 12$

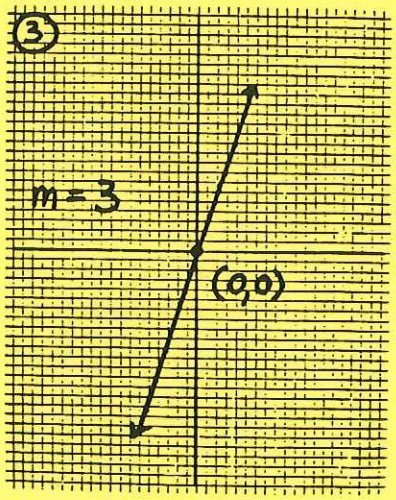
$(\frac{1}{4})(4x) = (\frac{1}{4})(12)$

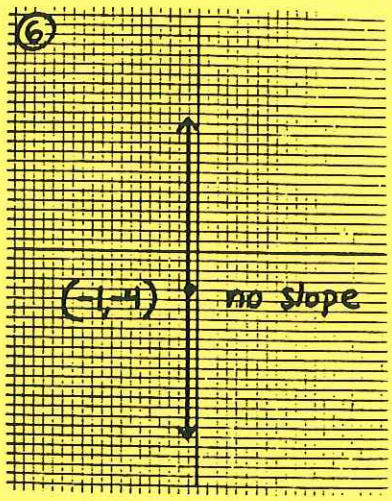
$x = 3$

⑫ $x = 3$

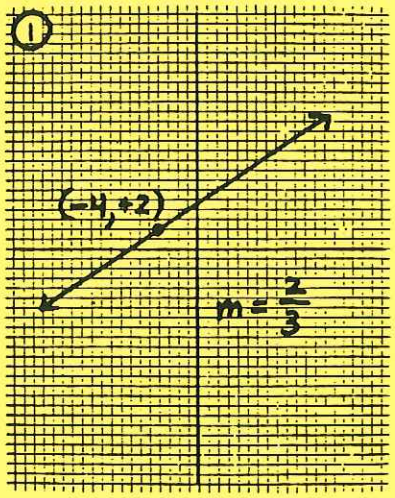
3. SLOPE

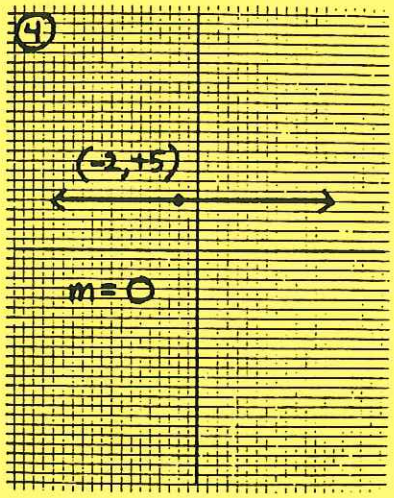
① $m = 1/3$
② $m = -8$
③ $m = -5/2$
④ $m =$ no slope
⑤ $m = 3/2$
⑥ $m = 4$
⑦ $m = 0$

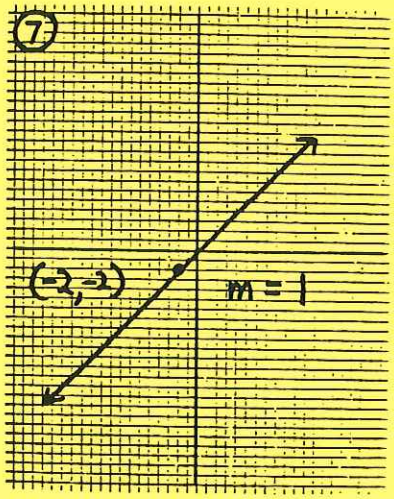


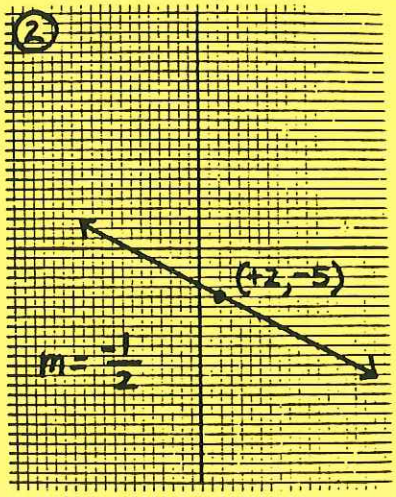


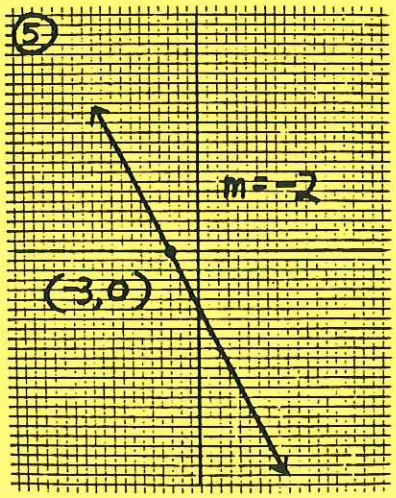
4. SLOPE METHOD

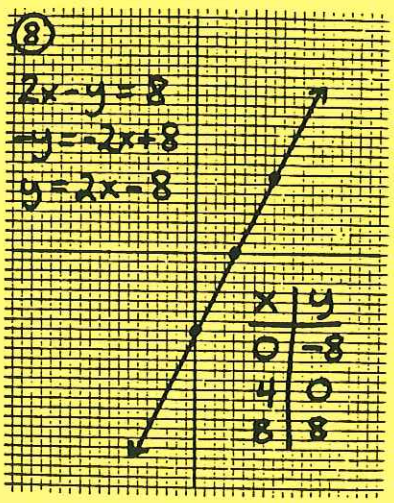












5. DETERMINE SLOPE

① $(-3,5)$ $(-8,2)$ $\frac{(5)-(2)}{(-3)-(-8)} = \frac{3}{5}$

② $(0,0)$ $(-3,-3)$ $\frac{(0)-(-3)}{(0)-(-3)} = 1$

③ $(5,-1)$ $(5,-2)$ $\frac{(-1)-(-2)}{(5)-(5)} =$ no slope

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

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

⑥ $(7,0)$ $(5,1)$ $\frac{(0)-(1)}{(7)-(5)} = \frac{-1}{2}$

⑦ $(-5,-2)$ $(-7,-5)$ $\frac{(-2)-(-5)}{(-5)-(-7)} = \frac{3}{2}$

⑧ $(6,-2)$ $(6,0)$ $\frac{(-2)-(0)}{(6)-(6)} =$ no slope

⑨ $(-3,-1)$ $(-4,-5)$ $\frac{(-1)-(-5)}{(-3)-(-4)} = 4$

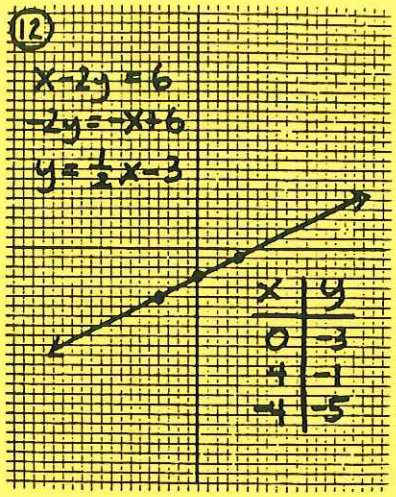
⑩ $(-2,3)$ $(-5,3)$ $\frac{(3)-(3)}{(-2)-(-5)} = 0$

⑪ $4x-2^{+2} \geq 8^{+2}$

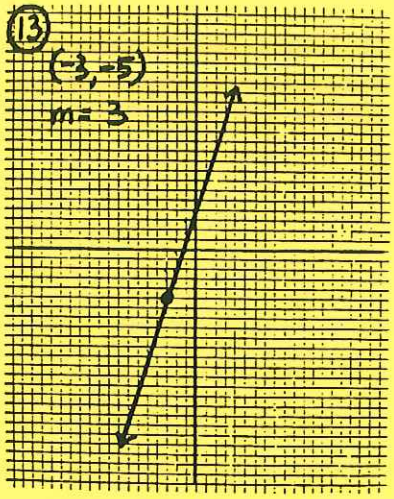
$4x \geq 10$

$(\frac{1}{4})(4x) \geq (\frac{1}{4})(10)$ $x \geq 5/2$

⑫



⑬



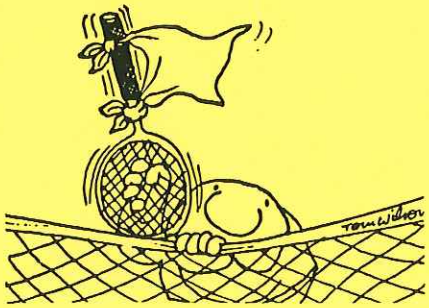
⑭ $m = -1/3$

⑮ no slope

⑯ $3x-2y=8$

$-2y=-3x+8$

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



6. BOTH FORMS

① $m = 3$

$b = -6$ $(0,-6)$

$-b/m = 2$ $(2,0)$

② $m = 2$

$b = 5$ $(0,5)$

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

③ $m = 8$

$b = 0$ $(0,0)$

$-b/m = 0$ $(0,0)$

④ $m = 0$

$b = 4$ $(0,4)$

$-b/m =$ none

⑤ $m = 3$

$b = -4$ $(0,-4)$

$-b/m = 4/3$ $(4/3,0)$

⑥ $m = 1/3$

$b = -6$ $(0,-6)$

$-b/m = 18$ $(18,0)$

⑦ $m = 2/3$
$b = 3 \quad (0,3)$
$-b/m = -9/2 \quad (-9/2, 0)$

⑧ $m = 2$
$b = -2/5 \quad (0, -2/5)$
$-b/m = 1/5 \quad (1/5, 0)$

⑨ $-A/B = 4$
$C/B = -2 \quad (0,-2)$
$C/A = 1/2 \quad (1/2, 0)$

⑩ $-A/B = -3$
$C/B = -5/2 \quad (0, -5/2)$
$C/A = -5/6 \quad (-5/6, 0)$

⑪ $-A/B = -4/3$
$C/B = 8/3 \quad (0, 8/3)$
$C/A = 2 \quad (2,0)$

⑫ $-A/B =$ no slope
$C/B =$ none
$C/A = 2 \quad (2,0)$

⑬ $-A/B = -1$
$C/B = 1 \quad (0,1)$
$C/A = 1 \quad (1,0)$

⑭ $-A/B = 0$
$C/B = 3 \quad (0,3)$
$C/A =$ none

⑮ $-A/B = -3$
$C/B = 1/4 \quad (0, 1/4)$
$C/A = 1/12 \quad (1/12, 0)$

⑯ $-A/B = -1$
$C/B = 7 \quad (0,7)$
$C/A = 7 \quad (7,0)$

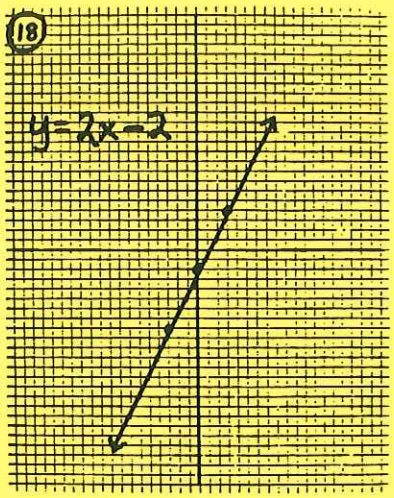
⑰ $-2/3\,x < 4$
$(-3/2)(-2/3\,x) > (-3/2)(4)$
$x > -6$

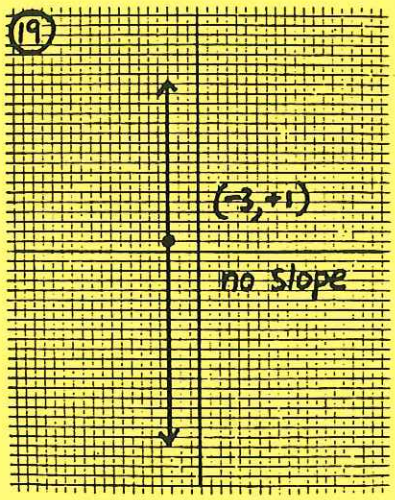
⑱ $2x - y = 2$
$-y = -2x + 2$
$y = 2x - 2$

