

$$\textcircled{1} \quad 40 - (-54) =$$

$$40 + 54 =$$

$$\textcircled{94 =}$$

$$\textcircled{2} \quad -8 - (-22) =$$

$$-8 + 22 =$$

$$\textcircled{14 =}$$

$$\textcircled{3} \quad 17 - (-19) + 14 + (-18) =$$

$$17 + 19 + 14 - 18 =$$

$$36 + 14 - 18 =$$

$$50 - 18 =$$

$$\textcircled{32 =}$$

$$\textcircled{4} \quad$$

$$-10^2 =$$

$$-(10)(10) =$$

$$-(100) =$$

$$\textcircled{-100 =}$$

$$\textcircled{5} \quad$$

$$(-6)^2 =$$

$$(-6)(-6) =$$

$$(36) =$$

$$\textcircled{36 =}$$

$$\textcircled{6} \quad$$

$$8 + 2(-4 - 1) =$$

$$8 + 2(-5) =$$

$$8 - 10 =$$

$$\textcircled{-2 =}$$

10-28-13

1

online

MATH 0200

Math Placement Test
For Elementary & Intermediate
Algebra

Warm-up

online

✓✓✓

$$\textcircled{7} \quad \frac{8(a-b)}{-9c-d} \quad a=7, \quad b=0, \quad c=-9, \quad d=82$$

2

$$\frac{8(7)-(0)}{-9(-9)-(82)} =$$

$$\frac{8(7-0)}{+81-82} =$$

$$\frac{8(7)}{-1} =$$

$$\frac{56}{-1} =$$

$$\textcircled{-56 =}$$

$$\textcircled{8.} \quad -9x - 3x =$$

$$\textcircled{-12x =}$$

$$\textcircled{9} \quad 7a - 2a + 5b =$$

$$\textcircled{5a + 5b =}$$

$$\textcircled{10} \quad 7x + 6 + 3x - x + 4 =$$

$$\textcircled{9x + 10 =}$$

$$\textcircled{11} \quad 3x^2 - 9x - 4 + 5x - 6 + 9x^2$$

$$\textcircled{12x^2 - 4x - 10 =}$$

$$\textcircled{12} \quad 9(y+8) - 6 =$$

$$9y + 72 - 6 =$$

$$\textcircled{9y + 66 =}$$

$$(13) \quad 9x - (7 - 3x) =$$

$$9x - 7 + 3x =$$

$$12x - 7 =$$

$$(14) \quad 4x + 8 - 2(-4x - 8) =$$

$$4x + 8 + 8x + 16 =$$

$$12x + 24 =$$

$$(15) \quad -4(9r + 7) + 6(3r + 5) =$$

$$-36r - 28 + 18r + 30 =$$

$$-18r + 2 =$$

$$(16) \quad 13(x - 52) = 26$$

$$13x - 676 = 26$$

$$13x - \cancel{676} + \cancel{676} = 26 + 676$$

$$13x = 702$$

$$\frac{13x}{13} = \frac{702}{13}$$

$$x = 54$$

$$(17) \quad 6x - (5x - 1) = 2$$

$$6x - 5x + 1 = 2$$

$$x + 1 = 2$$

$$x + 1 - 1 = 2 - 1$$

$$x = 1$$

$$\begin{aligned} (18) \quad & -7x + 3(2x - 4) = -9 - 4x \\ & -7x + 6x - 12 = -9 - 4x \\ & -1x - 12 = -9 - 4x \\ & -1x - 12 + 12 = -9 - 4x + 12 \end{aligned}$$

$$\begin{aligned} & -1x = -4x + 3 \\ & -1x + 4x = -4x + 3 + 4x \\ & 3x = 3 \end{aligned}$$

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

$$(x = 1)$$

$$\begin{aligned} (19) \quad & -7Q + 1.0 = -24.5 - 1.9Q \\ & -7Q + 1.0 - 1.0 = -24.5 - 1.9Q - 1.0 \\ & -7Q = -1.9Q - 25.5 \\ & -7Q + 1.9Q = -1.9Q - 25.5 + 1.9Q \end{aligned}$$

$$-5.1Q = -25.5$$

$$\frac{-5.1Q}{-5.1} = \frac{-25.5}{-5.1}$$

$$(Q = 5)$$

(4)

$$(20) \quad \frac{1}{2}x + \frac{6}{5} = \frac{2x}{5} \quad \text{LCD} = 10$$

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

$$1x(5) + 6(2) = 2x(2)$$

$$5x + 12 = 4x$$

$$5x + \cancel{12} - 12 = 4x - 12$$

$$5x = 4x - 12$$

$$5x - 4x = 4x - 12 - 4x$$

$$x = -12$$

5

$$(21) \quad \frac{7}{3} - \frac{x}{3} = \frac{x}{4} \quad \text{LCD} = 12$$

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

$$7(4) - x(4) = x(3)$$

$$28 - 4x = 3x$$

$$\cancel{28} - 4x - \cancel{28} = 3x - 28$$

$$-4x = 3x - 28$$

$$-4x - 3x = 3x - 28 - 3x$$

$$-7x = -28$$

$$\frac{-7x}{-7} = \frac{-28}{-7}$$

$$x = 4$$

$$(22) \quad \frac{r+6}{5} = \frac{r+8}{7}$$

$$\text{LCD} = 35$$

$$35\left(\frac{r+6}{5}\right) = 35\left(\frac{r+8}{7}\right)$$

$$7(r+6) = 5(r+8)$$

$$7r + 42 = 5r + 40$$

$$7r + \cancel{42} - \cancel{42} = 5r + 40 - 42$$

$$7r = 5r - 2$$

$$7r - 5r = \cancel{5r} - 2 - \cancel{5r}$$

$$2r = -2$$

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

$$r = -1$$

$$(23) \quad \frac{17x}{16} + \frac{x}{16} = \frac{6x}{1} + \frac{1}{8} + \frac{15x}{16}$$

$$\text{LCD} = 16$$

$$\frac{17x}{16}(16) + \frac{x}{16}(16) = \frac{6x}{1}(16) + \frac{1}{8}(16) + \frac{15x}{16}(16)$$

$$17x(1) + x(1) = 6x(16) + 1(2) + 15x(1)$$

$$17x + x = 96x + 2 + 15x$$

$$18x = 111x + 2$$

$$18x - 111x = 111x + 2 - 111x$$

$$-93x = 2$$

$$\frac{-93x}{-93} = \frac{2}{-93}$$

$$x = \frac{-2}{93}$$

6.

