

Algebra Skills Review

ANSWER KEY I

① Additive Inverse

② $2a^2 - 3ab + a^3$
 $2(-2)^2 - 3(-2)(-3) + (-2)^3$
 $2(4) - 3(6) + (-8)$
 $8 + (-18) + (-8) = \boxed{-18}$


③ $3ab - 2a(a - 3b) - 4a^2$
 $3ab - 2a^2 + 6ab - 4a^2$
 $\boxed{9ab - 6a^2}$

④ $\frac{2n}{3} - 3(n-1) = -4(n+4) - 1$
 $\frac{2n}{3} - 3n + 3 = -4n - 16 - 1$
 $2n - 9n + 9 = -12n - 51$
 $5n = -60$
 $\boxed{n = -12}$

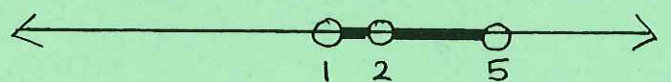
⑤ $\frac{2x+9}{5} > \frac{x+4}{3}$
 $3(2x+9) > 5(x+4)$
 $6x+27 > 5x+20$
 $\boxed{x > -7}$

⑥ $3nc - 2 = 5n$
 $3nc - 5n = 2$
 $n(3c - 5) = 2$
 $\boxed{n = \frac{2}{3c-5} \text{ for } c \neq \frac{5}{3}}$

⑦ $|a+2| - 4 \geq 2$
 $|a+2| \geq 6$
 $a+2 \geq 6$ or $a+2 \leq -6$
 $\boxed{a \geq 4 \text{ or } a \leq -8}$



⑧ $|3a-9| < 6$ and $|a| \neq 2$
 $\boxed{3a-9 < 6 \text{ and } 3a-9 > -6}$ and $a \neq 2$ and $a \neq -2$
 $3a < 15$ $3a > 3$
 $a < 5$ and $a > 1$
 $\boxed{1 < a < 5}$ and $(a \neq 2 \text{ and } a \neq -2)$



⑨ $(-\frac{1}{2}x^2y^3z)^2 (-2xy^{-1}z^2)^3$
 $(\frac{1}{4}x^4y^6z^2)(-8x^3y^{-3}z^6) = \boxed{-2x^7y^3z^8}$

⑩ $\frac{-18a^2b^3c^{-3}}{8a^{-3}b^2c^{-1}} = \boxed{\frac{-9a^5b}{4c^2}}$

⑪ $(.03 \times 10^3)(.14 \times 10^{-2})$
 $.0042 \times 10^{-5} = \boxed{4.2 \times 10^{-8}}$

⑫ $(4x+7)(2x-5) = \boxed{8x^2 - 6x - 35}$

⑬

$$\begin{array}{r}
 2a^2 + 3a + 2 - \frac{3}{a-1} \\
 a-1 \overline{) 2a^3 + a^2 - a - 5} \\
 \underline{2a^3 - 2a^2} \\
 3a^2 - a \\
 \underline{3a^2 - 3a} \\
 2a - 5 \\
 \underline{2a - 2} \\
 -3
 \end{array}$$

Algebra Skills Review

ANSWER KEY I

$$(14) (2ab^{x+2} - 3c^{4x})^2$$

$$4a^2b^{2x+4} - 12ab^{x+2}c^{4x} + 9c^{8x}$$

$$(15) (4x^n + y^{n-3})(4x^n - y^{n-3})$$

$$16x^{2n} - y^{2n-6}$$

$$(16) 12a^2b, 30ab^3c, 56abc^2$$

$$12 = 2^2 \cdot 3$$

$$\text{GCF} = 2$$

$$30 = 2 \cdot 3 \cdot 5$$

$$\text{LCM} = 2^3 \cdot 3 \cdot 5 \cdot 7$$

$$56 = 2^3 \cdot 7$$

$$\text{GCF} = 2ab \quad \text{LCM} = 840a^2b^3c^2$$

$$(17) n^8 - 1 = (n^4 + 1)(n^4 - 1) = (n^4 + 1)(n^2 + 1)(n^2 - 1)$$

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

$$(18) 6n^2 + 14n - 12$$

$$2(3n^2 + 7n - 6) = 2(3n^2 + 9n - 2n - 6) =$$

$$2[3n(n+3) - 2(n+3)] = 2(n+3)(3n-2)$$

$$(19) (3n-2x)^2 - (n+5x)^2$$

$$[(3n-2x) + (n+5x)][(3n-2x) - (n+5x)]$$

$$(4n+3x)(2n-7x)$$

$$(20) a^2b^2 - a^4 + a^2b^2 - b^4$$

$$a^2(b^2 - a^2) + b^2(a^2 - b^2)$$

$$a^2(b^2 - a^2) - b^2(b^2 - a^2)$$

$$(b^2 - a^2)(a^2 - b^2)$$

$$(b+a)(b-a)(a+b)(a-b)$$

$$(21) 2n^3 + 6n = -8n^2$$

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

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

$$2n(n+3)(n+1) = 0$$

$$n = 0, -3, -1$$

$$(22) (-2, -10) (4, -15) \quad \frac{(-10) - (-15)}{(-2) - (-4)} = \frac{5}{-6}$$

$$\frac{5}{-6} = \frac{A}{-B} \quad A = 5$$

$$B = 6$$

$$5x + 6y = c$$

$$5(-2) + 6(-10) = -70$$

$$5x + 6y = -70$$

$$(23) 2x - y = 12 \quad \text{slope} = 2$$

perpendicular slope = $-\frac{1}{2}$

$$y = -\frac{1}{2}x + b \quad (-3, 9)$$

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

$$9 = \frac{3}{2} + b$$

$$b = \frac{15}{2}$$

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

$$(24) y = \frac{2}{5}x - 4 \quad \text{slope} = \frac{2}{5} \quad (-2, -5)$$

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

continued

Algebra Skills Review

ANSWER KEY I

25) $4x + 4 = -2y$ divide by -2

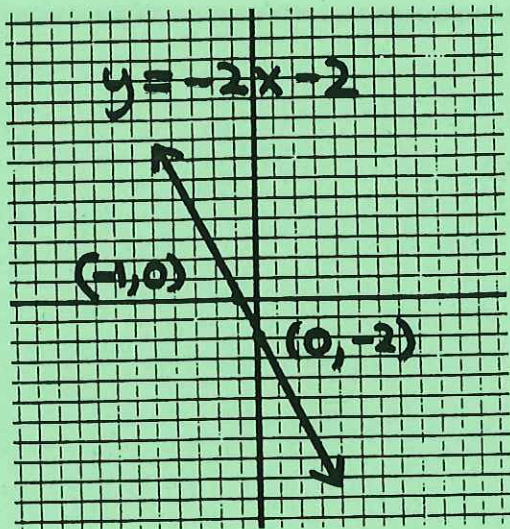
$$-2x - 2 = y$$

$$y = -2x - 2$$

slope = $m = -2$

y-int = $b = -2$ $(0, -2)$

x-int = $-b/m = -1$ $(-1, 0)$



26) $(-9, 7)$ $(-3, 5)$

x-coordinate $\frac{(-9) + (-3)}{2} = -6$

y-coordinate $\frac{(7) + (5)}{2} = 6$

$$(-6, 6)$$

27) $f[g(n+3)]$ $f(x) = x - x^2$ $g(x) = x - 5$

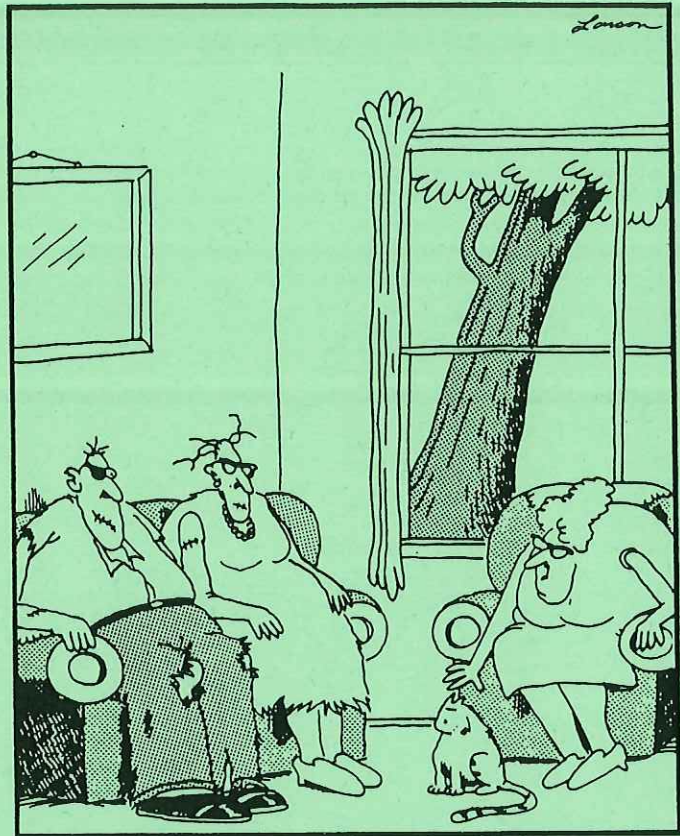
$$g(n+3) = (n+3) - 5 = n - 2$$

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

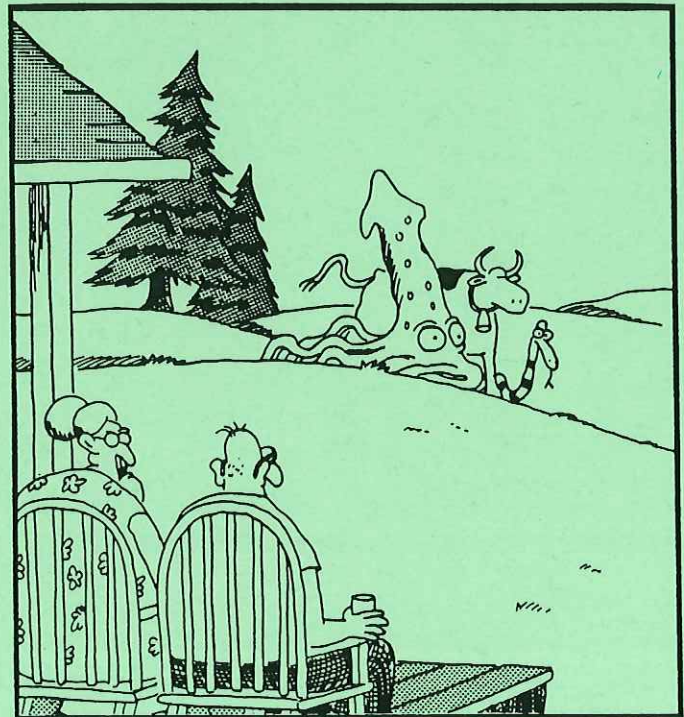
$$(n-2) - (n^2 - 4n + 4)$$

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

$$-n^2 + 5n - 6$$



"Oh, what a cute little Siamese. ... Is he friendly?"