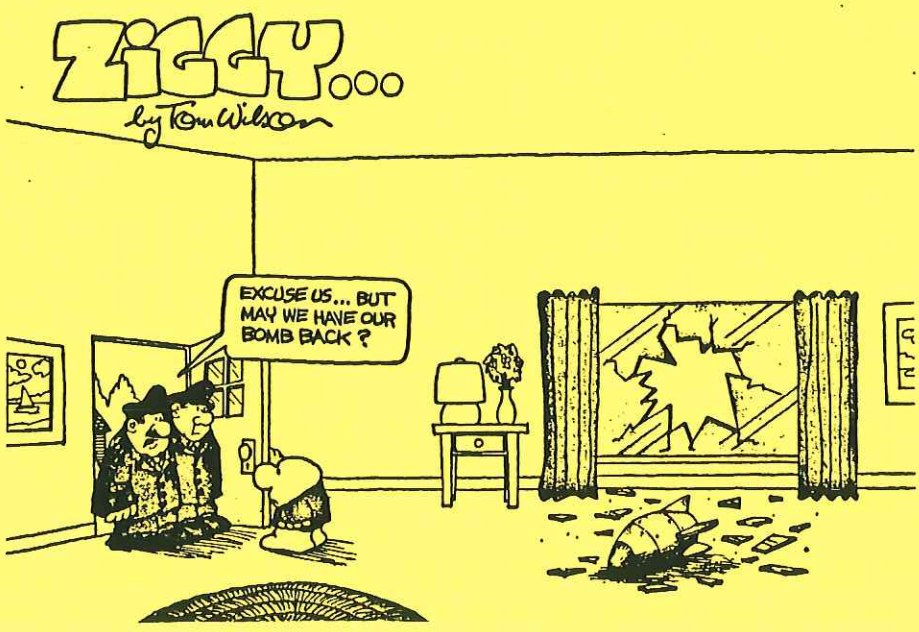
x	y
0	-2
-3	-8
3	4

⑳ $(-5, 2) \quad (-3, 0)$

$$\frac{(2)-(0)}{(-5)-(-3)} = -1$$



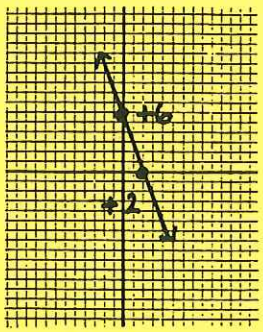




7. LINEAR EQUATIONS

① Slope-Intercept
$y = -3x + 6$

slope $(m) = -3$
y-int $(b) = 6$ $(0,6)$
x-int $(-b/m) = 2$ $(2,0)$

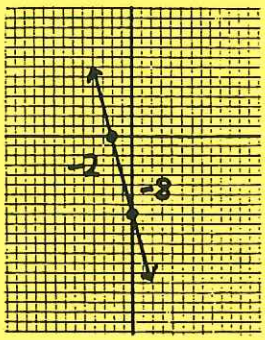


Standard
$3x + y = 6$

slope $(-A/B) = -3$
y-int $(C/B) = 6$ $(0,6)$
x-int $(C/A) = 2$ $(2,0)$

② Slope-Intercept
$y = -4x - 8$

slope $(m) = -4$
y-int $(b) = -8$ $(0,-8)$
x-int $(-b/m) = -2$ $(-2,0)$

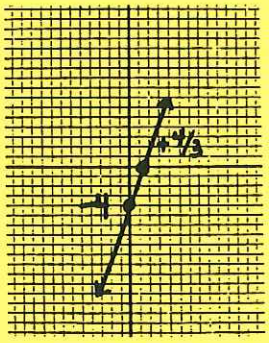


Standard
$4x + y = -8$

slope $(-A/B) = -4$
y-int $(C/B) = -8$ $(0,-8)$
x-int $(C/A) = -2$ $(-2,0)$

③ Slope-Intercept
$y = 3x - 4$

slope $(m) = 3$
y-int $(b) = -4$ $(0,-4)$
x-int $(-b/m) = 4/3$ $(4/3,0)$

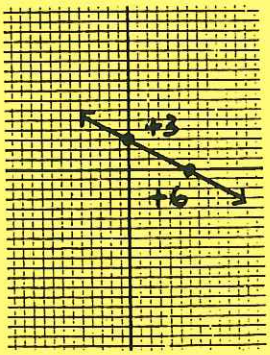


Standard
$3x - y = 4$

slope $(-A/B) = 3$
y-int $(C/B) = -4$ $(0,-4)$
x-int $(C/A) = 4/3$ $(4/3,0)$

④ Slope-Intercept
$y = -1/2\,x + 3$

slope $(m) = -1/2$
y-int $(b) = 3$ $(0,3)$
x-int $(-b/m) = 6$ $(6,0)$

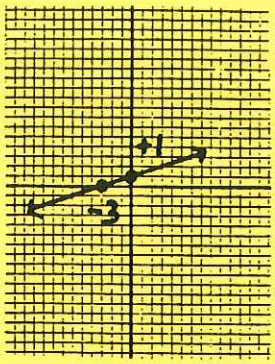


Standard
$x + 2y = 6$

slope $(-A/B) = -1/2$
y-int $(C/B) = 3$ $(0,3)$
x-int $(C/A) = 6$ $(6,0)$

⑤ Slope - Intercept
$y = \frac{1}{3}x + 1$

Slope (m) = 1/3
y-int (b) = 1 (0,1)
x-int $(\frac{-b}{m})$ = -3 (-3,0)

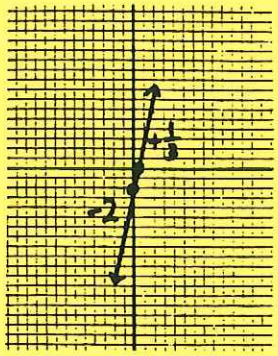


Standard
$x - 3y = -3$

Slope $(-A/B)$ = 1/3
y-int (C/B) = 1 (0,1)
x-int (C/A) = -3 (-3,0)

⑥ Slope - Intercept
$y = 6x - 2$

Slope (m) = 6
y-int (b) = -2 (0,-2)
x-int $(\frac{-b}{m})$ = 1/3 (1/3,0)

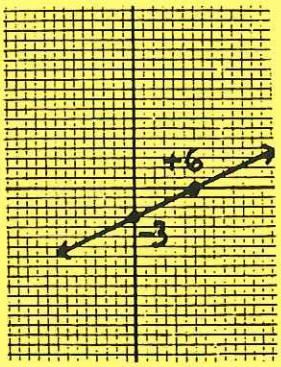


Standard
$6x - y = 2$

Slope $(-A/B)$ = 6
y-int (C/B) = -2 (0,-2)
x-int (C/A) = 1/3 (1/3,0)

⑦ Slope - Intercept
$y = \frac{1}{2}x - 3$

Slope (m) = 1/2
y-int (b) = -3 (0,-3)
x-int $(-b/m)$ = 6 (6,0)



Standard
$x - 2y = 6$

Slope $(-A/B)$ = 1/2
y-int (C/B) = -3 (0,-3)
x-int (C/A) = 6 (6,0)

8. MORE LINEAR EQUATIONS

① Slope - Int
$y = -2/3x + 8/3$

$m = -2/3$
$b = 8/3$ (0, 8/3)
$-b/m = 4$ (4,0)

Standard
$2x + 3y = 8$

$-A/B = -2/3$
$C/B = 8/3$ (0, 8/3)
$C/A = 4$ (4,0)

② Slope-Int
$y = -2x - 6$

$m = -2$
$b = -6 \quad (0,-6)$
$\frac{-b}{m} = -3 \quad (-3,0)$

Standard
$2x + y = -6$

$\frac{-A}{B} = -2$
$\frac{C}{B} = -6 \quad (0,-6)$
$\frac{C}{A} = -3 \quad (-3,0)$

③ Slope-Int
$y = 8x - 4$

$m = 8$
$b = -4 \quad (0,-4)$
$\frac{-b}{m} = \frac{1}{2} \quad (\frac{1}{2},0)$

Standard
$8x - y = 4$

$\frac{-A}{B} = 8$
$\frac{C}{B} = -4 \quad (0,-4)$
$\frac{C}{A} = \frac{1}{2} \quad (\frac{1}{2},0)$

④ Sbpe-Int
$y = 2x - \frac{2}{3}$

$m = 2$
$b = -\frac{2}{3} \quad (0,-\frac{2}{3})$
$\frac{-b}{m} = \frac{1}{3} \quad (\frac{1}{3},0)$

Standard
$6x - 3y = 2$

$\frac{-A}{B} = 2$
$\frac{C}{B} = -\frac{2}{3} \quad (0,-\frac{2}{3})$
$\frac{C}{A} = \frac{1}{3} \quad (\frac{1}{3},0)$

⑤ Slope-Int
$y = \frac{3}{8}x - \frac{3}{2}$

$m = \frac{3}{8}$
$b = -\frac{3}{2} \quad (0,-\frac{3}{2})$
$\frac{-b}{m} = 4 \quad (4,0)$

Standard
$3x - 8y = 12$

$\frac{-A}{B} = \frac{3}{8}$
$\frac{C}{B} = -\frac{3}{2} \quad (0,-\frac{3}{2})$
$\frac{C}{A} = 4 \quad (4,0)$

⑥ Slope-Int
none

This equation has no slope-intercept form

Standard
$x = 2$

$\frac{-A}{B} =$ none
$\frac{C}{B} =$ none
$\frac{C}{A} = 2 \quad (2,0)$

⑦ Slope-Int
$y = 3x$

$m = 3$
$b = 0 \quad (0,0)$
$\frac{-b}{m} = 0 \quad (0,0)$

Standard
$3x - y = 0$

$\frac{-A}{B} = 3$
$\frac{C}{B} = 0 \quad (0,0)$
$\frac{C}{A} = 0 \quad (0,0)$

⑧ Slope-Int
$y = 3$

$m = 0$
$b = 3 \quad (0,3)$
$\frac{-b}{m} =$ none

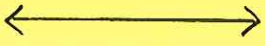
Standard
$y = 3$

$\frac{-A}{B} = 0$
$\frac{C}{B} = 3 \quad (0,3)$
$\frac{C}{A} =$ none

⑨ $3x - 2 \overset{+2}{<} 4 \overset{+2}{}$
$3x < 6$
$(\frac{1}{3})(3x) < (\frac{1}{3})(6)$
$x < 2$

⑩ $2x + 6 \overset{-6}{} = 5 \overset{-6}{}$
$2x = -1$
$(\frac{1}{2})(2x) = (\frac{1}{2})(-1)$
$x = -\frac{1}{2}$

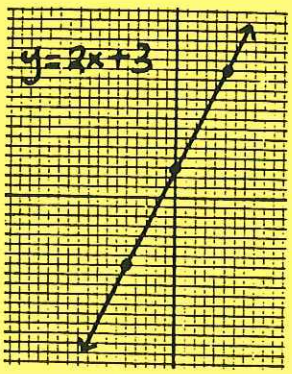
⑪ $2(2x-1) < 4x - 3$
$4x - 2 < 4x - 3$
$-2 < -3$
False Inequality
No Solutions



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

x	y
0	3
5	13
-5	-7

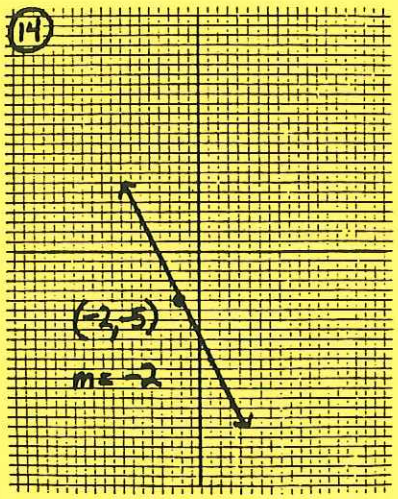
Chart Method



(13) $(-6,2)\ (-8,1)$

$$\frac{(2)-(1)}{(-6)-(-8)} = \frac{1}{2}$$

(14)



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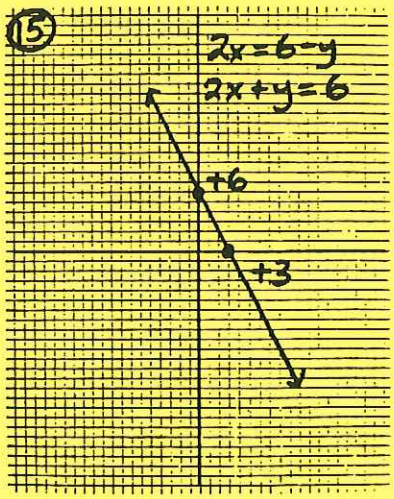
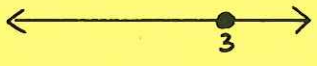