$$(24) A = P(1 + rt)$$

for t

$$A = P + Prt$$

$$A - P = \cancel{P} + Prt - \cancel{P}$$

$$A - P = Prt$$

$$\frac{A - P}{Pr} = \frac{\cancel{Pr}t}{\cancel{Pr}}$$

$$\frac{A - P}{Pr} = t$$

$$(25) A = \frac{1}{2}h(a + b)$$

for a

$$2A = 2\left(\frac{1}{2}h\right)(a + b)$$

$$2A = h(a + b)$$

$$2A = ha + hb$$

$$2A - hb = ha + \cancel{hb} - \cancel{hb}$$

$$2A - hb = ha$$

$$\frac{2A - hb}{h} = \frac{ha}{h}$$

$$\frac{2A - hb}{h} = a$$

1

$$26) V = \frac{1}{3} \pi r^2 h$$

$$r = 2$$

$$V = 16\pi \text{ cubic meters}$$

Volume of a right
Circular Cone



$$16\pi = \frac{1}{3} \pi (2)^2 h$$

$$16\pi = \frac{1}{3} \pi (4) h$$

$$16\pi = \frac{4}{3} \pi h$$

$$\frac{16\pi}{\pi} = \frac{4\pi h}{\pi}$$

$$16 = \frac{4}{3} h$$

$$\frac{3}{4}(16) = \frac{3}{4}(\frac{4}{3}h)$$

$$3(4) = h$$

$$12 = h$$

meters

OR

$$r = 2$$

$$V = 16\pi$$

$$V = \frac{1}{3} \pi r^2 h$$

Solve for h first

$$3V = 3(\frac{1}{3} \pi r^2 h)$$

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$$

$$\frac{3V}{\pi r^2} = h$$

$$h = \frac{3V}{\pi r^2}$$

$$h = \frac{3(16\pi)}{\pi(2)^2}$$

$$h = \frac{3(16\pi)}{\pi(4)}$$

$$h = 3(4)$$

$$h = 12 \text{ meters}$$

$$(27) -16 = -9P + 3Q \quad \text{for } P$$

$$-16 - 3Q = -9P + 3Q - 3Q$$

$$-16 - 3Q = -9P$$

$$\frac{-16 - 3Q}{-9} = \frac{-9P}{-9}$$

$$\frac{-16 - 3Q}{-9} = P$$

$$\frac{-1(16 + 3Q)}{-1(9)} = P$$

$$\frac{16 + 3Q}{9} = P$$

9

$$(28) \frac{X}{a} + \frac{Y}{b} = 1 \quad \text{for } X$$

$$LCD = ab$$

$$\frac{X}{a}(ab) + \frac{Y}{b}(ab) = 1(ab)$$

$$X(b) + Y(a) = ab$$

$$bx + ay = ab$$

$$bx + \cancel{ay} - \cancel{ay} = ab - ay$$

$$bx = ab - ay$$

$$\frac{bx}{b} = \frac{ab - ay}{b}$$

$$X = \frac{ab - ay}{b}$$

OR

$$X = \frac{a(b - y)}{b}$$

$$X = a\left(\frac{b - y}{b}\right)$$

$$X = a\left(\frac{b}{b} - \frac{y}{b}\right)$$

$$X = a\left(1 - \frac{y}{b}\right)$$

29) $ax + by = c$

for x

$$ax + by - by = c - by$$

$$ax = c - by$$

$$\frac{ax}{a} = \frac{c - by}{a}$$

$$x = \frac{c - by}{a}$$

10

30) $4x - 4 \geq 20$

$$4x - 4 + 4 \geq 20 + 4$$

$$4x \geq 24$$

$$\frac{4x}{4} \geq \frac{24}{4}$$

$$x \geq 6$$



$$[6, +\infty)$$

31) $36 - 6x \geq -6$

$$36 - 6x - 36 \geq -6 - 36$$

$$-6x \geq -42$$

$$\frac{-6x}{-6} \leq \frac{-42}{-6}$$

$$x \leq 7$$



$$(-\infty, 7]$$

$$(32) \quad \frac{x}{2} \geq 3 + \frac{x}{8}$$

$$LCD = 8$$

11

$$\frac{x}{2}(8) \geq \frac{3}{1}(8) + \frac{x}{8}(8)$$

$$x(4) \geq 3(8) + x(1)$$

$$4x \geq 24 + x$$

$$4x - x \geq 24 + x - x$$

$$3x \geq 24$$

$$\frac{3x}{3} \geq \frac{24}{3}$$

$$x \geq 8$$



$$[8, +\infty)$$

$$(33) \quad \frac{x+7}{6} - \frac{5}{48} > \frac{x+3}{8}$$

$$LCD = 48$$

$$48\left(\frac{x+7}{6}\right) - 48\left(\frac{5}{48}\right) > 48\left(\frac{x+3}{8}\right)$$

$$8(x+7) - 1(5) > 6(x+3)$$

$$8x + 56 - 5 > 6x + 18$$

$$8x + 51 > 6x + 18$$

$$8x + 51 - 51 > 6x + 18 - 51$$

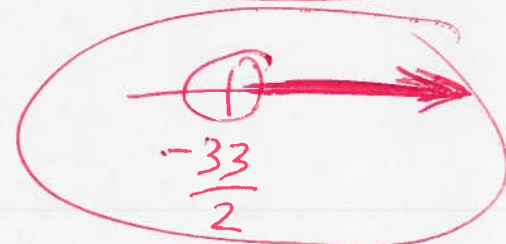
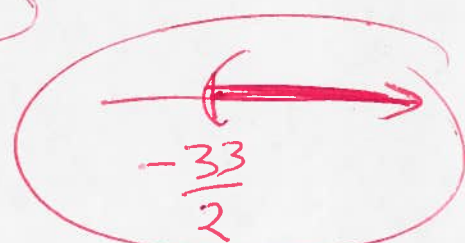
$$8x > 6x - 33$$

$$8x - 6x > 6x - 33 - 6x$$

$$2x > -33$$

$$\frac{2x}{2} > \frac{-33}{2}$$

$$x > -\frac{33}{2}$$



$$\left(-\frac{33}{2}, +\infty\right)$$

(34) $13 \leq 3x+1 \leq 19$
 $13-1 \leq 3x+1-1 \leq 19-1$
 $12 \leq 3x \leq 18$
 $\frac{12}{3} \leq \frac{3x}{3} \leq \frac{18}{3}$
 $4 \leq x \leq 6$

~~$[4, 6]$~~

~~$[4, 6]$~~

$[4, 6]$

12

(35) $|r-2|=5$ $|x|=a$
 $x=-a$ OR $x=a$

$r-2=-5$ OR $r-2=5$

$r-2+2=-5+2$ OR $r-2+2=5+2$

$r=-3$ OR $r=7$

$\{-3, 7\}$

(36) $|x-9| < 16$

$|x| < a$
 $-a < x < a$

$-16 < x-9 < 16$

$-16+9 < x-9+9 < 16+9$

$-7 < x < 25$

~~$(-7, 25)$~~

~~$(-7, 25)$~~

$(-7, 25)$

37 $|x+6| > 16$

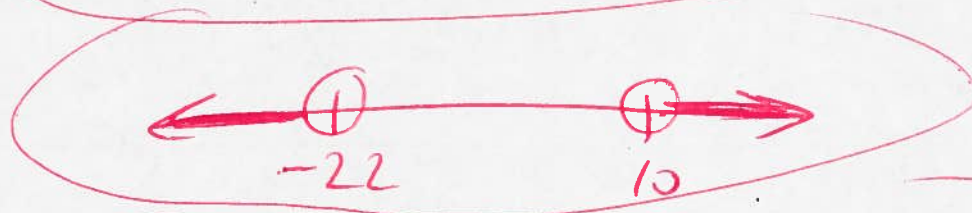
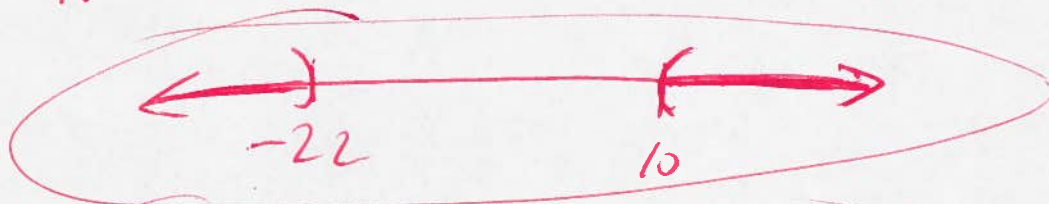
$|x| > a$
 $x < -a$ OR $x > a$

13

$x+6 < -16$ OR $x+6 > 16$

$x+6-6 < -16-6$ OR $x+6-6 > 16-6$

$x < -22$ OR $x > 10$



$(-\infty, -22) \cup (10, \infty)$

38. Determine if the ordered pair is a solution to the equation

$(3, 5)$
 $x \quad y$

$5x + y = 20$

$5(3) + (5) = 20 ?$

$15 + 5 = 20 ?$

$20 = 20$ Yes

39 Graph use the intercepts)

14.