"Looks like another one of those stupid 'Incredible Journey' things."

Algebra Skills Review

ANSWER KEY II

① Commutative Property of Addition

② $a^3 - 3b^2 + 3ab$

$(-1)^3 - 3(-4)^2 + 3(-1)(-4)$

$(-1) - 3(16) + 3(4)$

$(-1) + (-48) + (12) = \boxed{-37}$

③ $4x(2x-y) - 3x(y+2x)$

$8x^2 - 4xy - 3xy - 6x^2 = \boxed{2x^2 - 7xy}$

④ $12 + \frac{3x}{5} = -3(x+8)$

$12 + \frac{3x}{5} = -3x - 24$

$60 + 3x = -15x - 120$

$18x = -180$

$x = \boxed{-10}$

⑤ $\frac{3(2n+1)}{7} \geq \frac{12-n}{3}$

$\frac{6n+3}{7} \geq \frac{12-n}{3}$

$3(6n+3) \geq 7(12-n)$

$18n+9 \geq 84-7n$

$25n \geq 75$

$n \geq \boxed{3}$

⑥ $2(3x+y) = 3y(x-1)$

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

$6x - 3xy = -5y$

$x(6-3y) = -5y$

$x = \frac{-5y}{6-3y}$
for $y \neq 2$

⑦ $|n-1| + 3 < 9$

$|n-1| < 6$

$n-1 < 6$ and $n-1 > -6$

$n < 7$ and $n > -5$

$\boxed{-5 < n < 7}$

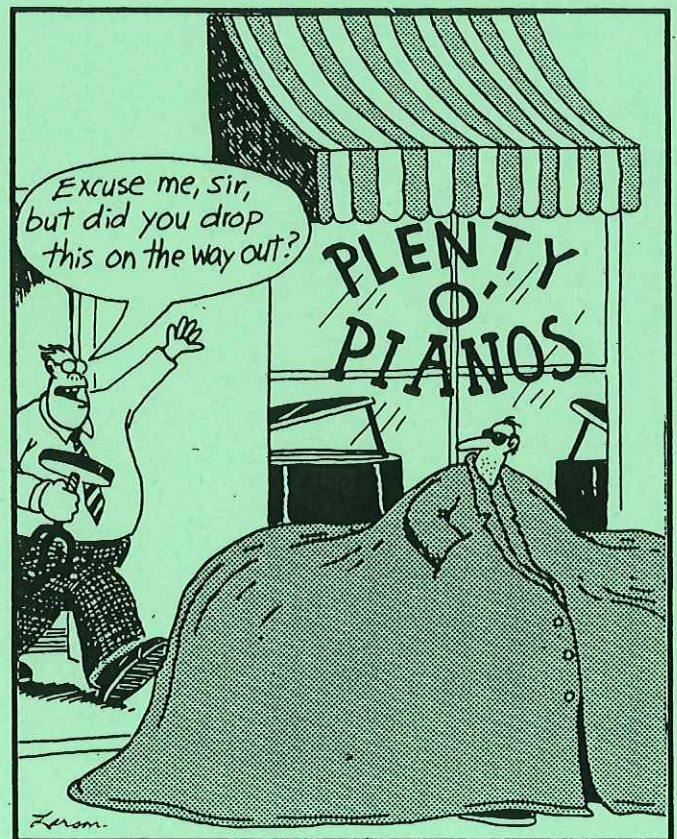


⑧ $|n+4| - 1 \geq 2$ and $|n| < 10$

$|n+4| \geq 3$

$[n+4 \geq 3 \text{ or } n+4 \leq -3]$ and $[n < 10 \text{ and } n > -10]$

$(n \geq -1 \text{ or } n \leq -7)$ and $(-10 < n < 10)$



Stupid clerks

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS I & II - ANSWER KEY

① Multiplicative Inverse

② $4x2y - 2(x+2y)$

$$4(-1)^2(-5) - 2((-1)+2(-5))$$

$$4(1)(-5) - 2(-11)$$

$$(-20) - (-22) = \boxed{2}$$

③ $3n^2 - 2n(n+m) + 2mn - n^2$

$$3n^2 - 2n^2 - 2mn + 2mn - n^2 = \boxed{0}$$

④ $5(n-2) = \frac{n}{2} + 3n - 1$

$$5n - 10 = \frac{n}{2} + 3n - 1$$

$$10n - 20 = n + 6n - 2$$

$$10n - 20 = 7n - 2$$

$$3n = 18$$

$$\boxed{n = 6}$$

⑤ $3(n+4) > \frac{4n+6}{3}$

$$3n+12 > \frac{4n+6}{3}$$

$$3(3n+12) > 4n+6$$

$$9n+36 > 4n+6$$

$$5n > -30$$

$$\boxed{n > -6}$$

⑥ $xy - 3ab = 2a(x+b)$

$$xy - 3ab = 2ax + 2ab$$

$$xy - 2ax = 5ab$$

$$x(y-2a) = 5ab$$

$$\boxed{x = \frac{5ab}{y-2a} \text{ for } y-2a \neq 0}$$

⑦ $|2a-1| - 2 > 7$

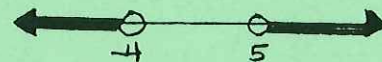
$$|2a-1| > 9$$

$$2a-1 > 9 \text{ or } 2a-1 < -9$$

$$2a > 10 \qquad 2a < -8$$

$$a > 5 \text{ or } a < -4$$

$$\boxed{a > 5 \text{ or } a < -4}$$

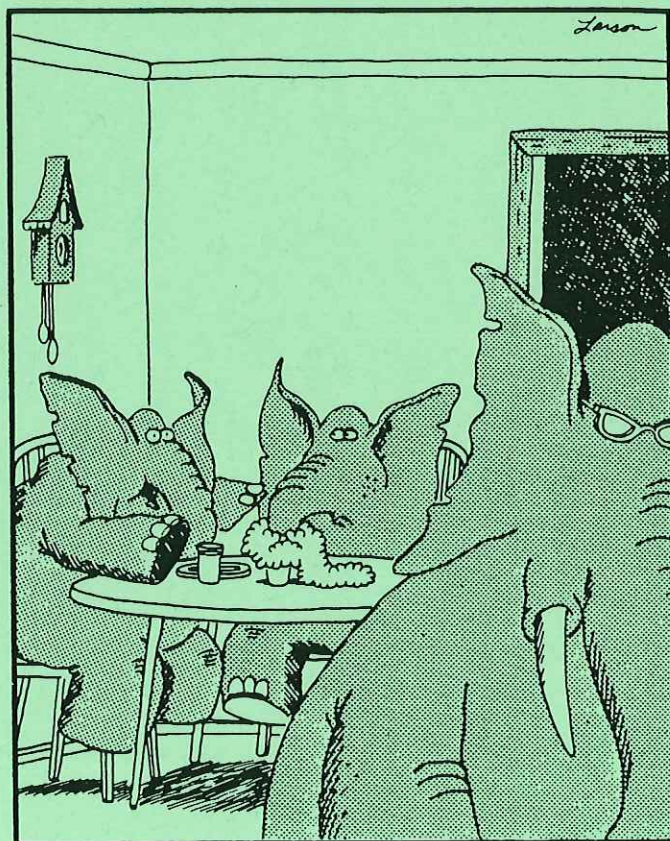


⑧ $|a+4| \leq 7$ and $|a| \neq 2$

$$[a+4 \leq 7 \text{ and } a+4 \geq -7] \text{ and } [a \neq 2 \text{ and } a \neq -2]$$

$$[a \leq 3 \text{ and } a \geq -11]$$

$$\boxed{(-11 \leq a \leq 3) \text{ and } (a \neq 2 \text{ and } a \neq -2)}$$



"Mom! Allen's makin' his milk foam!"

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS I & II - ANSWER KEY

$$\textcircled{9} (2x^{-2}y^3)^5 (-\frac{1}{2}x^4y^{-2})^3$$

$$(32x^{-10}y^{15}) (-\frac{1}{8}x^{12}y^{-6}) = \boxed{-4x^2y^9}$$

$$\textcircled{10} \frac{-12x^3y^{-2}}{-20x^{-2}y^{\frac{4}{2}-2}} = \boxed{\frac{3x^5z^2}{5y^6}}$$

$$\textcircled{11} \frac{7000 \times 10^{-4}}{.5 \times 10^{-2}} = 14,000 \times 10^{-2} = \boxed{1.4 \times 10^2}$$

$$\textcircled{12} (2a-7b)(3a-5b) = \boxed{6a^2-31ab+35b^2}$$

$$\textcircled{13} \begin{array}{r} x-3y \overline{) 4x^3+12x^2y+36xy^2+108y^3+319y^4} \\ \underline{4x^4-12x^3y} \\ 12x^3y \\ \underline{12x^3y-36x^2y^2} \\ 36x^2y^2 \\ \underline{36x^2y^2-108xy^3} \\ 108xy^3-5y^4 \\ \underline{108xy^3-324y^4} \\ 319y^4 \end{array}$$