9. REVIEW

(1) $4x-3=9$

$4x=12 \quad x=3$



(2) $2x-1<6$

$2x<7 \quad x<7/2$

(3) $2x-3 \geq 5x+6$

$-3x \geq 9$

$(-\frac{1}{3})(-3x) \leq (-\frac{1}{3})(9)$

$x \leq -3$

(4) $2(3n-1)=6n-3$

$6n-2=6n-3$

$-2=-3$

False Equation

No Solutions

(5) $2n-5 \leq 3(n-1)-n$

$2n-5 \leq 3n-3-n$

$2n-5 \leq 2n-3$

$-5 \leq -3$

Identity

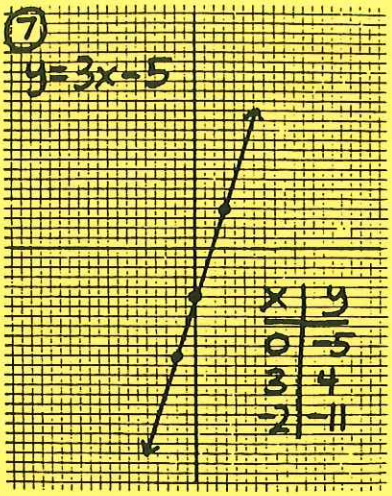
All Solutions

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

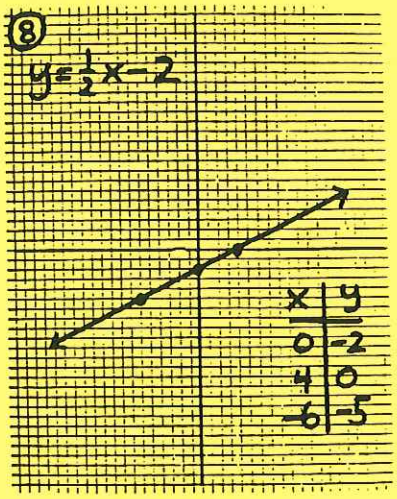
$(3/2)(2/3n)=(3/2)(-3)$

$n=-9/2$

(7)



(8)



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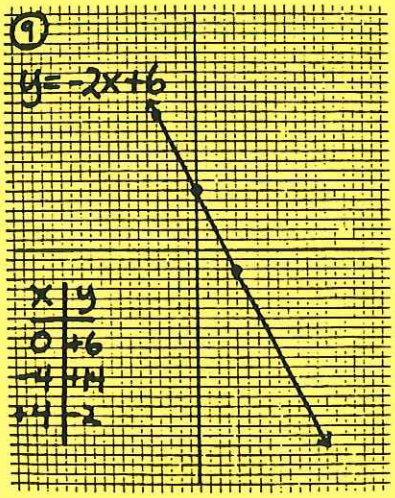

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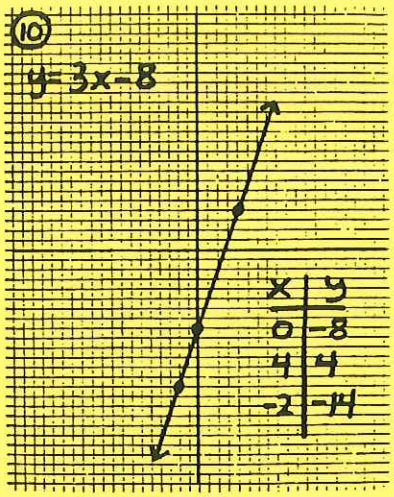

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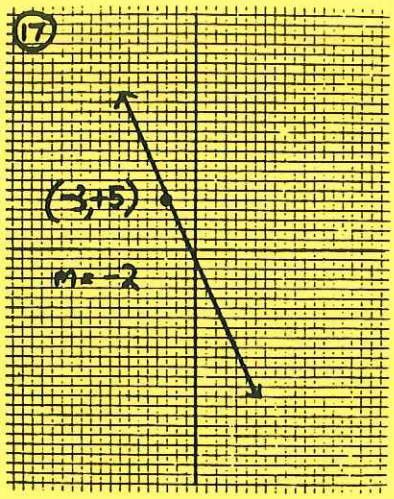

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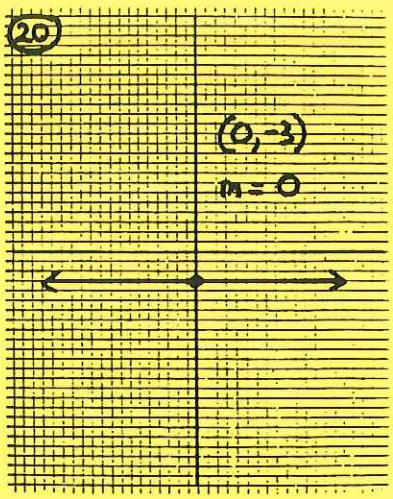


(11) $(-5,-3)\ (7,-4)$

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

(12) $(-3,9)(-3,-4)$

$$\frac{(9)-(-4)}{(-3)-(-3)} = \text{NO SLOPE}$$

(13) $(8,-3)(-6,-10)$

$$\frac{(-3)-(-10)}{(8)-(-6)} = \frac{1}{2}$$

(14) $(-6,-10)(-10,-10)$

$$\frac{(-10)-(-10)}{(-6)-(-10)} = 0$$

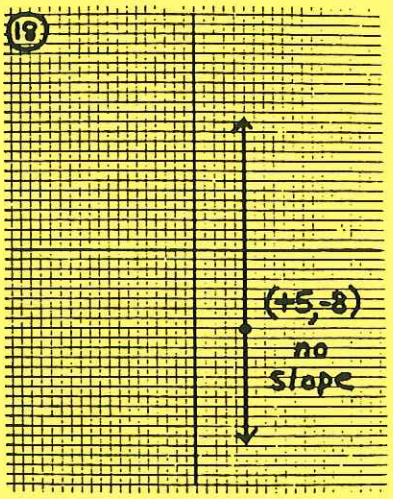
(15) 0

5/6

(16) no slope

-6

(18)



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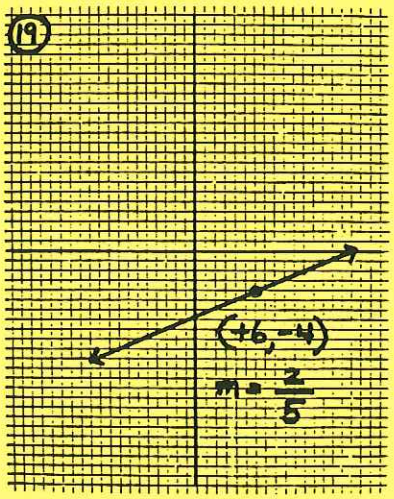


(21) Slope-Intercept

$y = 3/2x + 2$

$m = 3/2$

$b = 2 \quad (0,2)$

$-b/m = -4/3 \quad (-4/3, 0)$

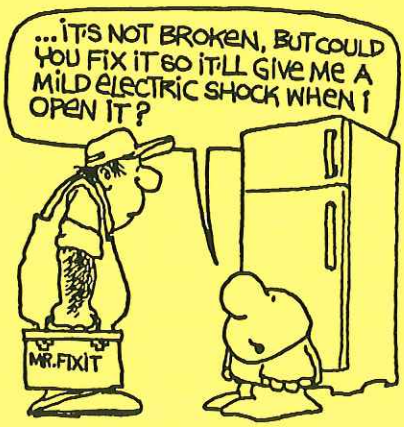
Standard

$3x - 2y = -4$

$-A/B = 3/2$

$C/B = 2 \quad (0,2)$

$C/A = -4/3 \quad (-4/3, 0)$



(22) Slope-Int: $y = 6x - 3$

$m = 6$

$b = -3$ $(0,-3)$

$\frac{-b}{m} = \frac{1}{2}$ $(\frac{1}{2},0)$

Standard: $6x - y = 3$

$-A/B = 6$

$C/B = -3$ $(0,-3)$

$C/A = \frac{1}{2}$ $(\frac{1}{2},0)$

(23) Slope-Int: $y = -\frac{1}{2}x + 7$

$m = -1/2$

$b = 7$ $(0,7)$

$\frac{-b}{m} = 14$ $(14,0)$

Standard: $x + 2y = 14$

$-A/B = -1/2$

$C/B = 7$ $(0,7)$

$C/A = 14$ $(14,0)$

(24) Slope-Int: $y = 3/2x + 2$

$m = 3/2$

$b = 2$ $(0,2)$

$\frac{-b}{m} = -4/3$ $(\frac{-4}{3},0)$

Standard: $3x - 2y = -4$

$-A/B = 3/2$

$C/B = 2$ $(0,2)$

$C/A = -4/3$ $(\frac{-4}{3},0)$

(25) Slope-Int: $y = -1/3x + 3$

$m = -1/3$

$b = 3$ $(0,3)$

$-b/m = 9$ $(9,0)$

Standard: $x + 3y = 9$

$-A/B = -1/3$

$C/B = 3$ $(0,3)$

$C/A = 9$ $(9,0)$

(26) Slope-Int: $y = 6x + 3$

$m = 6$

$b = 3$ $(0,3)$

$\frac{-b}{m} = \frac{-1}{2}$ $(\frac{-1}{2},0)$

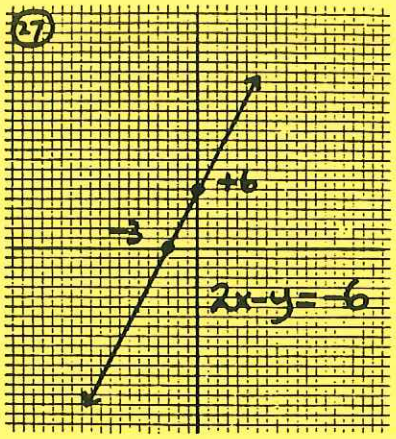
Standard: $6x - y = -3$

$-A/B = 6$

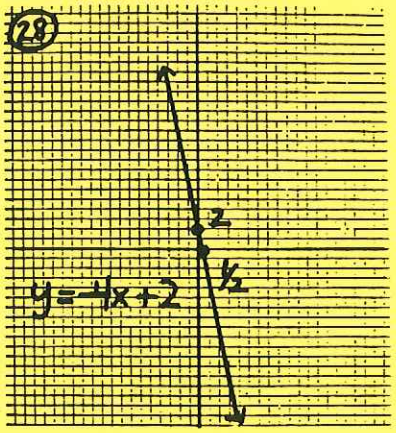
$C/B = 3$ $(0,3)$

$C/A = \frac{-1}{2}$ $(\frac{-1}{2},0)$

(27)



(28)



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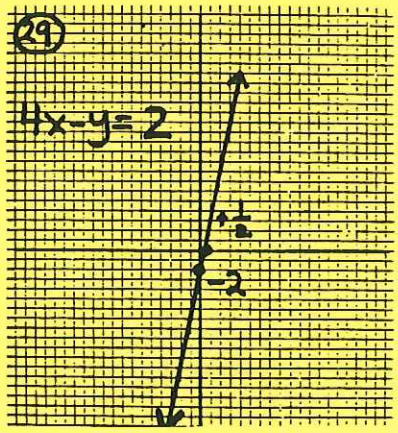

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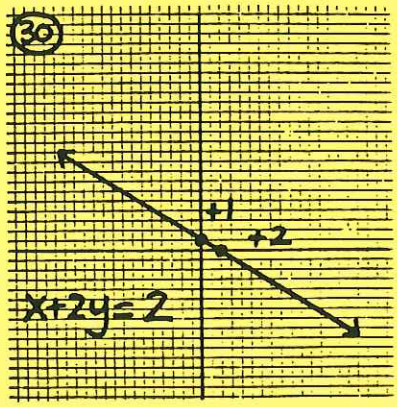
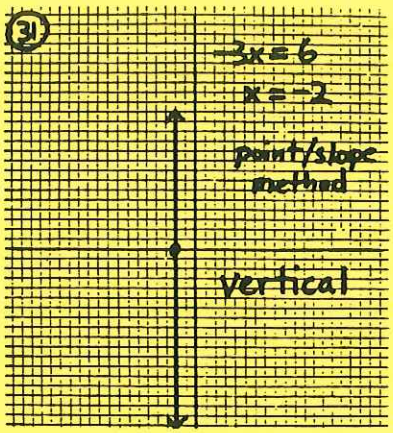
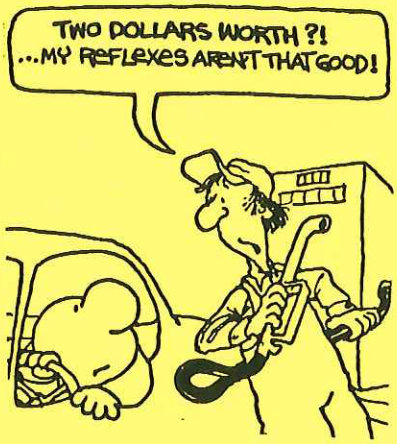
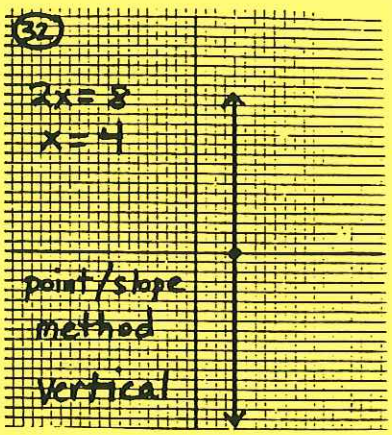