Let $x=0$ $2x-3y=6$

$$2(0)-3y=6$$

$$0-3y=6$$

$$-3y=6$$

$$\frac{-3y}{-3} = \frac{6}{-3}$$

$$y = -2$$

$$(0, -2)$$

Let $y=0$

$$2x-3y=6$$

$$2x-3(0)=6$$

$$2x-0=6$$

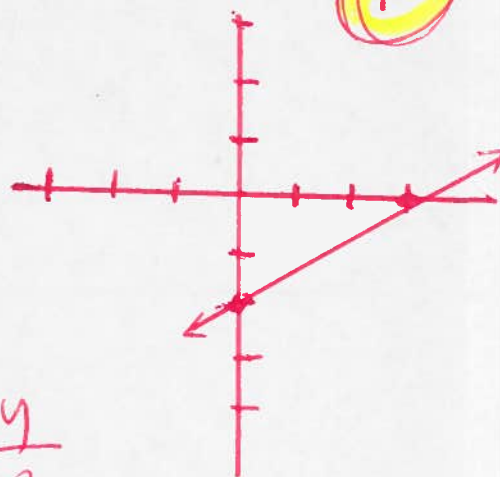
$$2x=6$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x=3$$

$$(3, 0)$$

x	y
0	-2
3	0



$2x-3y=6$ Solve for y OR

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

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

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

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

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

Let $x=0$ $y = \frac{2}{3}(0) - 2$

$$y = 0 - 2$$

$$y = -2$$

$$(0, -2)$$

Let $x=3$

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

$$y = 2 - 2$$

$$y = 0$$

$$(3, 0)$$

x	y
0	-2
3	0

(40) Find the slope of the line through
 $(8, 3)$ and $(-4, 4)$
 x_1, y_1 x_2, y_2

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(3) - (4)}{(8) - (-4)}$$

$$m = \frac{3 - 4}{8 + 4}$$

$$m = -\frac{1}{12}$$

15

(41) Find the slope and the y-intercept

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

$$\cancel{2x} - 3y - \cancel{2x} = -8 - 2x$$

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

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

$$y = \frac{8}{3} + \frac{2x}{3}$$

$$y = \frac{2x}{3} + \frac{8}{3}$$

$$\text{Slope} = m = \frac{2}{3}$$

Let $x=0$

$$y = \frac{2}{3}(0) + \frac{8}{3}$$

$$y = 0 + \frac{8}{3}$$

$$y = \frac{8}{3}$$

$$(0, \frac{8}{3})$$

y-intercept

(42) Graph

$$y = 2x - 6$$

$$y = 2(0) - 6$$

$$y = 0 - 6$$

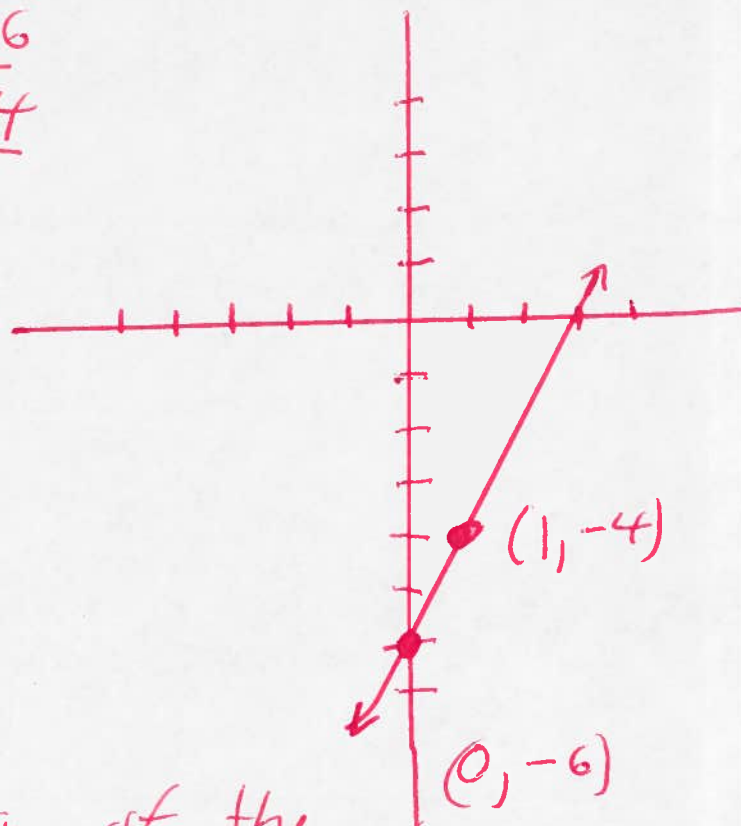
$$y = -6$$

X	
0	-6
1	-4

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

$$y = 2 - 6$$

$$y = -4$$



(43) Find the equation of the line with $m=3$ and point $(-3, 6)$
 x_1, y_1

Point Slope formula

$$y - y_1 = m(x - x_1)$$

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

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

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

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

$$y = 3x + 15$$

(44) Determine if the pair of lines is parallel, perpendicular, or neither

$$Y_1 = 6x - 8$$

$$m_1 = 6$$

$$m_2 = -\frac{1}{6}$$

17.

$$Y_2 = -\frac{1}{6}x - 1$$

$$m_1 \cdot m_2 =$$

$$(6)\left(-\frac{1}{6}\right) =$$

$$-\frac{6}{6} =$$

$$-1 =$$

Lines are perpendicular

(45) $Y_1 = 9x - 6$

$$m_1 = 9$$

$$m_2 = 9$$

$$Y_2 = 9x + 4$$

$$\text{Since } m_1 = m_2 = 9$$

Lines are parallel

(46) $Y_1 = 5x - 4$

$$m_1 = 5$$

$$m_2 = -5$$

$$Y_2 = -5x - 8$$

$$m_1 \neq m_2$$

$$5 \neq -5$$

NOT Parallel

$$m_1 \cdot m_2 = (5)(-5) = -25 \neq -$$

NOT Perpendicular

Neither

(47) $x+y=10$
 $3x+5y=16$

Solve by elimination

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

$$(3x+5y)(1) = 16(1)$$

$$\begin{array}{r} -5x - 5y = -50 \\ 3x + 5y = 16 \end{array}$$

$$\hline -2x = -34$$

$$-2x = -34$$

$$\frac{-2x}{-2} = \frac{-34}{-2}$$

$x=17$

Subst

$$x+y=10$$

$$(17)+y=10$$

$$17+y=10$$

$$17+y-17=10-17$$

$y=-7$

$(x, y) = (17, -7)$

OR

Solve by Substitution

Solve for y

$$x+y=10$$

$$x+y-x=10-x$$

$$y=10-x$$

$$\begin{array}{r} x+y=10 \\ 3x+5y=16 \end{array}$$

$$3x+5(10-x)=16$$

$$3x+50-5x=16$$

$$-2x+50=16$$

$$-2x+50-50=16-50$$

$$-2x=-34$$

$$\frac{-2x}{-2} = \frac{-34}{-2}$$

$x=17$

Subst

$$x+y=10$$

$$(17)+y=10$$

$$17+y=10$$

$$17+y-17=10-17$$

$y=-7$

$(x, y) = (17, -7)$

(48) $x+y=16$
 $y=3x$

Solve by substitution

(19)

$$\begin{aligned} x+y &= 16 \\ x+(3x) &= 16 \\ x+3x &= 16 \\ 4x &= 16 \\ \frac{4x}{4} &= \frac{16}{4} \end{aligned}$$

$x=4$

subst
 $x+y=16$
 $(4)+y=16$
 $4+y=16$
 $4+y-4=16-4$

$y=12$

$(x, y) = (4, 12)$

(49) $8x-4y=8$ Solve by elimination
 $2x-y=5$

$$(8x-4y)(-1) = 8(-1)$$

$$(2x-y)(4) = 5(4)$$

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

$$8x-4y = 20$$

$$0+0=12$$

$$0 \neq 12$$

No solution OR

$\emptyset$ OR $\{ \}$

$$\begin{array}{r}
 \textcircled{50} \quad x - y = 7 \\
 x + y = 5 \\
 \hline
 2x + 0 = 12 \\
 2x = 12 \\
 \frac{2x}{2} = \frac{12}{2} \\
 \hline
 \textcircled{x = 6}
 \end{array}$$

Subst

$$\begin{array}{r}
 \rightarrow x - y = 7 \\
 (6) - y = 7 \\
 6 - y = 7 \\
 \cancel{6} - y \cancel{- 6} = 7 - 6 \\
 -y = 1 \\
 \frac{-y}{-1} = \frac{1}{-1} \\
 \hline
 \textcircled{y = -1}
 \end{array}$$