$$\textcircled{14} (x^{3n-2} - 4y^{2n+1})^2$$

$$\boxed{x^{6n-4} - 8x^{3n-2}y^{2n+1} + 16y^{4n+2}}$$

$$\textcircled{15} (3a^{3x} + b^{x-1})(3a^{3x} - b^{x-1})$$

$$\boxed{9a^{6x} - b^{2x-2}}$$

$$\textcircled{16} 60a^3b^5c^2, 100a^4b^2c^3, 108a^2b^3c^4$$

$$60 = 2^2 \cdot 3 \cdot 5 \quad \text{GCF} = 2^2$$

$$100 = 2^2 \cdot 5^2 \quad \text{LCM} = 2^2 \cdot 3^3 \cdot 5^2$$

$$108 = 2^2 \cdot 3^3$$

$$\boxed{\text{GCF} = 4a^2b^2c^2 \quad \text{LCM} = 2700a^4b^5c^4}$$

$$\textcircled{17} 3a^6b^2 - 3a^2b^6 = 3a^2b^2(a^4-b^4) =$$

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

$$\boxed{3a^2b^2(a^2+b^2)(a+b)(a-b)}$$

$$\textcircled{18} 6a^2 - 3ab - 9b^2$$

$$3(2a^2 - ab - 3b^2) = 3[2a^2 - 3ab + 2ab - 3b^2]$$

$$3[a(2a-3b) + b(2a-3b)] = \boxed{3(2a-3b)(a+b)}$$

$$\textcircled{19} (2n+5)^2 - (n-4)^2$$

$$[(2n+5)+(n-4)][(2n+5)-(n-4)]$$

$$\boxed{(3n+1)(n+9)}$$

$$\textcircled{20} a^6 - a^4b^2 - a^2b^4 + b^6$$

$$a^4(a^2-b^2) - b^4(a^2-b^2)$$

$$(a^2-b^2)(a^4-b^4)$$

$$(a+b)(a-b)(a^2+b^2)(a^2-b^2)$$

$$\boxed{(a+b)(a-b)(a^2+b^2)(a+b)(a-b)}$$

$$\text{or } (a+b)^2(a-b)^2(a^2+b^2)$$

$$\textcircled{21} 9a^3 = 4a$$

$$9a^3 - 4a = 0$$

$$a(9a^2 - 4) = 0$$

$$a(3a+2)(3a-2) = 0$$

$$\boxed{a = 0, -\frac{2}{3}, \frac{2}{3}}$$

Continued

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS I & II - ANSWER KEY

22) $(-4, 5)$ $(-3, 9)$ $\frac{(5)-(9)}{(-4)-(-3)} = \frac{-4}{-1} = 4$

$\frac{4}{1} = \frac{A}{-B}$ $A=4$ $B=-1$

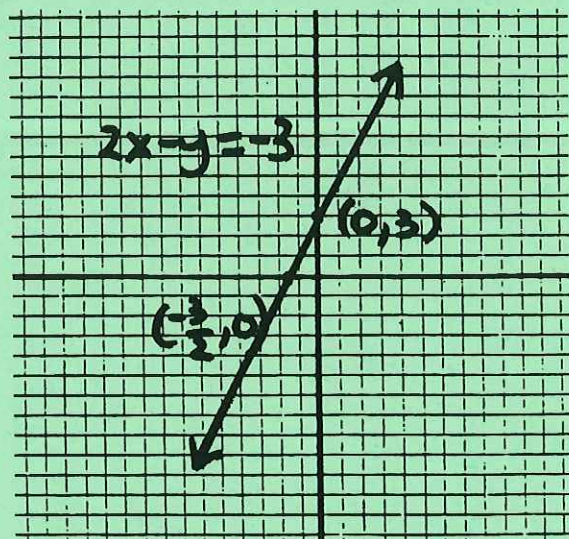
$4x - y = C$

$4(-4) - (5) = -21$ $\boxed{4x - y = -21}$

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

y-int = $\frac{C}{B} = 3 = \boxed{(0, 3)}$

x-int = $\frac{C}{A} = -\frac{3}{2} = \boxed{(-\frac{3}{2}, 0)}$



23) $3x + 2y = 4$ slope = $-\frac{3}{2}$

perpendicular slope = $\frac{2}{3}$

$y = \frac{2}{3}x + b$ $(-1, 5)$

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

$\frac{15}{3} + \frac{2}{3} = b$ $\boxed{y = \frac{2}{3}x + \frac{17}{3}}$

24) $y + 6 = \frac{2}{3}(x - 3)$

$\boxed{\text{slope} = \frac{2}{3}}$

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

$3y + 18 = 2x - 6$

$-2x + 3y = -24$

$2x - 3y = 24$

y-intercept = $\frac{24}{-3} = -8 = \boxed{(0, -8)}$

x-intercept = $\frac{24}{2} = 12 = \boxed{(12, 0)}$

26) $A(5, -12)$ $B(-1, 4)$

x-coordinate $\frac{[(5)+(-1)]}{2} = 2$

y-coordinate $\frac{[(-12)+(4)]}{2} = -4$

midpoint $\boxed{(2, -4)}$

25) $-\frac{4}{3}x + \frac{2}{3}y = 2$ mult. by 3

$-4x + 2y = 6$ mult. by -1

$4x - 2y = -6$ Div. by 2

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

27) $f[g(n-3)]$ $f(x) = 6 - x^2$ $g(x) = x - 1$

$g(n-3) = (n-3) - 1$

$n - 4$

$f(n-4) = 6 - (n-4)^2$

$6 - (n^2 - 8n + 16)$

$6 - n^2 + 8n - 16$

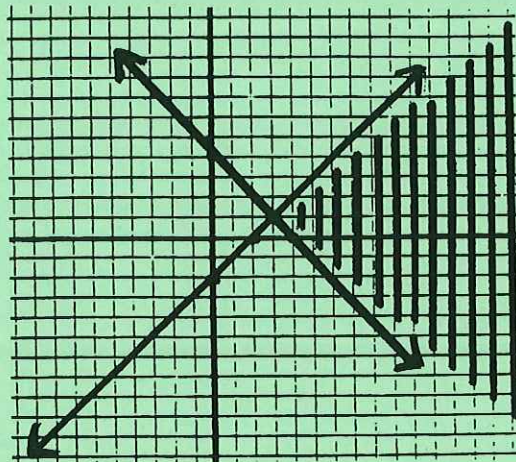
$\boxed{-n^2 + 8n - 10}$

Algebra Skills Review

ANSWER KEY III

① $4x - y = 6$ slope = 4 y-int = -6
 $12x - 3y = 18$ slope = 4 y-int = -6

consistent, dependent, inf. solutions



② $5x - 2y = 17$
 $x + 3y = 0$ mult. by -5

$$\begin{array}{r} 5x - 2y = 17 \\ -5x - 15y = 0 \\ \hline -17y = 17 \\ y = -1 \end{array}$$

$$\begin{array}{l} x + 3(-1) = 0 \\ x + (-3) = 0 \\ x = 3 \end{array}$$

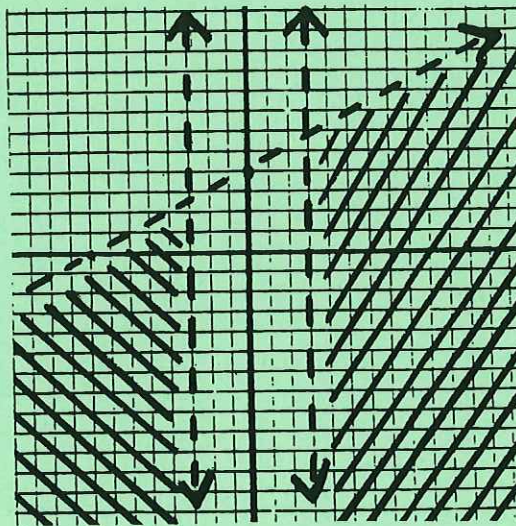
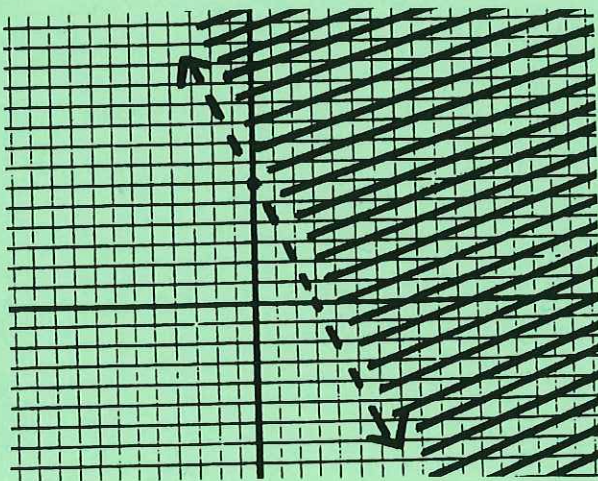
$(3, -1)$

⑤ $y < \frac{1}{2}x + 4$ and $|x| > 3$

$(y < \frac{1}{2}x + 4)$ and $(x > 3$ or $x < -3)$

③ $2x + y > 6$

$y > -2x + 6$



④ $|y - 1| + 3 \leq x$

$|y - 1| \leq x - 3$

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

$y \leq x - 2$ and $y \geq -x + 4$

⑥ $\sqrt{54x^2y^3z^8} = 3|x|y z^4 \sqrt{6y}$

Continued

Algebra Skills Review

ANSWER KEY III

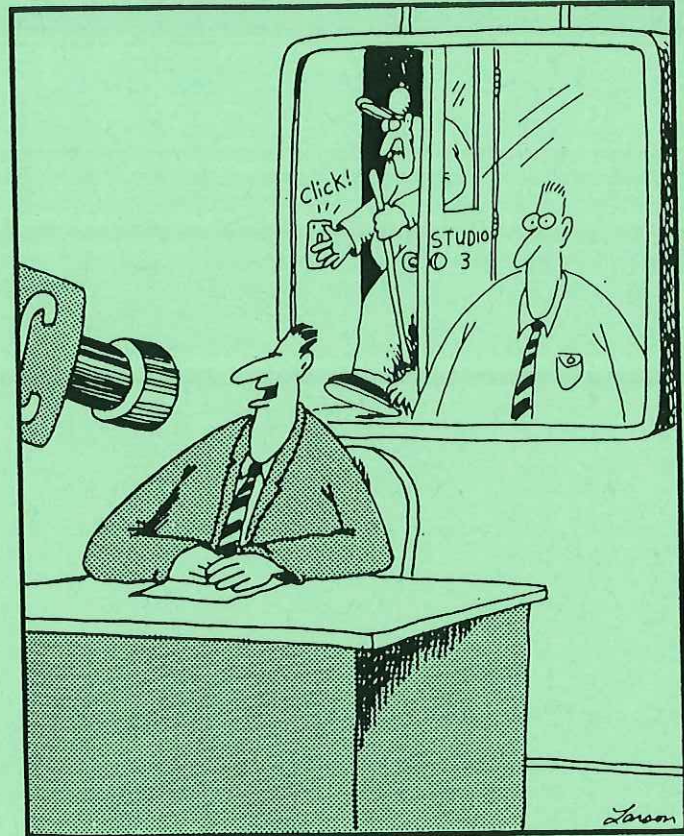
$$\begin{array}{r} \textcircled{7} \quad 14.28 \approx \boxed{14.3} \\ \sqrt{204.0000} \\ \hline 1 \\ 2\overline{)104} \\ \underline{96} \\ 28\overline{)800} \\ \underline{564} \\ 284\overline{)23600} \end{array}$$