(31)

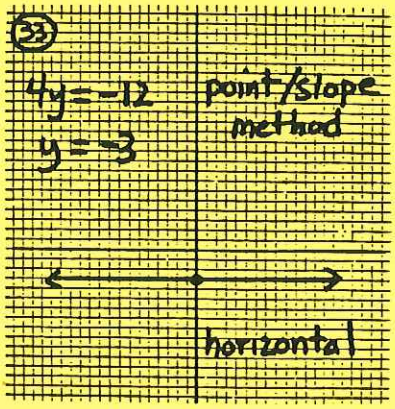




(32)



(33)



(34)

$-3y = -15$

$y = 5$

point/slope method

horizontal

(37)

$y = 3x$

through origin

Slope

$m = 3$

(38)

$y = -x$

through origin

slope

$m = -1$

(35)

$2x - y = 0$

through origin

Slope

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

(36)

$4x + 8y = 0$

through origin

Slope

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

UNIT 13

Interest & Radicals

1. RADICALS & CONSECUTIVE INTEGERS

① $\sqrt{36} < \sqrt{45} < \sqrt{49}$
$\boxed{6} < \sqrt{45} < \boxed{7}$

② $\sqrt{100} < \sqrt{110} < \sqrt{121}$
$\boxed{10} < \sqrt{110} < \boxed{11}$

③ $\sqrt{4} < \sqrt{6} < \sqrt{9}$
$\boxed{2} < \sqrt{6} < \boxed{3}$

④ $\sqrt{121} < \sqrt{125} < \sqrt{144}$
$\boxed{11} < \sqrt{125} < \boxed{12}$

⑤ $-\sqrt{36} < -\sqrt{30} < -\sqrt{25}$
$\boxed{-6} < -\sqrt{30} < \boxed{-5}$

⑥ $-\sqrt{100} < -\sqrt{90} < -\sqrt{81}$
$\boxed{-10} < -\sqrt{90} < \boxed{-9}$

⑦ $\sqrt{169} < -\sqrt{150} < -\sqrt{144}$
$\boxed{-13} < -\sqrt{150} < \boxed{-12}$

⑧ $-\sqrt{4} < -\sqrt{2} < -\sqrt{1}$
$\boxed{-2} < -\sqrt{2} < \boxed{-1}$

⑨ $\sqrt{25} < \sqrt{28} < \sqrt{36}$
$\boxed{5} < \sqrt{28} < \boxed{6}$

⑩ $\sqrt{49} < \sqrt{56} < \sqrt{64}$
$\boxed{7} < \sqrt{56} < \boxed{8}$

⑪ $\sqrt{9} < \sqrt{13} < \sqrt{16}$
$\boxed{3} < \sqrt{13} < \boxed{4}$

⑫ $\sqrt{16} < \sqrt{18} < \sqrt{25}$
$\boxed{4} < \sqrt{18} < \boxed{5}$

⑬ $-\sqrt{9} < -\sqrt{6} < -\sqrt{4}$
$\boxed{-3} < -\sqrt{6} < \boxed{-2}$

⑭ $-\sqrt{25} < -\sqrt{20} < -\sqrt{16}$
$\boxed{-5} < -\sqrt{20} < \boxed{-4}$

⑮ $-\sqrt{64} < -\sqrt{60} < -\sqrt{49}$
$\boxed{-8} < -\sqrt{60} < \boxed{-7}$

⑯ $-\sqrt{81} < -\sqrt{80} < -\sqrt{64}$
$\boxed{-9} < -\sqrt{80} < \boxed{-8}$

2. INTERPOLATION

① $20 = \sqrt{400}$
$\sqrt{410}$ } 10
$21 = \sqrt{441}$ } 41 $\quad 20\frac{10}{41}$

② $32 = \sqrt{1024}$
$\sqrt{1034}$ } 10
$33 = \sqrt{1089}$ } 65 $\quad 32\frac{2}{13}$

③ $46 = \sqrt{2116}$
$\sqrt{2147}$ } 31
$47 = \sqrt{2209}$ } 93 $\quad 46\frac{1}{3}$

④ $72 = \sqrt{5184}$
$\sqrt{5199}$ } 15
$73 = \sqrt{5329}$ } 145 $\quad 72\frac{3}{29}$

⑤ $97 = \sqrt{9409}$ } 150
$\sqrt{9559}$ } 195 $\quad 97\frac{10}{13}$
$98 = \sqrt{9604}$

⑥ $38 = \sqrt{1444}$ } 63
$\sqrt{1507}$ } 77 $\quad 38\frac{9}{11}$
$39 = \sqrt{1521}$

⑦ $16 = \sqrt{256}$ } 11
$\sqrt{267}$ } 33 $\quad 16\frac{1}{3}$
$17 = \sqrt{289}$

⑧ $10 = \sqrt{100}$ } 14
$\sqrt{114}$ } 21 $\quad 10\frac{2}{3}$
$11 = \sqrt{121}$

⑨ $55 = \sqrt{3025}$ } 30
$\sqrt{3055}$ } 111 $\quad 55\frac{10}{37}$
$56 = \sqrt{3136}$

⑩ $79 = \sqrt{6241}$ } 66
$\sqrt{6307}$ } 159 $\quad 79\frac{22}{53}$
$80 = \sqrt{6400}$

⑪ $34 = \sqrt{1156}$ } 23
$\sqrt{1179}$ } 69 $\quad 34\frac{1}{3}$
$35 = \sqrt{1225}$

⑫ $43 = \sqrt{1849}$ } 15
$\sqrt{1864}$ } 87 $\quad 43\frac{5}{29}$
$44 = \sqrt{1936}$

⑬ $64 = \sqrt{4096}$ } 33
$\sqrt{4129}$ } 129 $\quad 64\frac{11}{43}$
$65 = \sqrt{4225}$

⑭ $25 = \sqrt{625}$ } 17
$\sqrt{642}$ } 51 $\quad 25\frac{1}{3}$
$26 = \sqrt{676}$

⑮ $32 = \sqrt{1024}$ } 50
$\sqrt{1074}$ } 65 $\quad 32\frac{10}{13}$
$33 = \sqrt{1089}$

3. CALCULATING SQUARE ROOTS

①
```
         1 4 . 4 9      ≈ 14.5
        √2 10.00 00
         1
2[4]     1 10
           96
28[4]      14 00
           11 36
288[9]      2 64 00
            2 60 01
```

②

18.16

$\sqrt{330.0000}$

1

2[8] | 230

224

36[1] | 600

361

362[6] | 23900

21756

≈ 18.2

⑤

53.15

$\sqrt{2825.0000}$

25

10[3] | 325

309

106[1] | 1600

1061

1062[5] | 53900

53125

≈ 53.2

⑦

61.56

$\sqrt{3790.0000}$

36

12[1] | 190

121

122[5] | 6900

6125

1230[6] | 77500

73836

≈ 61.6

③

66.52

$\sqrt{4425.0000}$

36

12[6] | 825

756

132[5] | 6900

6625

1330[2] | 27500

26604

≈ 66.5

⑧

77.45

$\sqrt{6000.0000}$

49

14[7] | 1100

1029

154[4] | 7100

6176

1548[5] | 92400

77425

≈ 77.5

④

72.45

$\sqrt{5250.0000}$

49

14[2] | 350

284

144[4] | 6600

5776

1448[5] | 82400

72425

≈ 72.5

⑥

40.62

$\sqrt{1650.0000}$

16

8[0] | 50

0

80[6] | 5000

4836

812[2] | 16400

16244

≈ 40.6

⑨

8.246

$\sqrt{68.000000}$

64

16[2] | 400

324

164[4] | 7600

6576

1648[6] | 102400

98916

≈ 8.25

(10)
$$\begin{array}{r} 9.486 \\ \sqrt{90.000000} \\ 81 \\ 184 \overline{)\ 900} \\ 736 \\ 1888 \overline{)\ 16400} \\ 15104 \\ 18966 \overline{)\ 129600} \\ 113796 \end{array}$$
≈ 9.49

(11)
$$\begin{array}{r} 2.236 \\ \sqrt{5.000000} \\ 4 \\ 42 \overline{)\ 100} \\ 84 \\ 443 \overline{)\ 1600} \\ 1329 \\ 4466 \overline{)\ 27100} \\ 26796 \end{array}$$
≈ 2.24

(12)
$$\begin{array}{r} 2.828 \\ \sqrt{8.000000} \\ 4 \\ 48 \overline{)\ 400} \\ 384 \\ 562 \overline{)\ 1600} \\ 1124 \\ 5648 \overline{)\ 47600} \\ 45184 \end{array}$$
≈ 2.83

4. SIMPLE INTEREST

(1) $(850)(.08)(1) = 68$
$850 + 68 = \$918$

(2) $(1200)(.12)(.5) = 72$
$1200 + 72 = \$1272$

(3) $(5000)(.045)(2) = 450$
$5000 + 450 = \$5450$

(4) $(1500)(.105)(1.5) = 236.25$
$1500 + 236.25 = \$1736.25$

(5) $(6500)(.09)(5) = 2925$
$6500 + 2925 = \$9425$

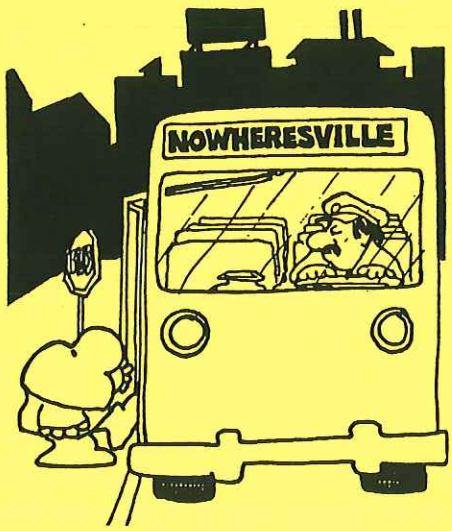
(6) $(35{,}000)(.085)(2.5) = 7437.50$
$35{,}000 + 7{,}437.50 = \$42{,}437.50$

(7) $(2750)(.11)(.25) = 75.625$
$2750 + 75.63 = \$2825.63$

(8) $(4500)(.12)(3.25) = 1755$
$4500 + 1755 = \$6255$

(9) $(6000)(.095)(5) = 2850$
$6000 + 2850 = \$8850$

(10) $(8750)(.105)(1.75) = 1607.8125$
$8750 + 1607.81 = \$10{,}357.81$



5. COMPOUND INTEREST

① $(9000)(1.05)^6 \approx \$12,060.86$

② $(8400)(1.045)^5 \approx \$10,467.93$

③ $(7500)(1.02)^5 \approx \$8,280.61$

④ $(6000)(1.09)^3 \approx \$7770.17$

⑤ $(15{,}000)(1.08)^2 \approx \$17,496$

⑥ $(3500)(1.05)^4 \approx \$4254.27$

⑦ $(4000)(1.045)^3 \approx \$4564.66$

⑧ $(6500)(1.03)^4 \approx \$7315.81$

⑨ $(5000)(1.025)^3 \approx \$5384.45$

⑩ $(8500)(1.035)^{11} \approx \$12,409.74$

⑪ $(6000)(1.06)^6(1.03)^{16} \approx \$13,657.84$

⑫ $(10{,}000)(1.04)^5(1.02)^{10} \approx \$14,830.93$

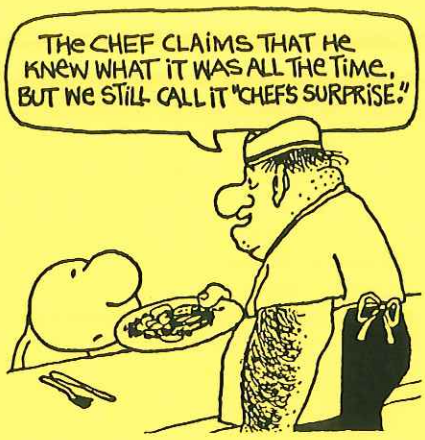
⑬ $(6400)(1.06)^5(1.015)^{20} \approx \$11,535.33$