$\textcircled{20}$

(x, y)
 $(6, -1)$

$$\begin{array}{r}
 \textcircled{51} \quad 0.03x - 0.1y = 1 \\
 -0.2x + 0.02y = 58 \\
 \hline
 (0.03x - 0.1y)(1) = 1(1) \\
 (-0.2x + 0.02y)(5) = 58(5) \\
 \hline
 0.03x - 0.1y = 1 \\
 -1x + 0.1y = 290 \\
 \hline
 -0.97x = 291 \\
 \frac{-0.97x}{-0.97} = \frac{291}{-0.97} \\
 \hline
 \textcircled{x = -300}
 \end{array}$$

Subst

$$\begin{array}{r}
 0.03x - 0.1y = 1 \\
 0.03(-300) - 0.1y = 1 \\
 -9 - 0.1y = 1 \\
 \cancel{-9} - 0.1y \cancel{+ 9} = 1 + 9 \\
 -0.1y = 10 \\
 \frac{-0.1y}{-0.1} = \frac{10}{-0.1} \\
 \hline
 \textcircled{y = -100}
 \end{array}$$

$(x, y) =$
 $(-300, -100)$

$$\begin{aligned} 52. \quad (8x^2 - 5x + 20) - (3x^2 + 5x - 40) &= \\ 8x^2 - 5x + 20 - 3x^2 - 5x + 40 &= \\ 5x^2 - 10x + 60 &= \end{aligned}$$

21.

$$\begin{aligned} 53. \quad & \text{EVALUATE} \\ -2x^3 - 5x^2 - x - 46 &= \text{ for } x = -2 \\ -2(-2)^3 - 5(-2)^2 - (-2) - 46 &= \\ -2(-2)(-2)(-2) - 5(-2)(-2) - (-2) - 46 &= \\ -2(-8) - 5(4) - (-2) - 46 &= \\ 16 - 20 + 2 - 46 &= \\ -4 + 2 - 46 &= \\ -2 - 46 &= \\ -48 &= \end{aligned}$$

$$\begin{aligned} 54. \quad (-4x^3y^4)(-5x^2y^2) &= \\ 20x^{3+2}y^{4+2} &= \\ 20x^5y^6 &= \end{aligned}$$

$$(55) \quad 9x(-10x-2) =$$

$$-90x^2 - 18x =$$

$$(56) \quad (y+4)(y+7) =$$

$$y^2 + 7y + 4y + 28 =$$

$$y^2 + 11y + 28 =$$

$$(57) \quad (2x-10)(x-12) =$$

$$2x^2 - 24x - 10x + 120 =$$

$$2x^2 - 34x + 120 =$$

$$(58) \quad (5x+7)(4x-10) =$$

$$20x^2 - 50x + 28x - 70 =$$

$$20x^2 - 22x - 70 =$$

$$(59) \quad (x-11y)(5x+6y) =$$

$$5x^2 + 6xy - 55xy - 66y^2 =$$

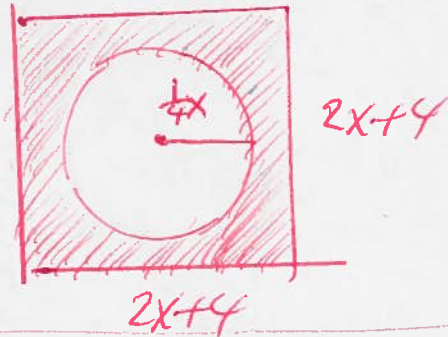
$$5x^2 - 49xy - 66y^2 =$$

$$(60) \quad (x+1)(x^2 - x + 1) =$$

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

$$x^3 + 1 =$$

61



23

Yards

Find the exact area of the shaded region.

$$A_1 = \pi r^2 \quad \text{Circle area}$$

$$A_2 = LW \quad \text{area of Square}$$

$$A_1 = \pi \left(\frac{1}{4}x\right)^2$$

$$A_2 = (2x+4)(2x+4)$$

$$A_1 = \pi \left(\frac{x}{4}\right)\left(\frac{x}{4}\right)$$

$$A_2 = 4x^2 + 8x + 8x + 16$$

$$A_1 = \pi \left(\frac{x^2}{16}\right)$$

$$A_2 = 4x^2 + 16x + 16$$

$$A_1 = \frac{\pi x^2}{16}$$

area of Square

area of circle

$$A_2 - A_1 = (4x^2 + 16x + 16) - \left(\frac{\pi x^2}{16}\right)$$

$$A_2 - A_1 = 4x^2 + 16x + 16 - \frac{\pi x^2}{16}$$

$$A_2 - A_1 = 4x^2 - \frac{\pi x^2}{16} + 16x + 16$$

$$A_2 - A_1 = \frac{4x^2 \left(\frac{16}{16}\right) - \frac{\pi x^2}{16} + 16x + 16}{1}$$

$$A_2 - A_1 = \frac{64x^2 - \pi x^2}{16} + 16x + 16$$

$$A_2 - A_1 = \frac{64x^2 - \pi x^2}{16} + 16x + 16$$

$$A_2 - A_1 = \frac{(64 - \pi)x^2}{16} + 16x + 16$$

Let $x=5$ and $\pi=3.14$ Approximate the area

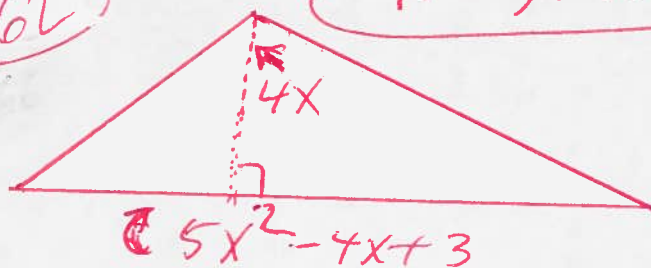
$$A_2 - A_1 = \frac{(64 - 3.14)(5)^2}{16} + 16(5) + 16$$