$$\begin{aligned} \textcircled{8} \quad & \sqrt{2}(3\sqrt{6}-\sqrt{10})-2\sqrt{3} \\ & 3\sqrt{12}-\sqrt{20}-2\sqrt{3} \\ & 6\sqrt{3}-2\sqrt{5}-2\sqrt{3} = \boxed{4\sqrt{3}-2\sqrt{5}} \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad & \frac{2\sqrt{3}}{3\sqrt{2}-\sqrt{3}} \cdot \frac{3\sqrt{2}+\sqrt{3}}{3\sqrt{2}+\sqrt{3}} = \frac{6\sqrt{6}+6}{18-3} = \\ & \frac{6\sqrt{6}+6}{15} = \boxed{\frac{2\sqrt{6}+2}{5}} \end{aligned}$$

$$\begin{aligned} \textcircled{10} \quad & \left. \begin{array}{l} \sqrt{1156} = 34 \\ \sqrt{1179} \\ \sqrt{1225} = 35 \end{array} \right\} 69 \left. \right\} 23 \\ & 34^{23/69} = \boxed{34^{1/3}} \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad & \sqrt{2x+5} - 1 = 2 \\ & \sqrt{2x+5} = 3 \\ & 2x+5 = 9 \\ & 2x = 4 \quad \boxed{x=2} \end{aligned}$$



"My next guest, on the monitor behind me, is an organized crime informant. To protect his identity, we've placed him in a darkened studio—so let's go to him now."

$$\begin{aligned} \textcircled{12} \quad & a^2 + b^2 = c^2 \\ & 4^2 + b^2 = 8^2 \\ & 16 + b^2 = 64 \\ & b^2 = 48 \rightarrow b = \sqrt{48} = \boxed{4\sqrt{3} \text{ m}} \end{aligned}$$

$$\begin{aligned} \textcircled{13} \quad & (3,5) \text{ to } (5,9) \\ & d = \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2} \\ & d = \sqrt{(3-5)^2 + (5-9)^2} = \sqrt{4+16} \\ & d = \sqrt{20} = \boxed{2\sqrt{5}} \end{aligned}$$

Algebra Skills Review

ANSWER KEY III

⑭ $y = x^2 - 10x + 21$
axis of symmetry $\rightarrow x = -b/2a$

$$x = 5$$

$$y = (5)^2 - 10(5) + 21$$

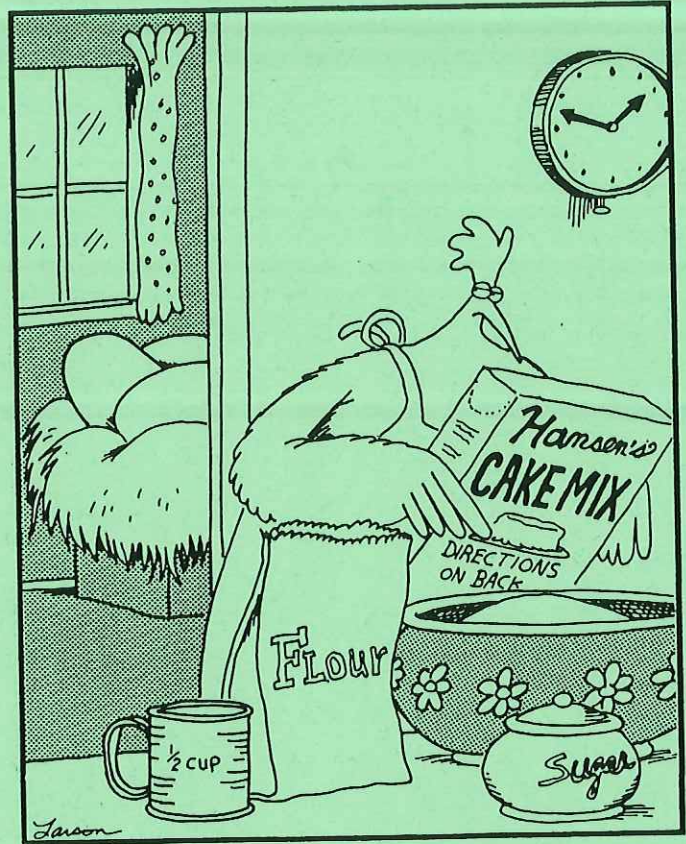
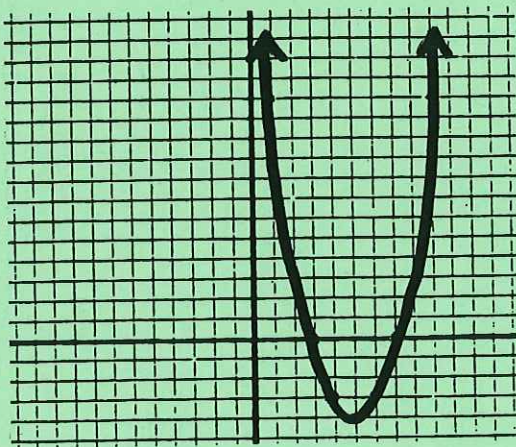
$$25 - 50 + 21 = -4 \quad \boxed{(5, -4)}$$

x	y
4	-3
3	0
1	12

$$(4)^2 - 10(4) + 21 = -3$$

$$(3)^2 - 10(3) + 21 = 0$$

$$(1)^2 - 10(1) + 21 = 12$$



⑰ $-4n^2 + 8n = -3$

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

$$a = -4 \quad \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$b = 8$$

$$c = 3$$

$$\frac{-8 \pm \sqrt{(8)^2 - 4(-4)(3)}}{2(-4)}$$

$$\boxed{\frac{2 \pm \sqrt{7}}{2}}$$

$$\frac{-8 \pm \sqrt{112}}{-8} = \frac{-8 \pm 4\sqrt{7}}{-8}$$

⑮ $2x^2 - 11x + 15 = 0$ $(x-3)(2x-5) = 0$

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

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

$$\boxed{x = 3, 5/2}$$

⑯ $2n^2 - 12n + 14 = 0$

$$n^2 - 6n = -7$$

$$n^2 - 6n + 9 = -7 + 9$$

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

$$n-3 = \pm\sqrt{2}$$

$$n = \boxed{3 \pm \sqrt{2}}$$

⑰ $x^2 + 5x + 3 = 0$

discriminant $b^2 - 4ac$ IR

$$(5)^2 - 4(1)(3) = 13$$

positive discriminant

$\boxed{2 \text{ real roots}}$

Algebra Skills Review

ANSWER KEY III

$$\textcircled{19} \frac{2x^2+x-1}{x^2+5x+6} \times \frac{x+3}{x+1}$$

$$\frac{(2x-1)\cancel{(x+1)}}{\cancel{(x+3)}(x+2)} \times \frac{\cancel{(x+3)}}{\cancel{(x+1)}}$$

$$\boxed{\frac{2x-1}{x+2}}$$

$$\textcircled{20} \frac{n^2-16}{n^2-64} \div \frac{n+4}{n-8}$$

$$\frac{\cancel{(n+4)}(n-4)}{(n+8)\cancel{(n-8)}} \times \frac{\cancel{(n-8)}}{\cancel{(n+4)}} = \boxed{\frac{n-4}{n+8}}$$

$$\textcircled{21} \frac{4}{5-n} - \frac{3}{n^2-5n} = \frac{4}{5-n} - \frac{3}{n(n-5)} =$$

$$\frac{4}{5-n} + \frac{3}{n(5-n)} = \frac{4n}{n(5-n)} + \frac{3}{n(5-n)} =$$

$$\boxed{\frac{4n+3}{n(5-n)}}$$

$$\textcircled{22} \frac{\frac{x+y}{a+b}}{\frac{x^2-y^2}{a^2-b^2}} = \frac{\frac{x+y}{a+b}}{\frac{(x+y)(x-y)}{(a+b)(a-b)}} =$$

$$\frac{\cancel{(x+y)}}{\cancel{(a+b)}} \times \frac{\cancel{(a+b)}(a-b)}{\cancel{(x+y)}(x-y)} = \boxed{\frac{a-b}{x-y}}$$