⑭ $(8200)(1.05)^6(1.025)^{10} \approx \$14,066.57$

6. REVIEW

① $\sqrt{36} < \sqrt{46} < \sqrt{49}$

$\boxed{6} < \sqrt{46} < \boxed{7}$



② $\sqrt{81} < \sqrt{92} < \sqrt{100}$

$\boxed{9} < \sqrt{92} < \boxed{10}$

③ $-\sqrt{9} < -\sqrt{8} < -\sqrt{4}$

$\boxed{-3} < -\sqrt{8} < \boxed{-2}$

④ $-\sqrt{36} < -\sqrt{26} < -\sqrt{25}$

$\boxed{-6} < -\sqrt{26} < \boxed{-5}$

⑤ $\sqrt{9} < \sqrt{13} < \sqrt{16}$

$\boxed{3} < \sqrt{13} < \boxed{4}$

⑥ $\sqrt{64} < \sqrt{70} < \sqrt{81}$

$\boxed{8} < \sqrt{70} < \boxed{9}$

⑦ $61 = \sqrt{3721}$, $\sqrt{3762}\}41$, $62 = \sqrt{3844}\}123$ $\quad 61\frac{1}{3}$

⑧ $49 = \sqrt{2401}$, $\sqrt{2467}\}66$, $50 = \sqrt{2500}\}99$ $\quad 49\frac{2}{3}$

(9) $37 = \sqrt{1369}$, $\sqrt{1394}$, $38 = \sqrt{1444}$

$1394 - 1369 = 25$; $1444 - 1369 = 75$ → $37\frac{1}{3}$

(10) $22 = \sqrt{484}$, $\sqrt{520}$, $23 = \sqrt{529}$

$520 - 484 = 36$; $529 - 484 = 45$ → $22\frac{4}{5}$

(11) $47 = \sqrt{2209}$, $\sqrt{2224}$, $48 = \sqrt{2304}$

$2224 - 2209 = 15$; $2304 - 2209 = 95$ → $47\frac{3}{19}$

(12) $16 = \sqrt{256}$, $\sqrt{278}$, $17 = \sqrt{289}$

$278 - 256 = 22$; $289 - 256 = 33$ → $16\frac{2}{3}$

(13) $\sqrt{620.000000} = 24.89 \approx 24.9$

4
4[4] | 220
176
48[8] | 4400
3904
496[9] | 49600
44721

(14) $\sqrt{2010.000000} = 44.83 \approx 44.8$

16
8[4] | 410
336
88[8] | 7400
7104
896[3] | 29600
26889

(15) $\sqrt{3210.000000} = 56.65 \approx 56.7$

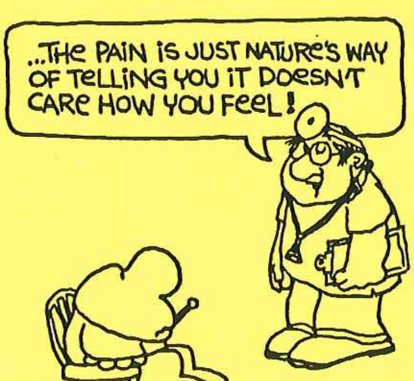
25
10[6] | 710
636
112[6] | 7400
6756
1132[5] | 64400
56625

(16) $\sqrt{6500.000000} = 80.62 \approx 80.6$

64
16[0] | 100
0
160[6] | 10000
9636
1612[2] | 36400
32244

(17) $\sqrt{2461.0000} = 49.60 \approx 49.6$

16
8[9] | 861
801
98[6] | 6000
5916
992[0] | 8400
0



(18)
$$\begin{array}{r} 55.22 \\ \sqrt{3050.0000} \\ 25 \\ 10\boxed{5}\ 550 \\ 525 \\ 110\boxed{2}\ 2500 \\ 2204 \\ 1104\boxed{2}\ 29600 \\ 22084 \end{array}$$

≈ 55.2

(19)
$$\begin{array}{r} 3.464 \\ \sqrt{12.000000} \\ 9 \\ 6\boxed{4}\ 300 \\ 256 \\ 68\boxed{6}\ 4400 \\ 4116 \\ 692\boxed{4}\ 28400 \\ 27696 \end{array}$$

≈ 3.46

(20)
$$\begin{array}{r} 2.645 \\ \sqrt{7.000000} \\ 4 \\ 4\boxed{6}\ 300 \\ 276 \\ 52\boxed{4}\ 2400 \\ 2096 \\ 528\boxed{5}\ 30400 \\ 26425 \end{array}$$

≈ 2.65

(21)
$$\begin{array}{r} 1.732 \\ \sqrt{3.000000} \\ 1 \\ 2\boxed{7}\ 200 \\ 189 \\ 34\boxed{3}\ 1100 \\ 1029 \\ 346\boxed{2}\ 7100 \\ 6924 \end{array}$$

≈ 1.73

(22)
$$\begin{array}{r} 3.872 \\ \sqrt{15.000000} \\ 9 \\ 6\boxed{8}\ 600 \\ 544 \\ 76\boxed{7}\ 5600 \\ 5369 \\ 774\boxed{2}\ 23100 \\ 15484 \end{array}$$

≈ 3.87

(23) $(4500)(.06)(3)$
$4500 + 810$
$\$5310$

(24) $(7200)(.09)(2.5)$
$7200 + 1620$
$\$8820$

(25) $(6755)(.045)(2.5)$
$6755 + 759.94$
$\$7514.94$

(26) $(2988)(.11)(5) = 1643.40$
$2988 + 1643.40 = \$4631.40$

(27) $(4620)(.0725)(1.5) \approx 502.43$
$4620 + 502.43 = \$5122.43$

(28) $(3574)(.0915)(3.25) \approx 1062.82$
$3574 + 1062.82 = \$4636.82$

(29) $(6400)(1.08)^4 \approx \$8707.13$

(30) $(7500)(1.09)^6 \approx \$12,578.25$

(31) $(2455)(1.035)^3 \approx \$2721.90$

(32) $(3845)(1.045)^5 \approx \$4791.57$

(33) $(6875)(1.025)^{11} \approx \$9020.60$

(34) $(8210)(1.015)^{11} \approx \$9670.96$

(35) $(9000)(1.04)^6(1.02)^{12} \approx \$14,442.57$

(36) $(11,000)(1.06)^{13}(1.03)^7 \approx \$28,855.56$

(37) $(25,000)(1.1)^7(1.025)^{12} \approx \$65,520.20$

(38) $(17,500)(1.14)^4(1.035)^{16} \approx \$51,251.08$

UNIT 14

Properties

1. PROPERTIES OF REAL NUMBERS

① Multiplicative Identity

② Additive Inverse

③ Commutative Property of Addition

④ Zero Property

⑤ Associative Property of Addition

⑥ Multiplicative Inverse

⑦ Distributive Property

⑧ Closure

⑨ Commutative Property of Multiplication

⑩ Additive Identity

⑪ Commutative Property of Addition

⑫ Associative Property of Multiplication

2. PROPERTIES OF EQUALITY

① Reflexive Property of Equality

② Transitive Property of Equality

③ Symmetric Property of Equality

④ Substitution Property of Equality

⑤ Substitution Property of Equality

⑥ Reflexive Property of Equality

⑦ Symmetric Property of Equality

⑧ Transitive Property of Equality

3. ALL PROPERTIES

1. Associative Property of Addition
2. Multiplicative Inverse
3. Zero Property
4. Reflexive Property of Equality
5. Substitution Property of Equality
6. Commutative Property of Addition
7. Associative Property of Multiplication
8. Additive Identity
9. Distributive Property
10. Symmetric Property of Equality
11. Commutative Property of Addition
12. Commutative Property of Multiplication
13. Additive Inverse
14. Multiplicative Identity
15. Closure
16. Transitive Property of Equality
17. Substitution Property of Equality
18. Commutative Property of Addition
19. Distributive Property
20. Closure

4. TYPES OF NUMBERS

1. R	8. IM	15. R
2. R	9. R	16. IR
3. IM	10. IR	17. IM
4. IR	11. R	18. R
5. IR	12. IR	19. R
6. R	13. IM	20. R
7. R	14. R	

5. REVIEW

① Multiplicative Inverse

② Closure

③ Transitive Property of Equality

④ Substitution Property of Equality

⑤ Reflexive Property of Equality

⑥ Zero Property

⑦ Additive Inverse

⑧ Commutative Property of Multiplication

⑨ Symmetric Property of Equality

⑩ Distributive Property

⑪ Multiplicative Identity

⑫ Associative Property of Multiplication

⑬ Commutative Property of Addition

⑭ Commutative Property of Addition

⑮ Symmetric Property of Equality

⑯ Associative Property of Addition

⑰ Substitution Property of Equality

⑱ Closure

⑲ R

⑳ R

㉑ R

㉒ R

㉓ IR

㉔ IM

㉕ R

㉖ IR

㉗ IR

㉘ R

㉙ IR

㉚ IM

㉛ R

㉜ R

㉝ IR

㉞ R

㉟ R

㊱ IM

QUARTER 4

Cumulative Review

1. PROBLEM SOLVING

① a) $2\frac{1}{2} \times \frac{5}{5} = 2\frac{5}{10}$

$+3\frac{3}{5} \times \frac{2}{2} = 3\frac{6}{10}$

$5\frac{11}{10} = 6\frac{1}{10}$

b) $4\frac{1}{3} \times \frac{4}{4} = 4\frac{4}{12}$

$+2\frac{3}{4} \times \frac{3}{3} = 2\frac{9}{12}$

$6\frac{13}{12} = 7\frac{1}{12}$

c) $1\frac{1}{4} \times \frac{3}{3} = 1\frac{3}{12}$

$+4\frac{5}{6} \times \frac{2}{2} = 4\frac{10}{12}$

$5\frac{13}{12} = 6\frac{1}{12}$

② a) $8\frac{1}{4} \times \frac{3}{3} = 8\frac{3}{12} = 7\frac{15}{12}$

$-3\frac{2}{3} \times \frac{4}{4} = 3\frac{8}{12} = 3\frac{8}{12}$

$4\frac{7}{12}$

b) $5 = 4\frac{5}{5}$

$-2\frac{2}{5} = 2\frac{2}{5}$

$2\frac{3}{5}$

c) $4\frac{2}{5} \times \frac{4}{4} = 4\frac{8}{20} = 3\frac{28}{20}$

$-1\frac{3}{4} \times \frac{5}{5} = 1\frac{15}{20} = 1\frac{15}{20}$

$2\frac{13}{20}$

③ a) $2\frac{1}{3} \times \frac{15}{28}$

$\frac{7}{3} \times \frac{15}{28}$

$\frac{1}{1} \times \frac{5}{4} = \frac{5}{4} = 1\frac{1}{4}$

b) $1\frac{1}{4} \times \frac{24}{25}$

$\frac{5}{4} \times \frac{24}{25}$

$\frac{1}{1} \times \frac{6}{5} = \frac{6}{5} = 1\frac{1}{5}$

c) $2\frac{1}{2} \times \frac{4}{35}$

$\frac{5}{2} \times \frac{4}{35}$

$\frac{1}{1} \times \frac{2}{7} = \frac{2}{7}$

④ a) $8 \div 1\frac{1}{4}$

$8 \div \frac{5}{4}$

$8 \times \frac{4}{5} = \frac{32}{5} = 6\frac{2}{5}$

b) $4\frac{1}{2} \div 3$

$\frac{9}{2} \times \frac{1}{3}$

$\frac{3}{2} \times \frac{1}{1} = \frac{3}{2} = 1\frac{1}{2}$

c) $6 \div 3\frac{1}{2}$

$6 \div \frac{7}{2}$

$6 \times \frac{2}{7} = \frac{12}{7} = 1\frac{5}{7}$

(5) a) $10 - 3.14 = 6.86$

b) $12.5 - 2.07 = 10.43$

c) $5.4 - 3.75 = 1.65$

(6) a) $.003 \times 1.15 = .00345$

b) $2.4 \times .04 = .096$

c) $.06 \times .08 = .0048$

(7) a) $(-2) + (-9) = -11$

b) $(6) + (-10) = -4$

c) $(-8) + (4) = -4$

(8) a) $(7) - (-9)$

$(7) + (9) = 16$

b) $(-12) - (-10)$

$(-12) + (10) = -2$

c) $(-8) - (5)$

$(-8) + (-5) = -13$

(9) a) $(-9) \times (-7) = 63$

b) $(-6) \times (4) = -24$

c) $(12) \times (-8) = -96$

(10) a) $(-15) \div (5) = -3$

b) $(20) \div (-4) = -5$

c) $(-18) \div (-9) = 2$

(11) a) 5, 3

b) 2, 5, 10, 3, 4, 6

c) 3

(12) a) $\dfrac{(2\frac{1}{2})}{(\frac{1\frac{1}{3}}{4})} = \dfrac{(2\frac{1}{2})}{(\frac{1}{3})} = \frac{15}{2}$