$$A_2 - A_1 = 191.09375 \text{ yd}^2$$

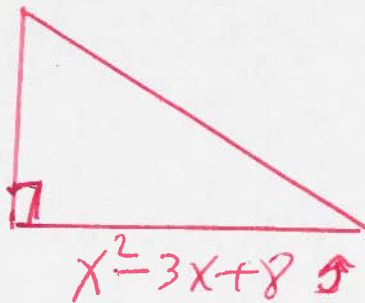
use a calculator

62

Triangle Areas



$x+8$



24

Find the areas of the triangles $A = \frac{1}{2}bH$

$A_1 = \frac{1}{2}bH$ triangle #1 area

$$A_1 = \frac{1}{2}(5x^2 - 4x + 3)(4x)$$

$$A_1 = \frac{1}{2}(20x^3 - 16x^2 + 12x)$$

$$A_1 = \frac{20x^3}{2} - \frac{16x^2}{2} + \frac{12x}{2}$$

$$A_1 = 10x^3 - 8x^2 + 6x$$

$$A_2 = \frac{1}{2}bH$$

triangle #2 area

$$A_2 = \frac{1}{2}(x^2 - 3x + 8)(x + 8)$$

$$A_2 = \frac{1}{2}(x^3 + 8x^2 - 3x^2 - 24x + 8x + 64)$$

$$A_2 = \frac{1}{2}(x^3 + 5x^2 - 16x + 64)$$

$$A_2 = \frac{1}{2}x^3 + \frac{5x^2}{2} - \frac{16x}{2} + \frac{64}{2}$$

$$A_2 = \frac{1}{2}x^3 + \frac{5}{2}x^2 - 8x + 32$$

$$A_1 = 10x^3 - 8x^2 + 6x$$

$$A_1 = 10(8)^3 - 8(8)^2 + 6(8)$$

$$A_1 = 4656 \text{ meters}^2$$

$$A_2 = \frac{1}{2}x^3 + \frac{5}{2}x^2 - 8x + 32$$

$$A_2 = \frac{1}{2}(8)^3 + \frac{5}{2}(8)^2 - 8(8) + 32$$

$$A_2 = 384 \text{ meters}^2$$

Now

Let $x = 8$
meters

(63) $(a+5)(a+5)=$

$$a^2 + 5a + 5a + 25 =$$

$$a^2 + 10a + 25 =$$

25

(64) $(m-a)^2 =$

$$(m-a)(m-a) =$$

$$m^2 - ma - ma + a^2 =$$

$$m^2 - 2ma + a^2 =$$

(65) $(x+3)^2 =$

$$(x+3)(x+3) =$$

$$x^2 + 3x + 3x + 9 =$$

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

(66) $(9a-11)^2 =$

$$(9a-11)(9a-11) =$$

$$81a^2 - 99a - 99a + 121 =$$

$$81a^2 - 198a + 121 =$$

(67) $(4b+5)^2 =$

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

$$16b^2 + 20b + 20b + 25 =$$

$$16b^2 + 40b + 25 =$$

$$(68) (4x-11y)^2 =$$

$$(4x-11y)(4x-11y) =$$

$$16x^2 - 44xy - 44xy + 121y^2 =$$

$$16x^2 - 88xy + 121y^2 =$$

26

$$(69) (x+5)(x-5) =$$

$$x^2 - 5x + 5x - 25 =$$

$$x^2 - 25 =$$

$$(70) (x+8y)(x-8y) =$$

$$x^2 - 8xy + 8xy - 64y^2 =$$

$$x^2 - 64y^2 =$$

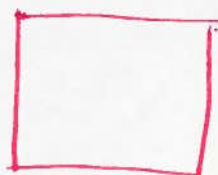
$$(71) (10a+3b)(10a-3b) =$$

$$100a^2 - 30ab + 30ab - 9b^2 =$$

$$100a^2 - 9b^2 =$$

$$(72)$$

$$3x+3$$



$$3x+3$$

Area

Square

$$A = LW$$

$$L = 3x+3$$

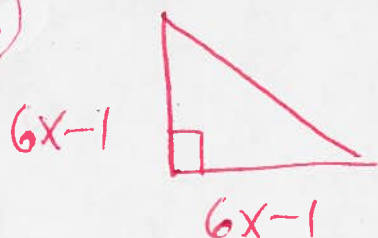
$$W = 3x+3$$

$$A = (3x+3)(3x+3)$$

$$A = 9x^2 + 9x + 9x + 9$$

$$A = 9x^2 + 18x + 9$$

(73)



Area

$$A = \frac{1}{2}BH$$

$$B = 6x-1$$

$$H = 6x-1$$

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

$$A = \frac{1}{2}(36x^2 - 6x - 6x + 1)$$

$$A = \frac{1}{2}(36x^2 - 12x + 1)$$

$$A = \frac{1}{2}(36x^2) - \left(\frac{1}{2}\right)(12x) + \left(\frac{1}{2}\right)(1)$$

$$A = 18x^2 - 6x + \frac{1}{2}$$

$$\frac{-42x^9y^{13}z^6}{7x^6y^8z^5} =$$

$$-6x^{9-6}y^{13-8}z^{6-5} =$$

$$-6x^3y^5z^1 =$$

$$\frac{12a^3 - 9a^5 + 15a}{3a} =$$

$$\frac{12a^3}{3a} - \frac{9a^5}{3a} + \frac{15a}{3a} =$$

$$4a^{3-1} - 3a^{5-1} + 5 =$$

$$4a^2 - 3a^4 + 5 =$$

(27)

76) $(x^2 + 7x - 18) \div (x + 9)$

Long division

$$\begin{array}{r} x - 2 \\ x + 9 \overline{) x^2 + 7x - 18} \\ \underline{-(x^2 + 9x)} \\ -2x - 18 \\ \underline{-(-2x - 18)} \\ 0 \end{array}$$

28

77) $3x^2y^6 + 15x^2y^5 =$

Factor out GCF

$3x^2y^5(y + 5) =$

78) $5x(3x + 4) - 4(3x + 4) =$

Factor out GCF

$(3x + 4)(5x - 4) =$

$(5x - 4)(3x + 4)$

79) $x^2 + 5x + xy + 5y =$

Factor by grouping

$(x^2 + 5x) + (xy + 5y) =$

$x(x + 5) + y(x + 5) =$

$(x + 5)(x + y) =$

80 $YX - 9X - 5Y + 45 =$ Factor by grouping

$$(YX - 9X) + (-5Y + 45) =$$

$$X(Y - 9) + 5(-Y + 9) =$$

$$X(\underline{Y - 9}) - 5(\underline{Y - 9}) =$$

$$(Y - 9)(X - 5) =$$

29

81 $16k^2 - 81m^2 =$

Factor

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

$$(4k)^2 - (9m)^2 =$$

$$(4k + 9m)(4k - 9m) =$$

82 $X^3 - 8Y^3$

Factor

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

$$(X)^3 - (8Y)^3 =$$

$$(X - 8Y)(X^2 + (X)(8Y) + (8Y)^2) =$$

$$(X - 8Y)(X^2 + 8XY + 64Y^2) =$$

83 $4X^2 - 196 =$

Factor

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

$$4(X^2 - 49) =$$

$$4(X^2 - (7)^2) =$$

$$4(X + 7)(X - 7) =$$

84

$$\frac{25m^2}{121} - \frac{9}{4} =$$

$$\begin{matrix} 5.5 & 3.3 \\ 11.1 & 2.2 \end{matrix}$$

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

$$\left(\frac{5m}{11}\right)^2 - \left(\frac{3}{2}\right)^2 =$$

$$\left(\frac{5m}{11} + \frac{3}{2}\right) \left(\frac{5m}{11} - \frac{3}{2}\right) =$$

30

85

$$4x^2 + 12x + 9 =$$

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

$$\begin{matrix} 4.1 \\ 2.2 \end{matrix}$$

$$\begin{matrix} 9.1 \\ 3.3 \end{matrix}$$

86

$$15x^2 - 14x - 8 =$$

$$(3x-4)(5x+2) =$$

$$\begin{matrix} 15.1 \\ 3.5 \end{matrix}$$

$$\begin{matrix} 8.1 \\ 2.4 \end{matrix}$$

87

$$15x^2 + 16xy + 4y^2 =$$

$$(3x+2y)(5x+2y) =$$

$$\begin{matrix} 15.1 \\ 3.5 \end{matrix}$$

$$\begin{matrix} 4.1 \\ 2.2 \end{matrix}$$

88

$$x^2 - x - 30 =$$

$$(x+5)(x-6) =$$

$$\begin{matrix} 30.1 \\ 10.3 \\ 5.6 \end{matrix}$$

89

$$x^2 + 7x - 44 =$$

$$(x-4)(x+11) =$$

$$\begin{matrix} 44.1 \\ 22.1 \\ 11.4 \end{matrix}$$

90

$$u^2 - 2uv - 48v^2 =$$

$$(u+6v)(u-8v) =$$

$$\begin{matrix} 48.1 \\ 24.2 \\ 12.4 \\ 16.3 \\ 6.8 \end{matrix}$$

91

$$x^2 + 16x + 64 =$$

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

$$\begin{matrix} 64.1 \\ 32.2 \\ 16.4 \\ 8.8 \end{matrix}$$

OK

$$(x+8)^2$$

$$(92) \quad b^2 - 36b + 324 =$$

$$(b - 18)(b - 18) = \text{OR } (b - 18)^2$$

$$(93) \quad 64x^2 - 48xy + 9y^2 =$$

$$(8x - 3y)(8x - 3y) = \text{OR } (8x - 3y)^2$$

$$(94) \quad 5x^2 - 5x - 30 =$$

$$5(x^2 - x - 6) =$$

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

$$\left(\begin{array}{l} 6 \cdot 1 \\ 2 \cdot 3 \end{array} \right)$$

$$\begin{array}{r} 36 \cdot 1 \\ 18 \cdot 2 \\ 12 \cdot 3 \\ 4 \cdot 9 \end{array}$$