$$\textcircled{23} \left[\frac{-2}{y+3} - \frac{2}{y} = -1 \right] (y+3)(y)$$

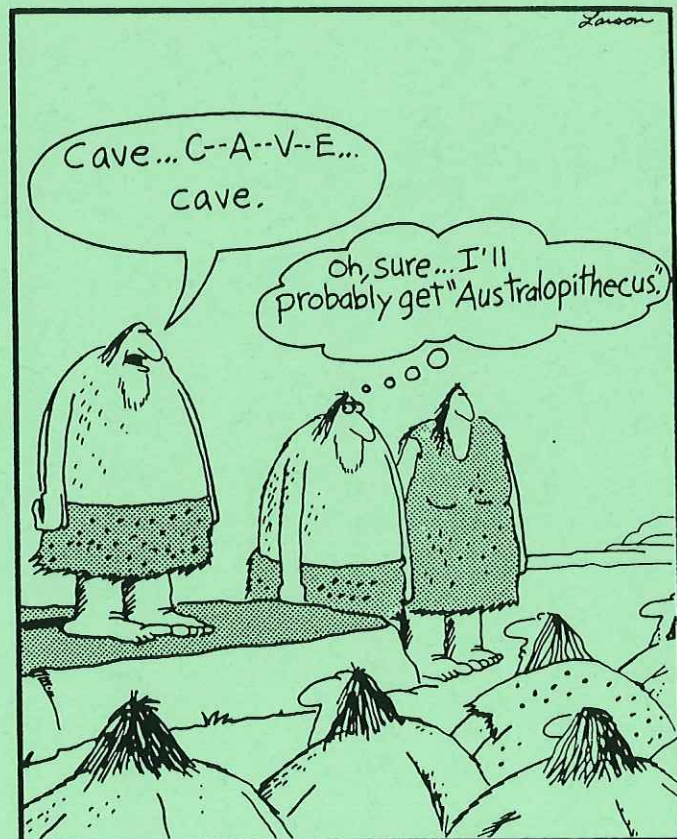
$$-2y - 2(y+3) = -(y+3)(y)$$

$$-2y - 2y - 6 = -y^2 - 3y$$

$$y^2 - y - 6 = 0$$

$$(y-3)(y+2) = 0$$

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



Primitive spelling bees

Algebra Skills Review

ANSWER KEY IV

① $y = 6x - 8$ slope = 6

$12x - 3y = 16$ slope = 4

independent, consistent, 1 solution

② $2x + 3y = 6$ mult. by -3

$3x + 4y = 7$ mult. by 2

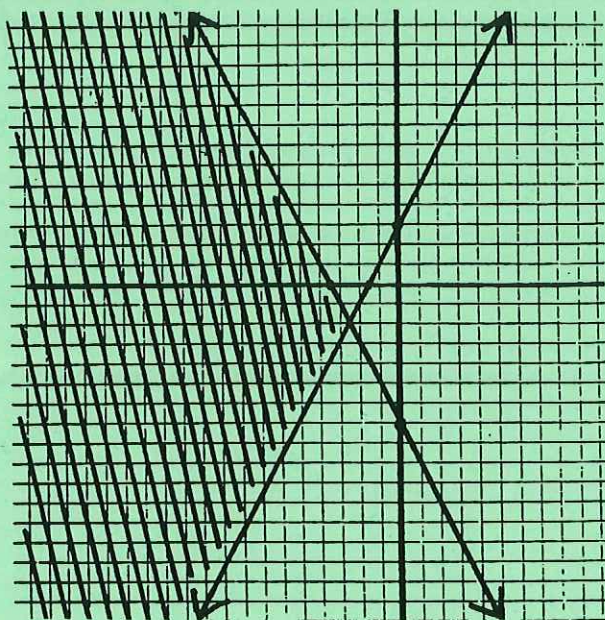
$-6x - 9y = -18$

$6x + 8y = 14$ $2x + 3(4) = 6$

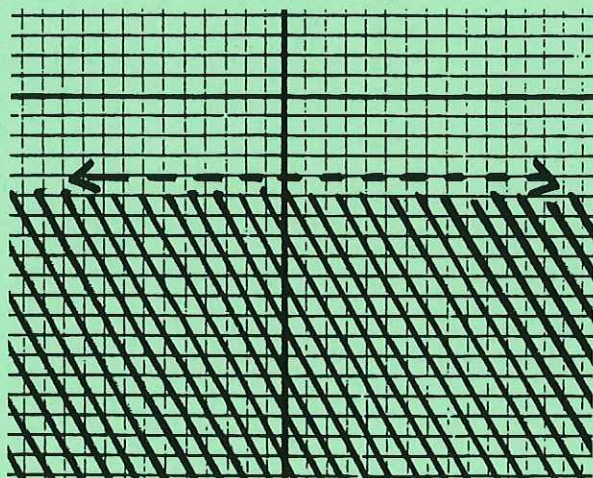
$-y = -4$ $2x = -6$

$y = 4$ $x = -3$

$(-3, 4)$



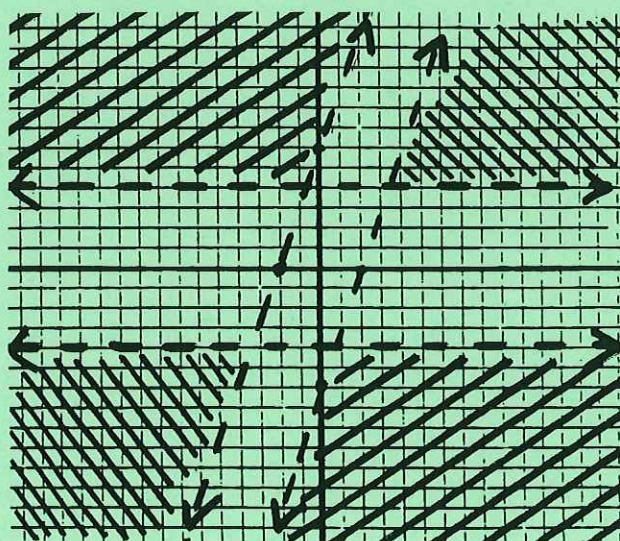
③ $y < -4$



⑤ $|y - 3x| > 6$ and $|y| > 4$

$[y - 3x > 6 \text{ or } y - 3x < -6]$

$[y > 3x + 6 \text{ or } y < 3x - 6]$ and $[y > 4 \text{ or } y < -4]$



④ $|y + 2| + 5 \leq -2x$

$|y + 2| \leq -2x - 5$

$y + 2 \leq -2x - 5$ and $y + 2 \geq -2x - 5$

$y \leq -2x - 7$ and $y \geq -2x - 3$

⑥ $\sqrt{72a^3b^4c^2} = 6ab^2|c|\sqrt{2a}$

Algebra Skills Review

ANSWER KEY IV

⑦ $\begin{array}{r} 21.35 \\ \sqrt{456.0000} \end{array} \approx \boxed{21.4}$

$$\begin{array}{r} 41 \overline{) 56} \\ \underline{41} \\ 1500 \\ \underline{1269} \\ 23100 \end{array}$$

⑧ $\sqrt{5}(3\sqrt{10} + 2\sqrt{15}) - \sqrt{27}$
 $3\sqrt{50} + 2\sqrt{75} - \sqrt{27}$
 $15\sqrt{2} + 10\sqrt{3} - 3\sqrt{3} = \boxed{15\sqrt{2} + 7\sqrt{3}}$

⑨ $\frac{3\sqrt{5}}{\sqrt{5}+2\sqrt{2}} \cdot \frac{\sqrt{5}-2\sqrt{2}}{\sqrt{5}-2\sqrt{2}} = \frac{15-6\sqrt{10}}{5-8} =$
 $\frac{15-6\sqrt{10}}{-3} = \boxed{-5+2\sqrt{10}}$

⑩ $38 = \sqrt{1444}$
 $\sqrt{1488}$
 $39 = \sqrt{1521}$
 $\left. \begin{array}{l} 38 \\ 39 \end{array} \right\} 77 \left. \right\} 44$
 $38 \frac{44}{77} = \boxed{38 \frac{4}{7}}$

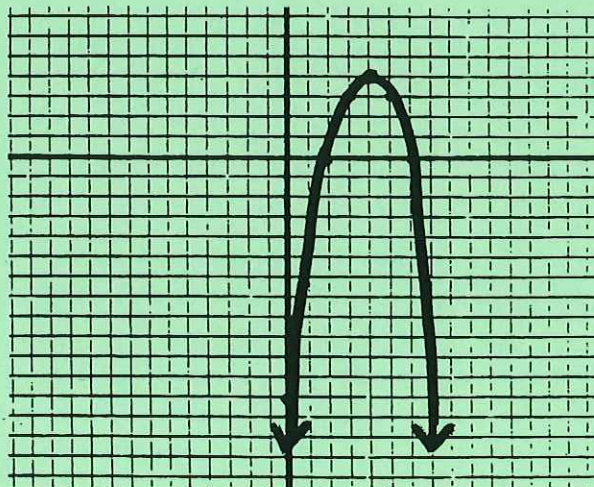
⑪ $\sqrt{4a+13} - 3 = 2$
 $\sqrt{4a+13} = 5$
 $4a+13 = 25$
 $4a = 12$
 $\boxed{a=3}$

⑫ $a^2+b^2=c^2$ $c^2=68$
 $2^2+8^2=c^2$ $c=\sqrt{68}$
 $4+64=c^2$ $c=\boxed{2\sqrt{17}}$

⑬ (6,-2) to (-2,-4)
 $d = \sqrt{(6-(-2))^2 + ((-2)-(-4))^2}$
 $d = \sqrt{(8)^2 + (2)^2} = \sqrt{68}$
 $d = \boxed{2\sqrt{17}}$

⑭ $y = -x^2 + 8x - 12$
axis $x = -\frac{b}{2a}$ $\boxed{x=4}$
 $y = -(4)^2 + 8(4) - 12 = 4$ $\boxed{(4,4)}$

x	y	
3	3	$-(3)^2 + 8(3) - 12 = 3$
2	0	$-(2)^2 + 8(2) - 12 = 0$
0	-12	$-(0)^2 + 8(0) - 12 = -12$



continued

Algebra Skills Review

ANSWER KEY IV

$$\begin{aligned} \textcircled{15} \quad 3x^2 + 16x + 16 &= 0 & (x+4)(3x+4) &= 0 \\ 3x^2 + 12x + 4x + 16 &= 0 & x &= -4, -4/3 \\ 3x(x+4) + 4(x+4) &= 0 & & \end{aligned}$$

$$\begin{aligned} \frac{(n+1)(n+1)}{(n-1)} \times \frac{2(n-1)(n-3)}{(n+1)} \\ \boxed{2(n+1)(n-3)} \quad \text{or} \quad \boxed{2n^2 - 4n - 6} \end{aligned}$$

$$\begin{aligned} \textcircled{16} \quad 3n^2 - 24n &= 36 \\ n^2 - 8n &= 12 \\ n^2 - 8n + 16 &= 12 + 16 \\ (n-4)^2 &= 28 \\ n-4 &= \pm 2\sqrt{7} \\ \boxed{n = 4 \pm 2\sqrt{7}} \end{aligned}$$

$$\begin{aligned} \textcircled{21} \quad \frac{3}{2n-4} + \frac{2}{2n-n^2} &= \frac{3}{2(n-2)} + \frac{2}{n(2-n)} \\ \frac{3}{2(n-2)} - \frac{2}{n(n-2)} &= \frac{3}{2(n-2)} \left(\frac{n}{n}\right) - \frac{2}{n(n-2)} \left(\frac{2}{2}\right) \end{aligned}$$

$$\begin{aligned} \textcircled{17} \quad 4n^2 + 8n - 1 &= 0 \\ a=4 \quad b=8 \quad c=-1 & \quad \frac{-8 \pm \sqrt{(8)^2 - 4(4)(-1)}}{2(4)} \\ \boxed{\frac{-2 \pm \sqrt{5}}{2}} \quad \frac{-8 \pm \sqrt{80}}{8} &= \frac{-8 \pm 4\sqrt{5}}{8} \end{aligned}$$

$$\boxed{\frac{3n-4}{2n(n-2)}}$$

$$\begin{aligned} \textcircled{22} \quad \frac{x+y}{x^2-y^2} &= \frac{(x+y)}{(x-y)(x+y)} = \frac{(x+y)}{(x-y)(\cancel{x+y})} \\ \frac{x-y}{y^2-x^2} &= \frac{(x-y)}{(y-x)(y+x)} = \frac{-1(\cancel{x-y})}{(\cancel{x-y})(y+x)} \end{aligned}$$

$$\begin{aligned} \textcircled{18} \quad 3x^2 + 6x + 3 &= 0 \\ \text{discriminant } b^2 - 4ac &= (6)^2 - 4(3)(3) \\ 36 - 36 &= 0 \end{aligned}$$