b) $\dfrac{(\frac{(\frac{1}{2})}{(4)})}{(1\frac{1}{2})} = \dfrac{(\frac{1}{8})}{(1\frac{1}{2})} = \frac{1}{12}$

c) $\dfrac{(2)}{(\frac{1\frac{1}{4}}{5})} = \dfrac{(2)}{(\frac{1}{4})} = 8$

(13) a) $0 \div 6 = 0$

b) $-8 \div 8 = -1$

c) $-24 \div 6 = -4$

(14) a) $(-3) + (-2) = -5$

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

b) $0 + 0 = 0$

$0 \div 2 = 0$

c) $(-8) + (-3) = (-11)$

$(-11) \div 2 = -5\frac{1}{2}$

(15) a) none

b) 0, 4

c) −10

(16) a) $8 - (-5) = 13$

b) $4 - (-11) = 15$

c) $5 - (-10) = 15$

(17) a) $4/5 = 4 \div 5$

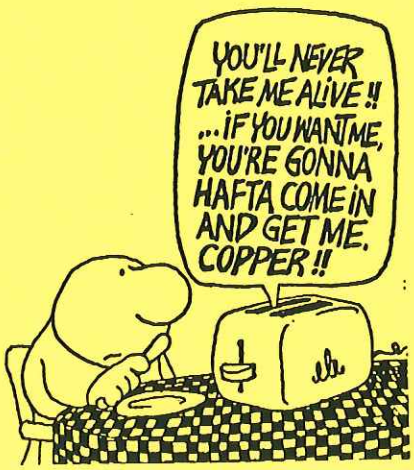
b) $7/5 = 7 \div 5$

c) $9/2 = 9 \div 2$

(18) a) $2/3 = 3\overline{)2}$

b) $1/5 = 5\overline{)1}$

c) $2/7 = 7\overline{)2}$



(19) a) $\frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$

b) $\frac{12}{9} = 1\frac{3}{9} = 1\frac{1}{3}$

c) $\frac{20}{14} = 1\frac{6}{14} = 1\frac{3}{7}$

(20) a) $3\frac{1}{8} = 25/8$

b) $2\frac{4}{5} = 14/5$

c) $3\frac{1}{2} = 7/2$

(21) a) .04

b) .004

c) .4

(22) a) $(3\times10^4)+(5\times\frac{1}{10}^3)$

b) $(2\times10^1)+(8\times\frac{1}{10}^2)$

c) $(3\times10^2)+(1\times\frac{1}{10}^2)+(4\times 1/10^4)$

(23) a) $5^3 = 125$

b) $2^5 = 32$

c) $4^0 = 1$

(24) a) $6^0 = 1$

b) $3^3 = 27$

c) $8^0 = 1$

(25) a) GCF 18, 24 = 6

b) GCF 22, 33 = 11

c) GCF 14, 42 = 14

(26) a) LCM 12, 20 = 60

b) LCM 9, 15 = 45

c) LCM 30, 25 = 150

(27) a) $108 = 2^2 \cdot 3^3$

b) $200 = 2^3 \cdot 5^2$

c) $240 = 2^4 \cdot 3 \cdot 5$

(28) a) 17, 19

b) 29

c) 31

(29) a) 16, 18, 20, 21, 22

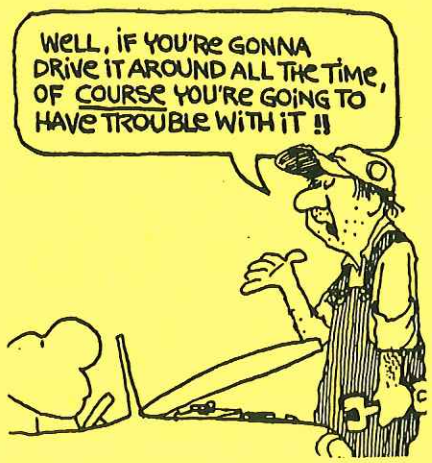
b) 35, 36, 38, 39, 40

c) 42, 44, 45

(30) a) 800

b) 799

c) 800



(31) a) 799.0

b) 798.984

c) 798.98

(32) a) $\frac{8}{5} \boxed{<} \frac{5}{3}$

b) $\frac{14}{3} \boxed{<} \frac{19}{4}$

c) $\frac{9}{7} \boxed{>} \frac{5}{4}$

(33) a) 2.6 $\boxed{>}$ 2.58

b) 2.04 $\boxed{<}$ 2.1

c) 3.4 $\boxed{<}$ 3.403

(34) a) -12 $\boxed{>}$ -15

b) -7 $\boxed{<}$ -5

c) -8 $\boxed{<}$ 0

(35) a) kℓ

b) kg

c) cm

(36) a) t

b) m

c) ℓ

(37) a) 2.34 kg = 2340g

b) 400 mm = 40 cm

c) 5.4ℓ = .0054 kℓ

(38) a) 45.2 cm = .452 m

b) 2500 mg = .0025 kg

c) 4.5 ℓ = 4500 mℓ

(39) a) $(40-32) \div 1.8 = 4.\overline{4}\,°C$

b) $(15-32) \div 1.8 = -9.\overline{4}\,°C$

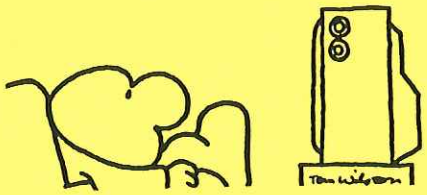
c) $(-6-32) \div 1.8 = -21.\overline{1}\,°C$

(40) a) $(80)(1.8)+32 = 176°F$

b) $(-10)(1.8)+32 = 14°F$

c) $(6)(1.8)+32 = 42.8°F$

WE INTERRUPT THIS PROGRAM FOR A SPECIAL BULLETIN FROM THE FOOD AND DRUG ADMINISTRATION .....DON'T EAT OR DRINK ANYTHING UNTIL FURTHER NOTICE!



(41) a) 50 cm = .5 m

$\$3 \div (.5) = \boxed{\$6/m}$

$\$5 \div (.75) = \$6.67/m$

b) 800 mℓ = .8 ℓ

$\$6.25 \div 3 = \$2.08/ℓ$

$\$1.56 \div .8 = \boxed{\$1.95/ℓ}$

c) 5000 g = 5 kg

$\$62.50 \div 24 = \$2.60/kg$

$\$12.50 \div 5 = \boxed{\$2.50\ kg}$

(42) a) $\frac{5}{8} = .625$

62.5%

b) $\frac{3}{4} = .75$

75%

c) $\frac{4}{5} = .8$

80%

(43) a) $\frac{4}{9} = 4 \div 9$

$.\overline{4}$

b) $\frac{7}{8} = 7 \div 8$

.875

c) $\frac{5}{6} = 5 \div 6$

$.8\overline{3}$

(44) a) $.06 = \frac{6}{100}$

$\frac{3}{50}$

b) $.24 = \frac{24}{100}$

$\frac{6}{25}$

c) $.4 = \frac{4}{10}$

$\frac{2}{5}$

(45) a) $8\% = \frac{8}{100}$

$\frac{2}{25}$

b) $12.5\% = .125$

$\frac{125}{1000} = \frac{1}{8}$

c) $1.5\% = .015$

$\frac{15}{1000} = \frac{3}{200}$

(46) a) 9.3%

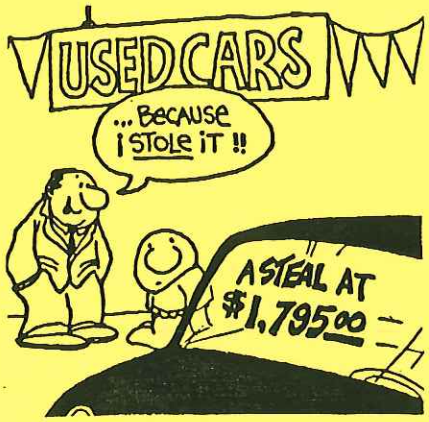
.093

b) 1.25%

.0125

c) 20.5%

.205



(47) a) $\frac{\text{part}}{\text{whole}}$ $\frac{n}{120} = \frac{2}{100}$ $100n = 240$, $n = 2.4$

b) $\frac{\text{part}}{\text{whole}}$ $\frac{6}{n} = \frac{40}{100}$ $40n = 600$, $n = 15$

c) $\frac{\text{part}}{\text{whole}}$ $\frac{n}{80} = \frac{12}{100}$ $100n = 960$, $n = 9.6$

(48) a) $4 \div \frac{2}{5} = 4 \times \frac{5}{2} = 10$

10 lessons

b) $\frac{2}{3} \times \frac{1}{8} = 1/12$ of the class

c) $3\frac{1}{2} \div 10 = 7/2 \times 1/10 = 7/20$

7/20 hours

(49) a) $\frac{\text{scored}}{\text{tot. players}} \quad \frac{9}{n} = \frac{60}{100}$

$60n = 900$

$n = 15$ players

b) $\frac{\text{green}}{\text{tot. pencils}} \quad \frac{n}{35} = \frac{20}{100}$

$100n = 700$

$n = 7$ green pencils

c) $\frac{\text{can't attend}}{\text{tot. invited}} \quad \frac{8}{n} = \frac{5}{100}$

$5n = 800$

$n = 160$

$160 - 8 = 152$ plan to attend

(50) a) $\frac{\text{discount}}{\text{org. price}} \quad \frac{n}{16} = \frac{15}{100}$

$100n = 240$

$n = \$2.40$ discount

$16 - 2.40$

$\$13.60$

b) $\frac{\text{discount}}{\text{org. price}} \quad \frac{6}{n} = \frac{20}{100}$

$20n = 600$

$n = \$30$ original price

$\$30 - \$6 = \$24$

c) $\frac{\text{selling pr.}}{\text{org. price}} \quad \frac{63}{72} = \frac{n}{100}$

$72n = 6300$

$n = 87.5\%$ selling price

$100 - 87.5 = 12.5\%$ discount

2. ALGEBRA

(1) a) $-4^2 - (-6) \times (-5)$

$-16 - (30)$

$-16 + (-30) = -46$

b) $(-2)^4 - (-2) \times (4) + 1$

$(16) - (-8) + 1$

$16 + (8) + 1 = 25$

c) $-5^2-(-4)\times(-3)-1$

$-25-(12)-1$

$-25+(-12)-1=-38$

② a) $3x^3y^2-xy$

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

$(-12)-(2)=-14$

b) $2(x^2-y)-y^3$

$2[(-1)^2-(-2)]-(-2)^3$

$2[3]-(-8)$

$6+8=14$

c) $xy+2x^2y^3$

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

$(2)+2(1)(-8)$

$2+(-16)=-14$

③ a) $6x+2y(x-y)+3xy$

$6x+2xy-2y^2+3xy$

$6x+5xy-2y^2$

b) $2x(x-y)-3(2x^2-xy)$

$2x^2-2xy-6x^2+3xy$

$-4x^2+xy$

c) $3ab-2a(a+2b)-a^2$

$3ab-2a^2-4ab-a^2$

$-3a^2-ab$

④ a) ICT

b) IO c) ECF

⑤ a) $x=.2\overline{6} \rightarrow 10x=2.\overline{6}$

$100x=26.\overline{6}$

$10x=2.\overline{6}$

$90x=24$ $\quad x=\frac{24}{90}=\frac{4}{15}$

b) $x=.01\overline{5} \rightarrow 100x=1.\overline{5}$

$1000x=15.\overline{5}$

$100x=1.\overline{5}$

$900x=14$ $\quad x=\frac{14}{900}=\frac{7}{450}$

c) $x=.2\overline{3} \rightarrow 10x=2.\overline{3}$

$100x=23.\overline{3}$

$10x=2.\overline{3}$

$90x=21$ $\quad x=\frac{21}{90}=\frac{7}{30}$

⑥ a) $8-\frac{5n}{3}=-2$

$24-5n=-6$

$-5n=-30$

$n=6$

b) $12+\frac{4x}{6}=10$

$72+4x=60$

$4x=-12$

$x=-3$

c) $\frac{7n}{5}-10=4$

$7n-50=20$

$7n=70$

$n=10$

⑦ a) $2(3n-3)=12+3n$

$6n-6=12+3n$

$3n=18$ $\quad n=6$

b) $3(5-4x)=23-8x$

$15-12x=23-8x$

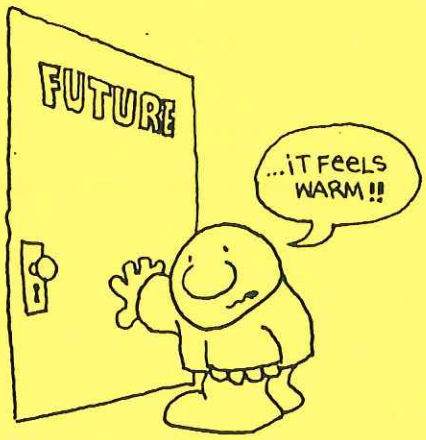
$-4x=8$ $\quad x=-2$

c) $12-2(n-3)=5(3-n)$

$12-2n+6=15-5n$

$18-2n=15-5n$

$3n=-3$ $\quad n=-1$



⑧ a) $-3x-4<5$

$-3x<9$

$\left(\frac{-1}{3}\right)(-3x)>\left(\frac{-1}{3}\right)(9)$

$x>-3$

b) $12-2(n-1)>5+3(4+3n)$

$12-2n+2>5+12+9n$

$14-2n>17+9n$

$-11n>3$

$\left(\frac{-1}{11}\right)(-11n)<\left(\frac{-1}{11}\right)(3)$

$n<-3/11$

c) $-2n+7\leq 17$

$-2n\leq 10$

$\left(\frac{-1}{2}\right)(-2n)\geq\left(\frac{-1}{2}\right)(10)$

$n\geq -5$

⑨ a)