31

$$(95) \quad y^3 + 12y^2 + 36y =$$

$$y(y^2 + 12y + 36) =$$

$$y(y + 6)(y + 6) = \text{OR } y(y + 6)^2$$

$$(96) \quad 3(x - 2) - a(x - 2) = \text{FACTOR}$$

$$(x - 2)(3 - a) = \text{OR } (3 - a)(x - 2)$$

$$(97) \quad (9y + 20)(2y + 25) = 0 \quad \text{Solve}$$

$$9y + 20 = 0 \quad \text{OR} \quad 2y + 25 = 0$$

$$9y + 20 - 20 = 0 - 20 \quad \text{OR} \quad 2y + 25 - 25 = 0 - 25$$

$$9y = -20 \quad \text{OR} \quad 2y = -25$$

$$\frac{9y}{9} = \frac{-20}{9} \quad \text{OR} \quad \frac{2y}{2} = \frac{-25}{2}$$

$$y = \frac{-20}{9} \quad \text{OR} \quad y = \frac{-25}{2}$$

(98) $56h^2 + 16h = 0$ Solve

$$8h(7h+2) = 0$$

$$8h = 0 \quad \text{OR} \quad 7h+2=0$$

$$\frac{8h}{8} = \frac{0}{8} \quad \text{OR} \quad 7h + \cancel{2} - \cancel{2} = 0 - 2$$

$$\text{OR} \quad 7h = -2$$

$$h = 0$$

$$\frac{7h}{7} = \frac{-2}{7}$$

$$h = -\frac{2}{7}$$

$$\left\{-\frac{2}{7}, 0\right\}$$

32

(99) $x^2 - x = 20$

$$x^2 - x - 20 = 0$$

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

$$x+4=0 \quad \text{OR} \quad x-5=0$$

$$x+4-4=0-4 \quad \text{OR} \quad x-5+5=0+5$$

$$x = -4$$

$$\text{OR} \quad x = 5$$

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

20 : 1
10 : 2
4 : 5

(100) $x(x-3) = 54$

$$x^2 - 3x = 54$$

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

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

$$x+6=0 \quad \text{OR} \quad x-9=0$$

$$x+6-6=0-6 \quad \text{OR} \quad x-9+9=0+9$$

$$x = -6$$

$$\text{OR} \quad x = 9$$

$$\{-6, 9\}$$

54 : 1
27 : 2
6 : 9

$$\textcircled{101} \quad \frac{3x-15}{x^2-25} =$$

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

$$\frac{3}{x+5} =$$

$$\textcircled{102} \quad \frac{y^2-2y-8}{y^2+8y+12} =$$

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

$$\frac{y-4}{y+6} =$$

$$\textcircled{103} \quad \frac{8y^4x^1}{30} \cdot \frac{10}{32x^3y^2} =$$

$$\frac{1y^{4-2}}{3} \cdot \frac{1}{4x^{3-1}} =$$

$$\frac{1y^2}{3} \cdot \frac{1}{4x^2} =$$

$$\frac{y^2}{12x^2} =$$

33

(104)

$$\frac{6y^4x^1}{27} \cdot \frac{9}{24x^3y^2} =$$

$$\frac{1y^{4-2}}{3} \cdot \frac{1}{4x^{3-1}} =$$

$$\frac{1y^2}{3} \cdot \frac{1}{4x^2} =$$

$$\frac{y^2}{12x^2} =$$

(105)

$$\frac{a^2-9b^2}{25ab^2} \cdot \frac{5a^2b}{a-3b} =$$

$$\frac{(a+3b)(\cancel{a-3b})}{25\cancel{a}^1b^2} \cdot \frac{5\cancel{a}^2\cancel{b}^1}{(\cancel{a-3b})} =$$

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

$$\frac{(a+3b)}{5b^1} \cdot \frac{1a^1}{1} =$$

$$\frac{(a+3b)}{5b} \cdot \frac{a}{1} =$$

$$\frac{a^2+3ab}{5b} =$$

34

106 $\frac{m^2 - 4}{m^2 + 4m - 12} \div \frac{m^2 - 4m - 12}{m - 2} =$

$$\frac{m^2 - 4}{m^2 + 4m - 12} \cdot \frac{m - 2}{m^2 - 4m - 12} =$$

$$\frac{(m+2)(m-2)}{(m-2)(m+6)} \cdot \frac{(m-2)}{(m+2)(m-6)} =$$

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

107 $\frac{7x+10}{2} - \frac{5x}{2} =$

$$\frac{(7x+10) - (5x)}{2} =$$

$$\frac{7x+10-5x}{2} =$$

$$\frac{2x+10}{2} =$$

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

$$x+5 =$$

35

LCD = 2

108

$$\frac{4}{x} + \frac{7}{x-3} =$$

$$LCD = x(x-3)$$

$$\frac{4}{x} \left(\frac{x-3}{x-3} \right) + \left(\frac{7}{x-3} \right) \left(\frac{x}{x} \right) =$$

36

$$\frac{4(x-3) + 7(x)}{x(x-3)} =$$

$$\frac{4x - 12 + 7x}{x(x-3)} =$$

$$\frac{11x - 12}{x(x-3)} =$$

109

$$\frac{4}{x+5} - \frac{6}{x-5}$$

$$LCD = (x+5)(x-5)$$

$$\left(\frac{4}{x+5} \right) \left(\frac{x-5}{x-5} \right) - \left(\frac{6}{x-5} \right) \left(\frac{x+5}{x+5} \right)$$

$$\frac{4(x-5) - 6(x+5)}{(x+5)(x-5)} =$$

$$\frac{4x - 20 - 6x - 30}{(x+5)(x-5)} =$$

$$\frac{-2x - 50}{(x+5)(x-5)} =$$

OR

$$\frac{-2(x+25)}{(x+5)(x-5)}$$

$$(110) \quad \frac{5w}{w+9} + \frac{5}{w} = \quad \text{LCD} = w(w+9)$$

$$\left(\frac{5w}{w+9}\right)\left(\frac{w}{w}\right) + \left(\frac{5}{w}\right)\left(\frac{w+9}{w+9}\right) =$$

$$\frac{5w(w) + 5(w+9)}{w(w+9)} =$$

$$\frac{5w^2 + 5w + 45}{w(w+9)} =$$

$$\text{OR} \quad \frac{5(w^2 + w + 9)}{w(w+9)}$$

$$(111) \quad \frac{16}{x^2-64} + \frac{1}{x+8} =$$

$$\frac{16}{(x+8)(x-8)} + \frac{1}{(x+8)} =$$

$$\frac{16}{(x+8)(x-8)} + \left(\frac{1}{x+8}\right)\left(\frac{x-8}{x-8}\right) =$$

$$\frac{16 + 1(x-8)}{(x+8)(x-8)} =$$

$$\frac{16 + x - 8}{(x+8)(x-8)} =$$

$$\frac{\cancel{x+8}}{(\cancel{x+8})(x-8)} =$$

$$\frac{1}{x-8} =$$

37

$$\text{LCD} = (x+8)(x-8)$$

(112)

$$\frac{14}{y^2 - 49}$$

$$\frac{35}{y-7} =$$

$$\frac{14}{(y+7)(y-7)} =$$

$$\frac{35}{(y-7)}$$

$$\frac{14}{(y+7)(y-7)} \cdot \frac{(y+7)(y-7)}{1} =$$

$$\frac{35}{(y-7)} \cdot \frac{(y+7)(y-7)}{1}$$

$$\frac{14}{1} =$$

$$35(y+7)$$

$$\frac{14}{35(y+7)} =$$

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

$$LCD = (y+7)(y-7)$$

38

(113)

$$\frac{64 - \frac{8}{z}}{8 - \frac{1}{z}} =$$

$$LCD = z$$

39

$$\frac{\left(\frac{64}{1} - \frac{8}{z}\right) \frac{z}{1}}{\left(\frac{8}{1} - \frac{1}{z}\right) \frac{z}{1}} =$$

$$\frac{\frac{64z}{1} - \frac{8z}{z}}{\frac{8z}{1} - \frac{z}{z}} =$$

$$\frac{64z - 8}{8z - 1} =$$

$$\frac{8(8z - 1)}{(8z - 1)} =$$

$$8 =$$

$$\textcircled{114} \quad \frac{\frac{3}{x} + \frac{2}{x^2}}{\frac{9}{x^2} - \frac{4}{x}} =$$

$$\textcircled{LCD = x^2}$$

$\textcircled{40}$

$$\frac{\left(\frac{3}{x} + \frac{2}{x^2}\right) \frac{x^2}{1}}{\left(\frac{9}{x^2} - \frac{4}{x}\right) \frac{x^2}{1}} =$$

$$\frac{\frac{3x^2}{x} + \frac{2x^2}{x^2}}{\frac{9x^2}{x^2} - \frac{4x^2}{x}} =$$