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

$\boxed{1 \text{ real root}}$ Rational

$$\begin{aligned} \textcircled{19} \quad \frac{n^2-16}{n^2-8n+16} \times \frac{n-4}{n^2+6n+8} \\ \frac{(\cancel{n-4})(n+4)}{(\cancel{n-4})(n+4)} \times \frac{(\cancel{n-4})}{(n+4)(n+2)} &= \boxed{\frac{1}{n+2}} \end{aligned}$$

$$\textcircled{23} \quad \left[1 - \frac{1}{x-1} = \frac{2}{x+1} \right] (x-1)(x+1)$$

$$\begin{aligned} (x-1)(x+1) - (x+1) &= 2(x-1) \\ (x^2-1) - (x+1) &= 2x-2 \\ x^2-1-x-1-2x+2 &= 0 \\ x^2-3x &= 0 \\ x(x-3) &= 0 \\ \boxed{x=0, 3} \end{aligned}$$

$$\textcircled{20} \quad \frac{n^2+2n+1}{n-1} \div \frac{n+1}{2n^2-8n+6}$$

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS III & IV - ANSWER KEY

① $y = 2x + 6$ slope = 2 y-int = 6
 $8x - 4y = 10$ slope = 2 y-int = $-\frac{5}{2}$

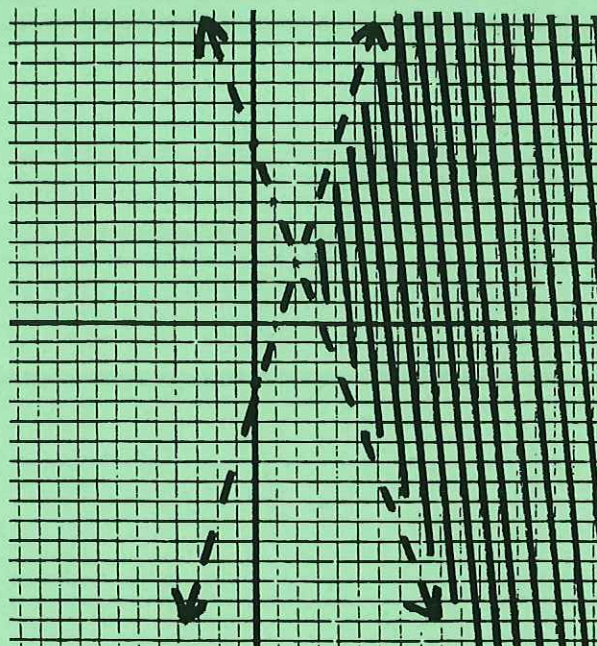
independent, inconsistent, 0 solutions

② $3x - 2y = 7$ mult. by 3
 $4x - 3y = 11$ mult. by -2

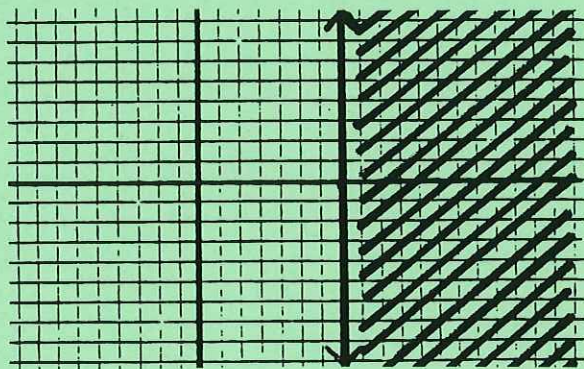
$$\begin{array}{r} 9x - 6y = 21 \\ 3(-) - 2y = 7 \\ \hline -8x + 6y = -22 \\ \hline x = -1 \\ x = -1 \end{array}$$

$3(-) - 2y = 7$
 $-2y = 10$
 $y = -5$

$(-1, -5)$

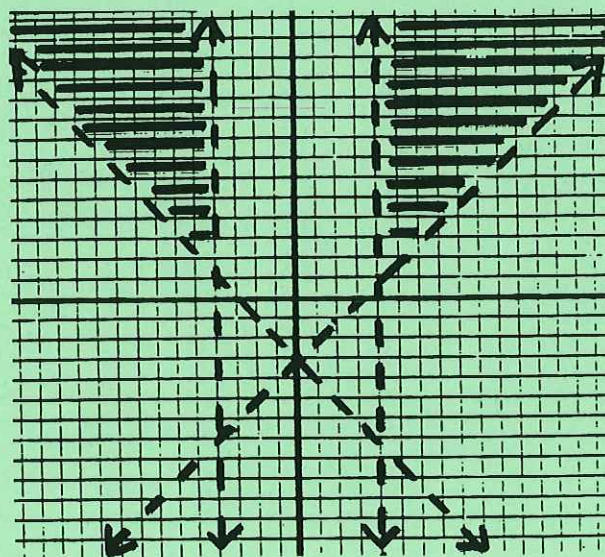


③ $x \geq 7$



⑤ $|x| < y + 3$ and $|x| > 4$

$(x < y + 3$ and $x > y - 3)$ and $(x > 4$ or $x < -4)$
 $(y > x - 3$ and $y > -x - 3)$ and $(x > 4$ or $x < -4)$



④ $|y - 3| + 6 < 3x$
 $|y - 3| < 3x - 6$
 $y - 3 < 3x - 6$ and $y - 3 > -3x + 6$

$y < 3x - 3$ and $y > -3x + 9$

⑥ $\sqrt{125a^3b^3c^2} = 5abc\sqrt{5ab}$

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS III & IV - ANSWER KEY

$$\textcircled{7} \quad \frac{25.33}{\sqrt{642.0000}} \approx \boxed{25.3}$$

$$\begin{array}{r} 4 \overline{) 242} \\ \underline{225} \\ 17 \end{array}$$

$$\begin{array}{r} 50 \overline{) 1700} \\ \underline{1509} \\ 191 \end{array}$$

$$\begin{array}{r} 506 \overline{) 19100} \\ \underline{1509} \\ 19100 \end{array}$$

$$\textcircled{8} \quad 4\sqrt{3}(\sqrt{6} - 2\sqrt{15}) - 2\sqrt{5}$$

$$4\sqrt{18} - 8\sqrt{45} - 2\sqrt{5}$$

$$12\sqrt{2} - 24\sqrt{5} - 2\sqrt{5} = \boxed{12\sqrt{2} - 26\sqrt{5}}$$

$$\textcircled{9} \quad \frac{4\sqrt{3}}{2\sqrt{2}-\sqrt{3}} \cdot \frac{2\sqrt{2}+\sqrt{3}}{2\sqrt{2}+\sqrt{3}} = \frac{8\sqrt{6}+12}{8-3} = \boxed{\frac{8\sqrt{6}+12}{5}}$$

$$\textcircled{10} \quad \left. \begin{array}{l} 47 = \sqrt{2209} \\ \sqrt{2264} \\ 48 = \sqrt{2304} \end{array} \right\} 95 \left. \begin{array}{l} \\ \\ \end{array} \right\} 55 \quad 47 \frac{55}{95} \quad \boxed{47 \frac{11}{19}}$$

$$\textcircled{11} \quad \sqrt{4x+13} + 3 = 4$$

$$\sqrt{4x+13} = 1$$

$$4x+13 = 1$$

$$4x = -12$$

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

$$\textcircled{12} \quad a^2 + b^2 = c^2$$

$$4^2 + 10^2 = c^2$$

$$16 + 100 = c^2$$

$$116 = c^2$$

$$c = \boxed{2\sqrt{29} \text{ m}}$$

$$\textcircled{13} \quad (4, 5) \text{ to } (8, -1)$$

$$d = \sqrt{(4-8)^2 + (5-(-1))^2}$$

$$d = \sqrt{(-4)^2 + (6)^2} = \sqrt{52}$$

$$d = \boxed{2\sqrt{13}}$$

$$\textcircled{14} \quad y = x^2 - 6x - 16$$

$$\text{axis } x = -b/2a \quad \boxed{x = 3}$$

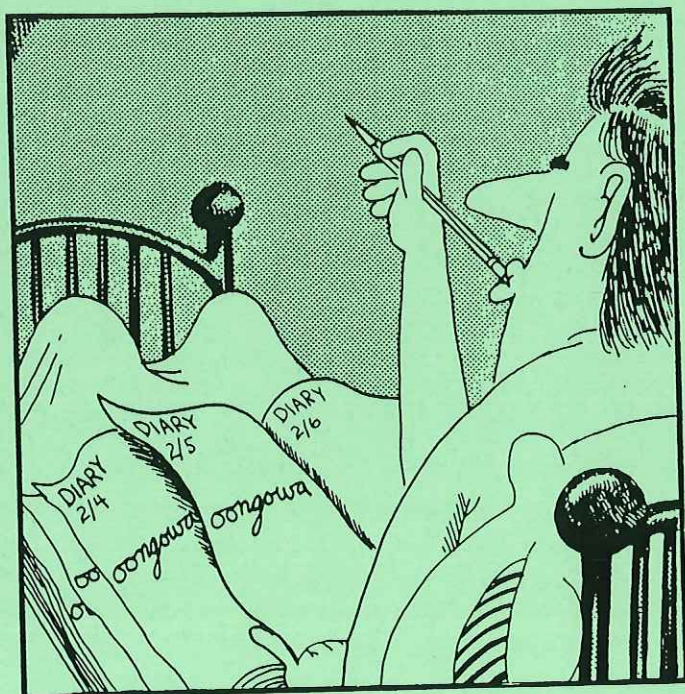
$$y = (3)^2 - 6(3) - 16 = -25 \quad \boxed{(3, -25)}$$