x	-5	$x+(x+2)+(x+4)=-9$
$x+2$	$\boxed{-3}$	$3x+6=-9$
$x+4$	-1	$3x=-15$
		$x=-5$

b)

x	5	$(x)+(x+1)+(x+2)+(x+3)=26$
$x+1$	6	$4x+6=26$
$x+2$	7	$x=5$
$x+3$	$\boxed{8}$	

c)

x	4	$2(x+4)-x=12$
$x+2$	$\boxed{6}$	$2x+8-x=12$
$x+4$	8	$x=4$

⑩ a) $3n-2=4n+1$

$-n=3$

$n=-3$

b) $(2n+5)-(n+3)=4$

$2n+5-n-3=4$

$n+2=4$

$n=2$

c) $(5n-4)-(2n+2)=6$

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

$3n-6=6$

$3n=12$

$n=4$

⑪ a) $\frac{-4x}{3}>-8$

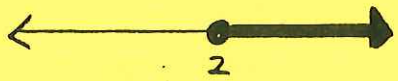
$-4x>-24$ $\quad x<6$

b) $4a - 2(5a+1) \leq -14$

$4a - 10a - 2 \leq -14$

$-6a \leq -12$

$a \geq 2$



c) $8 - \frac{2n}{5} < 10$

$40 - 2n < 50$

$-2n < 10$

$n > -5$

(12) a) $(-3,4)\ (-8,14)$

$\frac{4-14}{-3-(-8)} = \frac{-10}{5} = -2$

b) $(0,-7)\ (-2,-3)$

$\frac{-7-(-3)}{0-(-2)} = \frac{-4}{2} = -2$

c) $(-6,4)\ (-6,-8)$

$\frac{4-(-8)}{-6-(-6)} = \frac{12}{0}$ no slope

(13) a) $5x - 3y = 15$

$-3y = -5x + 15$

$y = 5/3x - 5$

b) $x - 2y = 8$

$-2y = -x + 8$

$y = 1/2x - 4$

c) $4x - 3y = -6$

$-3y = -4x - 6$

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

(14) a) $y = -5x + 10$

Slope $(m) = -5$

y-int $(b) = 10$

x-int $(-b/m) = 2$

b) $y = x - 4$

Slope $(m) = 1$

y-int $(b) = -4$

x-int $(-b/m) = 4$

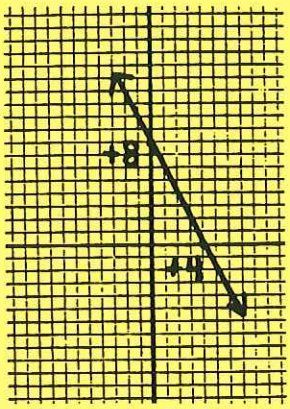
c) $y = 2x - 6$

Slope $(m) = 2$

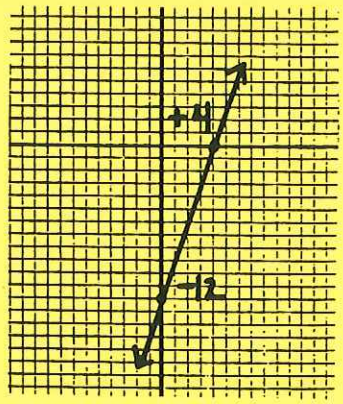
y-int $(b) = -6$

x-int $(-b/m) = 3$

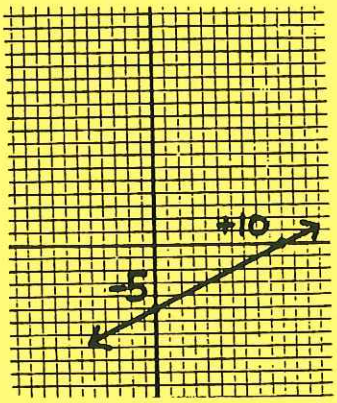
(15) a) $y = -2x + 8$



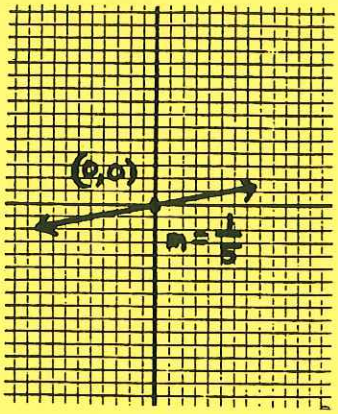
b) $y = 3x - 12$



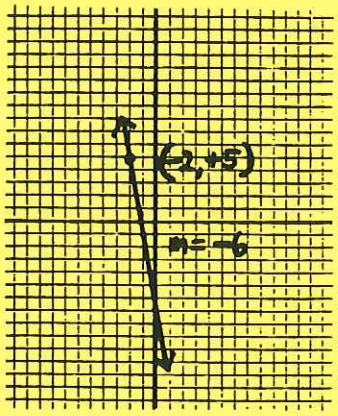
c) $y = 1/2x - 5$



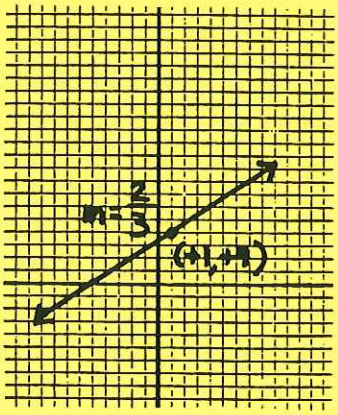
(16) a) (0,0) $m = 1/5$



b) (-2,5) $m = -6$



c) (1,4) $m = 2/3$



(17) a) $c^2 \boxed{<} -c$

Both are (+). Since c is a fraction, c^2 is closer to 0 than $-c$

b) $a^2 \boxed{>} b^3$

a^2 is (+), b^3 is (-)

c) $e-c \boxed{>} c-e$

$e-c$ is (+), $c-e$ is (-)

(18) a) $\sqrt{81} < \sqrt{90} < \sqrt{100}$

$\boxed{9} < \sqrt{90} < \boxed{10}$

b) $-\sqrt{16} < -\sqrt{10} < -\sqrt{9}$

$\boxed{-4} < -\sqrt{10} < \boxed{-3}$

c) $\sqrt{16} < \sqrt{18} < \sqrt{25}$

$\boxed{4} < \sqrt{18} < \boxed{5}$

(19) a)

$$\begin{array}{r} 21.21 \\ \sqrt{450.0000} \\ 4 \\ 4\boxed{1}\overline{)\,50} \\ 41 \\ 42\boxed{2}\overline{)\,900} \\ 844 \\ 424\boxed{1}\overline{)\,5600} \\ 4241 \end{array}$$

≈ 21.2

b)

$$\begin{array}{r} 70.71 \\ \sqrt{5000.0000} \\ 49 \\ 14\boxed{0}\overline{)\,100} \\ 0 \\ 140\boxed{7}\overline{)\,10000} \\ 9849 \\ 1414\boxed{1}\overline{)\,15100} \\ 14141 \end{array}$$

≈ 70.7

c)

$$\begin{array}{r} 33.16 \\ \sqrt{1100.0000} \\ 9 \\ 6\boxed{3}\overline{)\,200} \\ 189 \\ 66\boxed{1}\overline{)\,1100} \\ 661 \\ 662\boxed{6}\overline{)\,43900} \\ 39756 \end{array}$$

≈ 33.2

(20) a) $47 = \sqrt{2209}$, $\sqrt{2254}$ (45), $48 = \sqrt{2304}$ (95)

$47\ 9/19$

b) $31 = \sqrt{961}$, $\sqrt{979}$ (18), $32 = \sqrt{1024}$ (63)

$31\ 2/7$

c) $46 = \sqrt{2116}$, $\sqrt{2147}$ } 31 } 93

$47 = \sqrt{2209}$

$46\frac{1}{3}$

(21) a) $\sqrt{162} = \sqrt{2 \cdot 3^4}$

$9\sqrt{2}$

b) $\sqrt{200} = \sqrt{2^3 \cdot 5^2}$

$10\sqrt{2}$

c) $\sqrt{288} = \sqrt{25 \cdot 3^2}$

$12\sqrt{2}$

(22) a) $5\sqrt{6} \times 2\sqrt{3}$

$10\sqrt{18} = 30\sqrt{2}$

b) $2\sqrt{2} \times \sqrt{10}$

$2\sqrt{20} = 4\sqrt{5}$

c) $3\sqrt{3} \times 2\sqrt{15}$

$6\sqrt{45} = 18\sqrt{5}$

(23) a) $(12{,}000)(.07)(2.5) = 2100 + 12{,}000 = \$14{,}100$

b) $(8{,}450)(.065)(6.5) \approx 3570.13$

$3570.13 + 8450 = \$12{,}020.13$

c) $(13{,}200)(.08)(2.25) = 2376 + 13{,}200 = \$15{,}576$

(24) a) $16{,}200 \times 1.035^5 \approx \$19{,}240.52$

b) $13{,}400 \times 1.025^{12} = \$18{,}021.51$

c) $9{,}800 \times 1.055^5 \approx \$12{,}808.21$

(25) a) Additive Identity

b) Commutative Property of Addition

c) Distributive Property

(26) a) Reflexive Property of Equality

b) Substitution Property of Equality

c) Symmetric Property of Equality

(27) a) IR
b) IR
c) R

(28) a) IM
b) IR
c) R

3. GEOMETRY

(1) a) Isosceles triangle, Equiangular triangle

b) Obtuse triangle, Scalene triangle

c) Acute triangle, Equilateral triangle

(2) a) Square, octagon b) trapezoid, pentagon c) rhombus, heptagon

③ a) 360°
$(8-2)\times 180 = 1080 \div 8 = 135^\circ$

b) 540°, 60°

c) $(7-2)\times 180 = 900^\circ$
$(6-2)\times 180 = 720 \div 6 = 120^\circ$

④ a) Protractor, curve

b) Chord, Polygon

c) Point, π

⑤ a) F diameter is not a line seg.
T

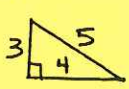
b) F does not connect two points on the circle

T $\pi d = 2\pi r$

c) T
F polygon is made of line segments

⑥ a) T
T one triangle has 180° and two have 360°

b) T would make more than 180°
F isosceles triangle can have an obtuse angle

c) F example: 