$$\frac{3x + 2}{9 - 4x} =$$

$$\textcircled{115} \quad \frac{\frac{5}{x} - \frac{4}{y}}{\frac{2}{x} + \frac{3}{y}} =$$

$$\textcircled{LCD = xy}$$

$$\frac{\left(\frac{5}{x} - \frac{4}{y}\right) \frac{xy}{1}}{\left(\frac{2}{x} + \frac{3}{y}\right) \frac{xy}{1}} =$$

$$\frac{\frac{5xy}{x} - \frac{4xy}{y}}{\frac{2xy}{x} + \frac{3xy}{y}} =$$

$$\frac{5y - 4x}{2y + 3x}$$

116

$$\frac{\frac{x}{36} - \frac{1}{x}}{1 + \frac{6}{x}} =$$

$$LCD = 36x$$

$$\frac{\left(\frac{x}{36} - \frac{1}{x}\right) \frac{36x}{1}}{\left(1 + \frac{6}{x}\right) \frac{36x}{1}} =$$

$$\frac{\frac{36x^2}{36} - \frac{36x}{x}}{\frac{36x}{1} + \frac{216x}{x}} =$$

$$\frac{x^2 - 36}{36x + 216} =$$

$$\frac{(x+6)(x-6)}{36(x+6)} =$$

$$\frac{x-6}{36} =$$

117

$$\frac{9 + \frac{3}{x}}{\frac{x}{4} + \frac{1}{12}} =$$

$$LCD = 12x$$

$$\frac{\left(\frac{9}{1} + \frac{3}{x}\right) \frac{12x}{1}}{\left(\frac{x}{4} + \frac{1}{12}\right) \frac{12x}{1}} =$$

$$\frac{\frac{108x}{1} + \frac{36x}{x}}{\frac{12x^2}{4} + \frac{12x}{12}} =$$

$$\frac{108x + 36}{3x^2 + x} =$$

$$\frac{36(3x+1)}{x(3x+1)} =$$

$$\frac{36}{x} =$$

~~36(3x+1)~~
~~36(3x+1)~~
~~36(3x+1)~~

41

$$(118) \quad \frac{36t^2 - 16u^2}{t^4}$$

$$LCD = t^4$$

$$\frac{\frac{36t^2 - 16u^2}{t^4}}{\frac{6}{u} - \frac{4}{t}} =$$

$$\frac{\left(\frac{36t^2 - 16u^2}{t^4}\right) \frac{t^4}{1}}{\frac{6}{u} - \frac{4}{t}} =$$

$$\left(\frac{6}{u} - \frac{4}{t}\right) \frac{t^4}{1}$$

$$\frac{(36t^2 - 16u^2) \cancel{t^4}}{\cancel{t^4}} =$$

$$\frac{6t^4}{u} - \frac{4t^4}{t}$$

$$\frac{36t^2 - 16u^2}{6t - 4u} =$$

$$\frac{4(9t^2 - 4u^2)}{2(3t - 2u)} =$$

$$\frac{\cancel{4}(3t + 2u)(\cancel{3t - 2u})}{2(\cancel{3t - 2u})} =$$

$$2(3t + 2u) = \text{OR}$$

$$6t + 4u =$$

42

(119) Find the excluded values and state the domain.

$$f(x) = 8 + \frac{6}{x+4}$$

$$\text{Set } x+4=0$$

$$x+4-4=0-4$$

$$x = -4$$

$$\text{Domain} = \{x \mid x \neq -4\}$$

43

(120) Find the excluded values and state the domain.

$$f(y) = \frac{y^2 - 24y}{6y}$$

$$\text{Set } 6y = 0$$

$$\frac{6y}{6} = \frac{0}{6}$$

$$y = 0$$

$$\text{Domain} = \{y \mid y \neq 0\}$$

(121) Find the excluded values and state the domain

$$f(x) = \frac{x^2 - 36}{x^2 - 11x + 30}$$

44

$$\text{Set } x^2 - 11x + 30 = 0$$

$$(x-5)(x-6) = 0$$

$$x-5=0 \quad \text{OR} \quad x-6=0$$

$$x-5+5=0+5 \quad \text{OR} \quad x-6+6=0+6$$

$$x=5$$

$$x=6$$

$$\text{Domain} = \{x \mid x \neq 5 \text{ OR } x \neq 6\}$$

(122)

$$\frac{6}{x} - \frac{1}{4} = \frac{4}{x}$$

$$\text{LCD} = 4x$$

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

$$6(4) - 1(x) = 4(4)$$

$$24 - x = 16$$

$$\cancel{24} - x - \cancel{24} = 16 - 24$$

$$-x = -8$$

$$\frac{-x}{-1} = \frac{-8}{-1}$$

$$x = 8$$

$$(123) \quad \frac{2}{y+2} - \frac{5}{y-2} = \frac{10}{y^2-4}$$

(45)

$$\frac{2}{y+2} - \frac{5}{y-2} = \frac{10}{(y+2)(y-2)}$$

$$\frac{2}{y+2} (y+2)(y-2) - \frac{5}{y-2} (y+2)(y-2) = \frac{10}{(y+2)(y-2)} (y+2)(y-2)$$

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

$$2y - 4 - 5y - 10 = 10$$

$$-3y - 14 = 10$$

$$-3y - 14 + 14 = 10 + 14$$

$$-3y = 24$$

$$\frac{-3y}{-3} = \frac{24}{-3}$$

$$y = -8$$

$$(124) \quad L = \frac{P}{2} - w \quad \text{Solve for } P$$

$$LCD = 2$$

$$2L = 2\left(\frac{P}{2}\right) - 2(w)$$

$$2L = P - 2w$$

$$2L + 2w = P - 2w + 2w$$

$$2L + 2w = P$$

$$P = 2L + 2w$$

(125) $\frac{1}{a} + \frac{1}{b} = c$ solve for a

$LCD = ab$

$$\frac{1}{a}(ab) + \frac{1}{b}(ab) = c(ab)$$

$$1b + 1a = cab$$

$$b + a = cab$$

$$b + \cancel{a} - \cancel{a} = cab - a$$

$$b = cab - a$$

$$b = a(cb - 1)$$

$$\frac{b}{(cb-1)} = \frac{a(\cancel{cb-1})}{(\cancel{cb-1})}$$

$$\frac{b}{cb-1} = a$$

$$\frac{b}{bc-1} = a$$

(126) y varies directly with x. If $y=15$ when $x=12$ find the variation constant k.

$$y = kx$$

$$15 = k(12)$$

$$\frac{15}{12} = \frac{k(\cancel{12})}{\cancel{12}}$$

$$\frac{15}{12} = k$$

$$\frac{3 \cdot 5}{3 \cdot 4} = k$$

$$\frac{5}{4} = k$$

(127) C varies directly with V. If $C = 225$ when $V = 9$, find C if $V = 14$.

47.

$$C = kV$$

$$225 = k(9)$$

$$\frac{225}{9} = \frac{k(9)}{9}$$

$$25 = k$$

$$C = 25V$$

$$C = 25(14)$$

$$C = 350$$

(128) $\sqrt{180} =$

$$\sqrt{36 \cdot 5} =$$

$$\sqrt{36} \sqrt{5} =$$

$$6\sqrt{5} =$$

$$\begin{array}{r} 2 \overline{) 180} \\ 2 \overline{) 90} \\ 3 \overline{) 45} \\ 3 \overline{) 15} \\ 5 \overline{) 5} \\ 1 \end{array}$$

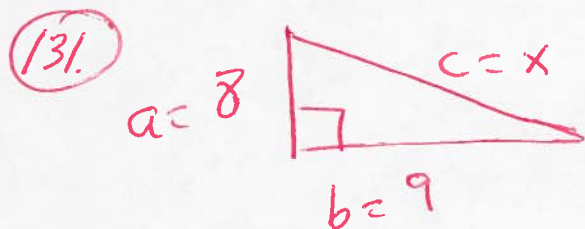
(129) $\sqrt{169x^6y^1z^9} =$

$$\sqrt{(13)^2 x^6 y^1 z^8 z^1} =$$

$$13x^3z^4\sqrt{y^1z^1} =$$

$$\begin{aligned}
 (130) \quad & 12\sqrt{2} - 8\sqrt{2} - \sqrt{2} = \\
 & 12\sqrt{2} - 8\sqrt{2} - 1\sqrt{2} = \\
 & 4\sqrt{2} - 1\sqrt{2} \\
 & 3\sqrt{2} =
 \end{aligned}$$