x	y
2	-24
0	-16
-2	0

$$(2)^2 - 6(2) - 16 = -24$$

$$(0)^2 - 6(0) - 16 = -16$$

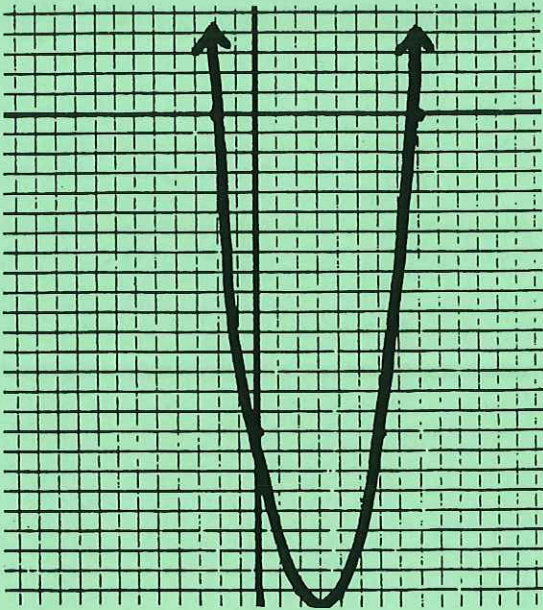
$$(-2)^2 - 6(-2) - 16 = 0$$



Tarzan contemplates another entry.

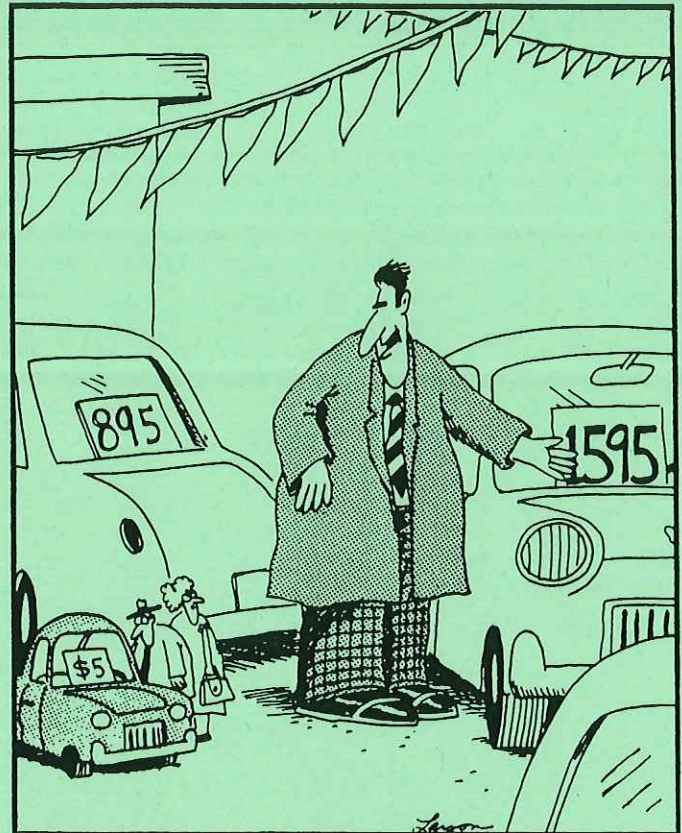
Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS III & IV - ANSWER KEY



$$\begin{aligned} (15) \quad & 4x^2 + 15x - 4 = 0 \\ & 4x^2 + 16x - x - 4 = 0 \\ & 4x(x+4) - 1(x+4) = 0 \\ & (x+4)(4x-1) = 0 \\ & \boxed{x = -4, \frac{1}{4}} \end{aligned}$$

$$\begin{aligned} (16) \quad & 3n^2 + 12 = 18n \\ & 3n^2 - 18n = -12 \\ & n^2 - 6n = -4 \\ & n^2 - 6n + 9 = -4 + 9 \\ & (n-3)^2 = 5 \\ & n-3 = \pm\sqrt{5} \\ & \boxed{n = 3 \pm \sqrt{5}} \end{aligned}$$



"Hey, hey, hey! Are you folks nuts? I'm telling you, *this* is the car for you."

$$\begin{aligned} (17) \quad & n^2 - 6n + 1 = 0 \\ & a = 1 \quad \frac{6 \pm \sqrt{(-6)^2 - 4(1)(1)}}{2(1)} \\ & b = -6 \\ & c = 1 \quad \frac{6 \pm \sqrt{32}}{2} = \frac{6 \pm 4\sqrt{2}}{2} \\ & \boxed{3 \pm 2\sqrt{2}} \end{aligned}$$

$$\begin{aligned} (18) \quad & 2x^2 + 4x + 3 = 0 \\ & \text{discriminant } b^2 - 4ac = (4)^2 - 4(2)(3) \\ & \quad \quad \quad 16 - 24 = -8 \\ & \boxed{\text{no real roots}} \end{aligned}$$

Algebra Skills Review

ADDITIONAL PRACTICE PROBLEMS III & IV - ANSWER KEY

$$\textcircled{19} \frac{2n^2-13n+15}{2n-3} \times \frac{n+1}{n^2-4n-5}$$

$$\frac{(n-5)(2n-3)}{(2n-3)} \times \frac{(n+1)}{(n-5)(n+1)} = \boxed{1}$$

$$\textcircled{20} \frac{n^2-81}{n^2-36} \div \frac{n-9}{n+6}$$

$$\frac{(n+9)(n-9)}{(n+6)(n-6)} \times \frac{(n+6)}{(n-9)} = \boxed{\frac{n+9}{n-6}}$$

$$\textcircled{21} \frac{-3}{5-a} - \frac{5}{a^2-25} = \frac{-3}{(5-a)} - \frac{5}{(a-5)(a+5)} =$$

$$\frac{3}{a-5} \left(\frac{a+5}{a+5} \right) - \frac{5}{(a-5)(a+5)} =$$

$$\frac{3(a+5)-5}{(a-5)(a+5)} = \frac{3a+15-5}{(a-5)(a+5)} = \boxed{\frac{3a+10}{(a-5)(a+5)}}$$

$$\textcircled{22} \frac{n+2 + \frac{2}{n+5}}{n+6 + \frac{6}{n+1}} = \frac{\frac{(n+2)(n+5)+2}{(n+5)}}{\frac{(n+6)(n+1)+6}{(n+1)}}$$

$$n^2+7n+10+2 = \frac{(n^2+7n+12)}{(n+5)}$$

$$n^2+7n+6+6 = \frac{(n^2+7n+12)}{(n+1)}$$

$$\frac{(n^2+7n+12)}{(n+5)} \times \frac{(n+1)}{(n^2+7n+12)} = \boxed{\frac{n+1}{n+5}}$$

$$\textcircled{23} \left[\frac{3x}{x^2-5x+4} = \frac{2}{x-4} + \frac{3}{x-1} \right] (x-4)(x-1)$$

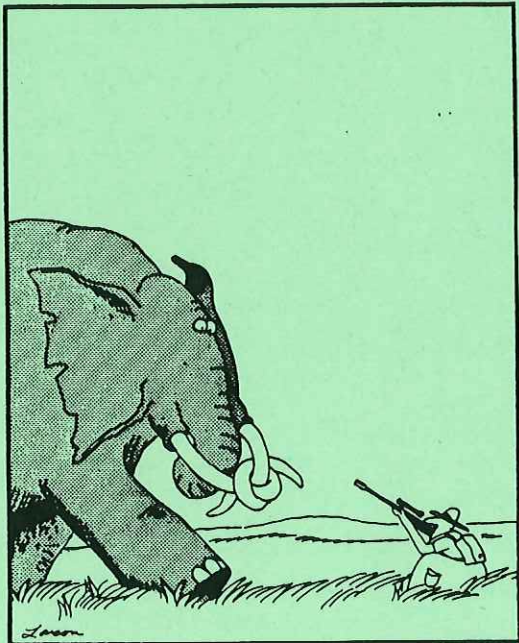
$$3x = 2(x-1) + 3(x-4)$$

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

$$3x = 5x-14$$

$$-2x = -14$$

$$\boxed{x=7}$$



Suddenly, his worst fears realized, the old fellow's tusks jammed.