T all sides, all angles congruent

⑦ a) T adjacent sides form right angles
F infinite amount (both)

b) T
F only true for a circle

c) T, T

⑧ a) F not always a square
F

b) T
T pentagon has 540°
$(5-2)\times 180 = 540$

c) T
T parallelogram has 2 pairs of parallel sides

⑨ a) III b) IV c) II

⑩ a) $a = (12.5)(3.5) = 43.75\ cm^2$
$P = 2(12.5)+2(3.5) = 32\ cm$

b) $a = (8)(2.5) = 20\ cm^2$
$P = 2(8)+2(4) = 24\ cm$

c) $a = (9.25)^2 = 85.5625\ cm^2$
$P = 4(9.25) = 37\ cm$

⑪ a) $a = \frac{1}{2}(10+6)\times(3.5) = 28\ m^2$
$P = 3.75+6+4+10 = 23.75\ m$

b) $a = \frac{1}{2}(7+9.5)\times(2.5) = 20.625\ m^2$
$P = 3+7+2.5+9.5 = 22\ m$

c) $a = \frac{1}{2}(3+6) \times 5 = 22.5\ m^2$

$p = 6 + 5.5 + 3 + 5.5 = 20\ m$

(12) a) $a = \frac{1}{2}(7)(5) = 17.5\ cm^2$

$p = 7 + 5.4 + 10.3 = 22.7\ cm$

b) $a = \frac{1}{2}(13)(12) = 78\ cm^2$

$p = 13 + 12.4 + 14.1 = 39.5\ cm$

c) $a = \frac{1}{2}(4)(7) = 14\ cm^2$

$p = 4 + 10.6 + 8.1 = 22.7\ cm$

(13) a) $a = \pi r^2$

$\pi (3.75)^2 = 14.0625\pi\ m^2$

$(3.14)(3.75)^2 = 44.15625\ m^2$

$C = 2\pi r$

$2\pi (3.75) = 7.5\pi\ m$

$2(3.14)(3.75) = 23.55\ m$

b) $a = \pi r^2$

$\pi (2.5)^2 = 6.25\pi\ m^2$

$(3.14)(2.5)^2 = 19.625\ m^2$

$C = 2\pi r$

$2\pi (2.5) = 5\pi\ m$

$2(3.14)(2.5) = 15.7\ m$

c) $a = \pi r^2$

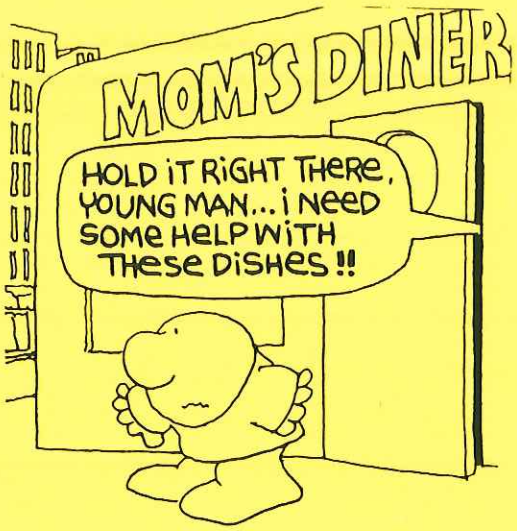
$\pi (4.75)^2 = 22.5625\pi\ m^2$

$(3.14)(4.75)^2 = 70.84625\ m^2$

$C = 2\pi r$

$2\pi (4.75) = 9.5\pi\ m$

$2(3.14)(4.75) = 29.83\ m$



(14) a) central angle $= 150°$

$a = \pi r^2 (part)$

$\pi (4)^2 \left(\frac{150}{360}\right) = 6.\overline{6}\pi\ m^2$

$(3.14)(4)^2\left(\frac{150}{360}\right) = 20.9\overline{3}\ m^2$

$C = 2\pi r (part) + 6r$

$2\pi (4)\left(\frac{150}{360}\right) + 6(4) = 3.\overline{3}\pi + 24\ m$

$2(3.14)(4)\left(\frac{150}{360}\right) + 6(4) = 34.4\overline{6}\ m$

b) central angle $= 180°$

$a = \pi r^2 (part)$

$\pi (5)^2\left(\frac{180}{360}\right) = 12.5\pi\ m^2$

$(3.14)(5)^2\left(\frac{180}{360}\right) = 39.25\ m^2$

$C = 2\pi r (part) + 2r$

$2\pi (5)\left(\frac{180}{360}\right) + 2(5) = 5\pi + 10\ m$

$2(3.14)(5)\left(\frac{180}{360}\right) + 2(5) = 25.7\ m$

c) central angle $= 150°$

$a = \pi r^2$ (part)

$\pi(6)^2\left(\frac{150}{360}\right) = 15\pi m^2$

$(3.14)(6)^2\left(\frac{150}{360}\right) = 47.1 m^2$

$C = 2\pi r$ (part) $+ 4r$

$2\pi(6)\left(\frac{150}{360}\right) + 4(6) = 5\pi + 24 m$

$2(3.14)(6)\left(\frac{150}{360}\right) + 4(6) = 39.7 m$

(15) a) $V = (5 \times 3) \times 8 = 120 m^3$

$a = 2(5 \times 3) + (per)(ht)$

$2(15) + (16)(8) = 158 m^2$

b) $V = \frac{1}{2}(6 \times 4) \times 10 = 120 m^3$

$a = 2\left[\frac{1}{2}(6 \times 4)\right] + (per)(ht)$

$(24) + (16)(10) = 184 m^2$

c) $V = (12 \times 4.5) \times 14 = 756 m^3$

$a = 2(12 \times 4.5) + (per)(ht)$

$(108) + (33)(14) = 570 m^2$

(16) a) $V = (\pi r^2)(ht)$

$(3.14)(3)^2(6) = 169.56 cm^3$

$a = 2(\pi r^2) + (2\pi r)(ht)$

$(2)(3.14)(3)^2 + (2)(3.14)(3)(6)$

$169.56 cm^2$

b) $V = (\pi r^2)(ht)$

$(3.14)(4)^2(8) = 401.92 cm^3$

$a = 2(\pi r^2) + (2\pi r)(ht)$

$2(3.14)(4)^2 + (2)(3.14)(4)(8)$

$301.44 cm^2$

c) $V = (\pi r^2)(ht)$

$(3.14)(2.5)^2(3) = 58.875 cm^3$

$a = 2(\pi r^2) + (2\pi r)(ht)$

$(2)(3.14)(2.5)^2 + (2)(3.14)(2.5)(3)$

$86.35 cm^2$

(17) a) $\frac{\text{small}}{\text{large}}$ $\frac{4}{9} = \frac{6}{x}$

$4x = 54 \longrightarrow x = 13.5 m$

b) $\frac{\text{small}}{\text{large}}$ $\frac{x}{6} = \frac{2}{8}$

$8x = 12 \longrightarrow x = 1.5 m$

c) $\frac{\text{small}}{\text{large}}$ $\frac{3}{5} = \frac{x}{12.5}$

$5x = 37.5 \longrightarrow x = 7.5 m$

(18) a) $x^2 + 9^2 = 12^2$

$x^2 + 81 = 144$

$x^2 = 63$

$x = \sqrt{63} = 3\sqrt{7} m$

b) $5^2 + 15^2 = x^2$

$25 + 225 = x^2$

$250 = x^2$

$x = \sqrt{250} = 5\sqrt{10} m$

c) $x^2 + 12^2 = 18^2$

$x^2 + 144 = 324$

$x^2 = 180$

$x = \sqrt{180} = 6\sqrt{5} m$

(19) a) short leg $(a) = 3\sqrt{2}$ m
hypotenuse $(2a) = 6\sqrt{2}$ m
long leg $(a\sqrt{3}) = 3\sqrt{6}$ m

b) long leg $(b) = 9\sqrt{6}$ m
short leg $\left(\frac{b\sqrt{3}}{3}\right) = \frac{9\sqrt{6}(\sqrt{3})}{3} = 3\sqrt{18} = 9\sqrt{2}$ m

hypotenuse $= 2$(short leg) $= 18\sqrt{2}$ m

c) hypotenuse $(2a) = 8\sqrt{2}$ m
short leg $(a) = 4\sqrt{2}$ m
long leg $(a\sqrt{3}) = 4\sqrt{6}$ m

(20) a) hypotenuse $(c) = 4\sqrt{10}$ m
legs $\left(\frac{c\sqrt{2}}{2}\right) = \frac{4\sqrt{10}(\sqrt{2})}{2} = 4\sqrt{5}$ m

b) hypotenuse $(c) = 6\sqrt{6}$ m
legs $\left(\frac{c\sqrt{2}}{2}\right) = \frac{6\sqrt{6}(\sqrt{2})}{2} = 6\sqrt{3}$ m

c) leg $(a) = 6\sqrt{2}$ m
hypotenuse $(a\sqrt{2}) = 6\sqrt{2}(\sqrt{2}) = 12$m

(21) a) $a + a + b = 180$
$a + a + (6a) = 180$
$8a = 180$
$a = 22.5$
$b = 6a = 6(22.5) = 135°$

b) $x + 3x + x + 3x = 360$
$8x = 360 \rightarrow x = 45°$

c) Supp of $50° = 130°$, $70° = 110°$
$90 + 90 + 130 + 110 + x = 540$
$x = 120°$

(22) a) $\angle b$
b) $\angle g$
c) $\angle f$ and $\angle d$

(23) a) $\angle a$ and $\angle g$
b) $\angle d, \angle f, \angle b, \angle h$
c) $\angle b$ and $\angle f$, $\angle c$ and $\angle g$

4. VOCABULARY

BASIC CURRICULUM

① Denominator
② Prime Factorization
③ Reciprocal
④ Proportion
⑤ Minuend
⑥ Infinite Decimal
⑦ Divisor
⑧ Gram
⑨ Median

(10) Selling / Purchase Price
(11) Addend
(12) Liter
(13) Factor
(14) Mode
(15) Central Tendency
(16) Composite Number
(17) Celsius
(18) Rate of Discount
(19) Odd Numbers
(20) Improper Fraction
(21) Capacity
(22) Difference
(23) GCF
(24) Terminating Decimal
(25) Undefined Value
(26) Mixed Numeral
(27) Data
(28) Fahrenheit
(29) Percent
(30) LCM
(31) Meter
(32) Original / Regular Pr.
(33) Mean
(34) Discount
(35) Repeating Decimal
(36) Complex Fraction
(37) Numerator
(38) Range
(39) Prime Number
(40) Sum
(41) Subtrahend
(42) Dividend
(43) Equivalent
(44) Multiple
(45) Product
(46) Even Number
(47) Quotient

ALGEBRA TERMS

(1) Associative Property of Addition
(2) Multiplicative Identity
(3) Reflexive Property of Equality
(4) Associative Property of Multiplication
(5) Transitive Property of Equality
(6) Multiplicative Inverse
(7) Commutative Property of Addition
(8) Additive Identity
(9) Closure

(10) Commutative Property of Multiplication
(11) Substitution Property of Equality
(12) Additive Inverse
(13) Zero Property
(14) Symmetric Property of Equality
(15) Distributive Property
(16) Simple Interest
(17) Open Sentence
(18) Exponent
(19) Absolute Value
(20) Ratio
(21) Natural Numbers
(22) Whole Numbers
(23) Radicand
(24) Index
(25) Ordered Pair
(26) Slope
(27) Linear Equation
(28) Variable
(29) Intercept
(30) Term
(31) Integers
(32) Constant
(33) Standard Form
(34) Irrational Numbers
(35) Graphing
(36) Principal
(37) Real Numbers
(38) Inequality
(39) Origin
(40) Identity
(41) Coefficient
(42) Equation
(43) Rational Numbers
(44) Vertical
(45) Closed Sentence
(46) Radical
(47) Expression
(48) Coordinate Axis
(49) Slope Intercept Form
(50) Imaginary Numbers
(51) Evaluating Expressions
(52) Simplifying Expressions
(53) Horizontal
(54) False Equation
(55) False Inequality
(56) Compound Interest
(57) Order of Operations
(58) Quadrant
(59) Interpolating

GEOMETRY TERMS

(1) Rectangle
(2) Legs
(3) Diameter
(4) Line
(5) Supplementary Angles
(6) Right Angle
(7) Pentagon
(8) Regular Polygon
(9) Degree
(10) Infinity
(11) Perimeter
(12) Radius
(13) Arc
(14) Semi-circle

15. Angle
16. Edge
17. Triangle
18. Scalene Triangle
19. Circle
20. Pi
21. Face
22. Lateral Face
23. Point
24. Heptagon
25. Central Angle
26. Trapezoid
27. Cylinder
28. Lateral Surface
29. Pythagorean Theorem
30. Pythagorean Triple
31. Line Segment
32. Parallel Lines
33. Ray
34. Corresponding Angles
35. Transversal
36. Parallelogram
37. Protractor
38. Volume
39. Rhombus
40. Equiangular Triangle
41. Area
42. Alternate Interior Angles
43. Complementary Angles
44. Vertical Angles
45. Similar Polygons
46. Equilateral Triangle
47. Octagon
48. Intersection
49. Quadrilateral
50. Perpendicular Lines
51. Curve
52. Obtuse Triangle
53. Square
54. Exclusive
55. Inclusive
56. Isosceles Triangle
57. Altitude
58. Line of Symmetry
59. Plane
60. Obtuse Angle
61. Polygon
62. Congruent
63. Hypotenuse
64. Sector
65. Hexagon
66. Acute Angle
67. closed Curve
68. Rectangular Prism
69. Linear Pair
70. Circumference
71. Chord
72. Triangular Prism
73. Acute Triangle
74. Right Triangle
75. Simple Closed Curve
76. Vertex
77. Adjacent Angles
78. Straight Angle
79. Surface Area