Algebra Problem Solving Review

ANSWER KEY V

①

n	-1	
$n+2$	$\boxed{1}$	←
$n+4$	3	

$$3(n+4) - (2n+5) = 6$$

$$3n+12-2n-5 = 6$$

$$n = -1$$

②

$$-10 < 3n - 4 < 17$$

$$-10 < 3n - 4 \text{ and } 3n - 4 < 17$$

$$-6 < 3n \text{ and } 3n < 21$$

$$-2 < n \text{ and } n < 7$$

$$-2 < n < 7 \text{ positive, even}$$

$$\boxed{n = 2, 4, 6}$$

③

	<u>now</u>	<u>In 5</u>	<u>In 4</u>
Ryan	$5n$	$5n+5$	
Sam	$8n$		$8n+4$

$$4(5n+5) = 3(8n+4)$$

$$20n+20 = 24n+12$$

$$-4n = -8$$

$$n = 2$$

Ryan now $5n = 10$
 Ryan last year = $\boxed{9 \text{ yrs. old}}$

④

n	$\boxed{5}$	$\boxed{-6}$
$n+1$	$\boxed{6}$	$\boxed{-5}$

$$n^2 + (n+1)^2 = 61$$

$$n^2 + (n^2 + 2n + 1) = 61$$

$$2n^2 + 2n - 60 = 0$$

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

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

$$n = 5 \text{ or } -6$$

⑤

$$t + u = 7 \rightarrow u = 7 - t$$

$$10u + t = 2(10t + u) - 25$$

$$10u + t = 20t + 2u - 25$$

$$8u - 19t = -25$$

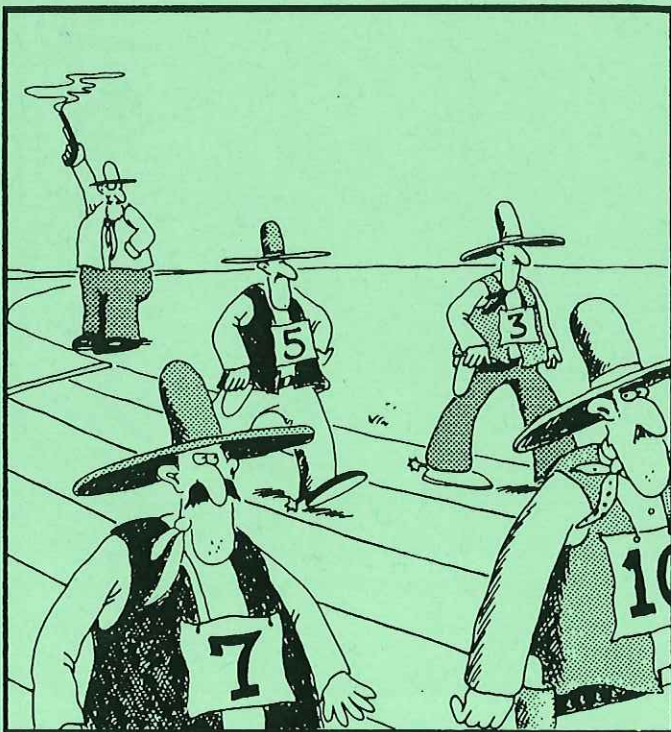
$$8(7-t) - 19t = -25$$

$$56 - 8t - 19t = -25$$

$$-27t = -81$$

$$t = 3 \quad u = 4$$

$$\boxed{34}$$



The 100-meter mosey

Algebra Problem Solving Review

ANSWER KEY V

$$\begin{aligned} \textcircled{6} \quad .085n + 3(210) &= 1004 \\ .085n + 630 &= 1004 \\ .085n &= 374 \\ n &= 4400 \end{aligned}$$

\$4400

$$\begin{array}{ll} \textcircled{7} \text{ nickels} & 28-3n \\ \text{dimes} & n \\ \text{quarters} & 2n \end{array}$$

$$\begin{aligned} 5(28-3n) + 10n + 25(2n) &= 365 \\ 140 - 15n + 10n + 50n &= 365 \\ 45n &= 225 \\ n &= 5 \end{aligned}$$

nickels $28-3n$

13 nickels

$$\textcircled{8} \quad \frac{\text{aft. tax}}{\text{org. pr.}} = \frac{15.37}{n} = \frac{106}{100}$$

$$106n = 1537$$

$$n = 14.5$$

\$14.50

$$\begin{aligned} \textcircled{9} \quad .06n &= .08(18000-n) + 240 \\ .06n &= 1440 - .08n + 240 \\ .14n &= 1680 \end{aligned}$$

$$n = 12000$$

\$12,000 at 6%

$$\begin{aligned} \textcircled{10} \quad 4.25n + 1.75(50-n) &= 120 \\ 4.25n + 87.5 - 1.75n &= 120 \\ 2.5n &= 32.5 \end{aligned}$$

$$n = 13$$

$$50-n = 37$$

**13 adult tickets
37 child tickets**



Algebra Problem Solving Review

ANSWER KEY V

⑪ $.40(30) - 0(n) = .60(30-n)$
 $12 = 18 - .6n$
 $.6n = 6$ **10L of water**

⑫ $\frac{r}{6} \cdot t = d$
 Amy $6 \cdot t = 6t$
 Rick $8 \cdot (t - \frac{3}{4}) = 8t - 6$

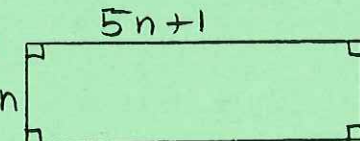
$6t = 8t - 6$ Amy arrives:
 $-2t = -6$ $1:30 + 3 =$ **4:30 PM**
 $t = 3$ Distance to beach:
 $6t =$ **18 miles**

⑬ $\frac{r}{r+c} \cdot 3 = 42$ downstream
 $\frac{r}{r-c} \cdot 7 = 42$ upstream

$(3r + 3c = 42) \div 3 = r + c = 14$
 $(7r - 7c = 42) \div 7 = r - c = 6$

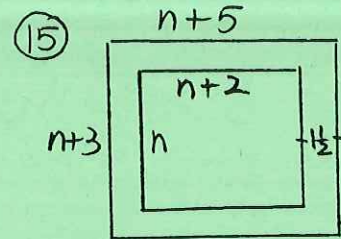
$2r = 20$
 $r = 10$
 $c = 4$

current **4 mph**

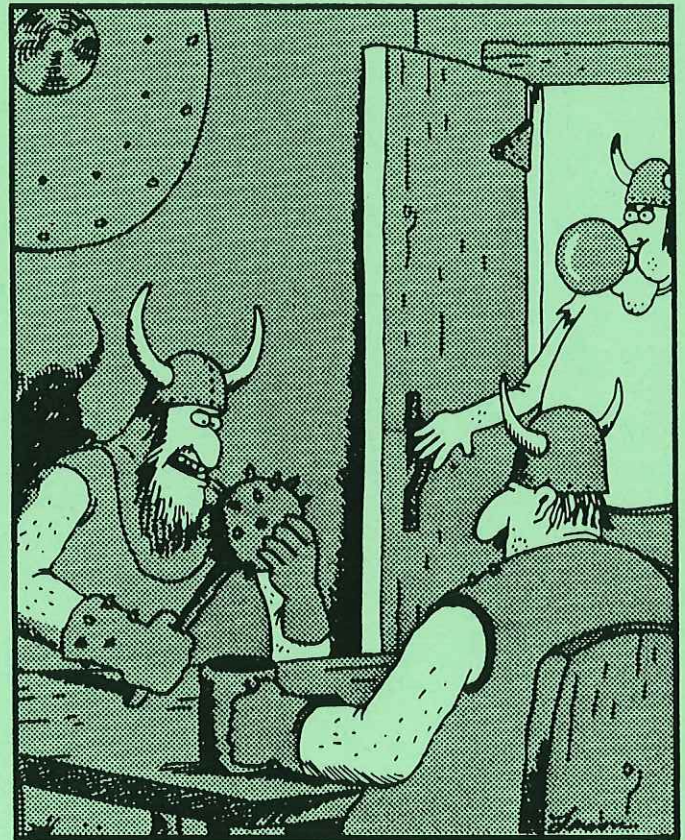
⑭ 

$2n + 2(5n+1) = 38$
 $2n + 10n + 2 = 38$
 $12n = 36$
 $n = 3$
 $5n + 1 = 16$

area
 $3 \times 16 =$ **48 cm²**



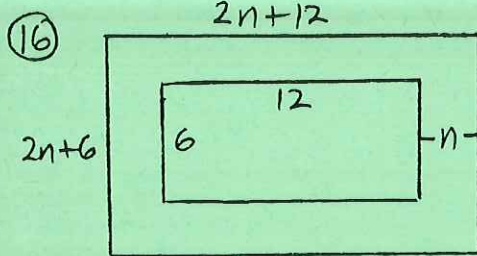
$(n+5)(n+3) - n(n+2) = 39$
 $(n^2 + 8n + 15) - (n^2 + 2n) = 39$
 $6n - 24 = 0$
 $6(n-4) = 0$ $n = 4$
4 by 6 in. $n+2 = 6$



"You know, Bjorg, there's something about holding a good, solid mace in your hand—you just look for an excuse to smash something."

Algebra Problem Solving Review

ANSWER KEY V



$$(2n+12)(2n+6) - (6)(12) = 63$$

$$(4n^2 + 36n + 72) - 72 = 63$$

$$4n^2 + 36n - 63 = 0$$

$$a=4 \quad \frac{-36 \pm \sqrt{(36)^2 - 4(4)(-63)}}{2(4)}$$

$$b=36$$

$$c=-63$$

$$\frac{-36 \pm 48}{8} = \frac{-84}{8} \text{ or } \frac{12}{8}$$

$$n = \boxed{1\frac{1}{2} \text{ feet}}$$

①⑦ $(n-5)(2n+2) = 54$

$$2n^2 - 8n - 10 = 54$$

$$2n^2 - 8n - 64 = 0$$

$$n^2 - 4n - 32 = 0$$

$$(n-8)(n+4) = 0$$

$$\boxed{n = 8 \text{ or } -4}$$

①⑧ $\frac{r}{r} \cdot \frac{t}{t} = \frac{w}{w}$

Jim $\frac{1}{3} \cdot t = \frac{t}{3}$

Russ $\frac{1}{6} \cdot t = \frac{t}{6}$

$$\left(\frac{t}{3} + \frac{t}{6} = 1\right) \text{ mult. by } 6$$

$$2t + t = 6$$

$$3t = 6 \rightarrow t = \boxed{2 \text{ hours}}$$

①⑨

$$\frac{r}{r} \cdot \frac{t}{t} = \frac{w}{w}$$

Susan $5 \cdot \frac{2}{15} = \frac{2}{3}$

Miwa $r \cdot \frac{2}{15} = \frac{2r}{15}$

$$\left(\frac{2}{3} + \frac{2r}{15} = 1\right) \text{ mult. by } 15$$

$$10 + 2r = 15$$

$$2r = 5$$

$$r = \frac{5}{2} \text{ reciprocal} = \frac{2}{5}$$

$$\frac{2}{5} \times 60 = \boxed{24 \text{ minutes}}$$

②⑩

$$\frac{r}{r} \cdot \frac{t}{t} = \frac{w}{w}$$

Fill Pipe 1 $\frac{1}{2} \cdot t = \frac{t}{2}$

Fill Pipe 2 $\frac{1}{5} \cdot t = \frac{t}{5}$

Drain $\frac{1}{4} \cdot t = \frac{t}{4}$

$$\left(\frac{t}{2} + \frac{t}{5} - \frac{t}{4} = 1\right) \text{ mult. by } 20$$

$$10t + 4t - 5t = 20$$

$$9t = 20$$

$$t = \frac{20}{9} = 2\frac{2}{9} \approx \boxed{2 \text{ hrs. } 13 \text{ min.}}$$



Eventually, Stevie looked up: His mother was nowhere in sight, and this was certainly no longer the toy department.