48



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 (8)^2 + (9)^2 &= c^2 \\
 64 + 81 &= c^2 \\
 145 &= c^2
 \end{aligned}$$

$$\sqrt{145} = \sqrt{c^2}$$

$$\sqrt{145} = c$$

$$\begin{aligned}
 (132) \quad & (1 + 3\sqrt{7})(1 - 3\sqrt{7}) = \\
 & 1 - 3\sqrt{7} + 3\sqrt{7} - 9(\sqrt{7})^2 = \\
 & 1 - 9(\sqrt{7})^2 = \\
 & 1 - 9(7) = \\
 & 1 - 63 = \\
 & -62 =
 \end{aligned}$$

(133) $S = s \sqrt{\frac{D}{d}}$

$s = 36, d = 48, D = 125$

$$S = 36 \sqrt{\frac{125}{48}}$$

$$S = 36 \frac{\sqrt{125}}{\sqrt{48}}$$

$$S = 36 \frac{\sqrt{25 \cdot 5}}{\sqrt{16 \cdot 3}}$$

$$S = 36 \frac{\sqrt{25} \sqrt{5}}{\sqrt{16} \sqrt{3}}$$

$$S = 36 \frac{5 \sqrt{5}}{4 \sqrt{3}}$$

$$S = 9 \frac{(5) \sqrt{5}}{\sqrt{3}}$$

$$S = \frac{45 \sqrt{5}}{\sqrt{3}}$$

$$S = \frac{45 \sqrt{5} \sqrt{3}}{\sqrt{3} \sqrt{3}}$$

$$S = \frac{45 \sqrt{15}}{(\sqrt{3})^2}$$

$$S = \frac{45 \sqrt{15}}{3}$$

$$S = 15 \sqrt{15}$$

$$\begin{array}{r} 5 \overline{) 125} \\ 5 \overline{) 25} \\ 5 \overline{) 5} \\ 1 \end{array}$$

$$\begin{array}{r} 2 \overline{) 48} \\ 2 \overline{) 24} \\ 2 \overline{) 12} \\ 2 \overline{) 6} \\ 3 \overline{) 3} \\ 1 \end{array}$$

(49)

134 $\sqrt{7-x} = x-1$

$$(\sqrt{7-x})^2 = (x-1)^2$$

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

$$7-x = x^2 - 1x - 1x + 1$$

$$7-x = x^2 - 2x + 1$$

$$0 = x^2 - 2x + 1 - 7 + x$$

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

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

$$x+2=0 \quad \text{OR} \quad x-3=0$$

$$x+2-2=0-2 \quad \text{OR} \quad x-3+3=0+3$$

$$x=-2 \quad \text{OR} \quad x=3$$

Chk $\sqrt{7-x} = x-1$

$$\sqrt{7-(3)} = (3)-1$$

$$\sqrt{7-3} = 3-1$$

$$\sqrt{4} = 2$$

$$2 = 2$$

Good

$$\sqrt{7-x} = x-1$$

$$\sqrt{7-(-2)} = (-2)-1$$

$$\sqrt{7+2} = -2-1$$

$$\sqrt{9} = -3$$

$$3 \neq -3$$

BAD

50

{3}

135

$$t = 2\pi \sqrt{\frac{L}{g}}$$

$$g = 32, \quad t = 5$$

51

$$5 = 2\pi \sqrt{\frac{L}{32}}$$

$$\frac{5}{2\pi} = \frac{2\pi \sqrt{\frac{L}{32}}}{2\pi}$$

$$\frac{5}{2\pi} = \sqrt{\frac{L}{32}}$$

$$\left(\frac{5}{2\pi}\right)^2 = \left(\sqrt{\frac{L}{32}}\right)^2$$

$$\frac{(5)^2}{(2\pi)^2} = \frac{L}{32}$$

$$\frac{25}{4\pi^2} = \frac{L}{32}$$

$$32 \left(\frac{25}{4\pi^2}\right) = 32 \left(\frac{L}{32}\right)$$

$$\frac{32(25)}{4\pi^2} = L$$

$$\frac{8(25)}{\pi^2} = L$$

$$\frac{200}{\pi^2} = L$$

(136)

$$r = \sqrt{\frac{s}{4\pi}}$$

$$s = 180$$

(52)

$$r = \sqrt{\frac{180}{4\pi}}$$

$$r = \sqrt{\frac{45}{\pi}}$$

$$r = \frac{\sqrt{45}}{\sqrt{\pi}}$$

$$\begin{array}{r} 3 \overline{)45} \\ 3 \overline{)15} \\ 5 \overline{)5} \\ 1 \end{array}$$

$$r = \frac{\sqrt{9 \cdot 5}}{\sqrt{\pi}}$$

$$r = \frac{\sqrt{9} \sqrt{5}}{\sqrt{\pi}}$$

$$r = \frac{3\sqrt{5}}{\sqrt{\pi}}$$

$$r = \frac{3\sqrt{5}}{\sqrt{\pi}} \cdot \frac{\sqrt{\pi}}{\sqrt{\pi}}$$

$$r = \frac{3\sqrt{5\pi}}{(\sqrt{\pi})^2}$$

$$r = \frac{3\sqrt{5\pi}}{\pi}$$

(137) $\sqrt[3]{-27a^{11}b^{13}} =$

$$\sqrt[3]{(-3)^3 \overset{\vee}{a^9} \overset{\vee}{a^2} \overset{\vee}{b^{12}} \overset{\vee}{b^1}} =$$

$$(-3)^1 a^3 b^4 \sqrt[3]{a^2 b^1} =$$

$$\boxed{-3a^3 b^4 \sqrt[3]{a^2 b} =}$$

53

(138) $\sqrt[4]{2x-4} + 3 = 7$

$$\sqrt[4]{2x-4} + \cancel{3-3} = 7-3$$

$$\sqrt[4]{2x-4} = 4$$

$$(\sqrt[4]{2x-4})^4 = (4)^4$$

$$2x-4 = (4)(4)(4)(4)$$

$$2x-4 = 256$$

$$2x - \cancel{4} + \cancel{4} = 256 + 4$$

$$2x = 260$$

$$\frac{2x}{2} = \frac{260}{2}$$

$$\boxed{x = 130}$$

(139) $h(x) = 3x^2 - 7x - 4$

$$h(-5) = 3(-5)^2 - 7(-5) - 4$$

$$h(-5) = 3(-5)(-5) - 7(-5) - 4$$

$$h(-5) = 3(25) - 7(-5) - 4$$

$$h(-5) = 75 + 35 - 4$$

$$h(-5) = 110 - 4$$

$$h(-5) = 106$$

54

(140) $g(t) = 8t^2 - 5t$

$$g\left(\frac{1}{2}\right) = 8\left(\frac{1}{2}\right)^2 - 5\left(\frac{1}{2}\right)$$

$$g\left(\frac{1}{2}\right) = 8\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) - 5\left(\frac{1}{2}\right)$$

$$g\left(\frac{1}{2}\right) = 8\left(\frac{1}{4}\right) - \frac{5}{2}\left(\frac{1}{2}\right)$$

$$g\left(\frac{1}{2}\right) = 2(1) - \frac{5}{2}$$

$$g\left(\frac{1}{2}\right) = 2 - \frac{5}{2}$$

$$g\left(\frac{1}{2}\right) = \frac{2}{1} - \frac{5}{2}$$

$$g\left(\frac{1}{2}\right) = \frac{2}{1}\left(\frac{2}{2}\right) - \frac{5}{2}$$

$$g\left(\frac{1}{2}\right) = \frac{4}{2} - \frac{5}{2}$$

$$g\left(\frac{1}{2}\right) = \frac{4-5}{2}$$

$$g\left(\frac{1}{2}\right) = -\frac{1}{2}$$

$$(141) \quad f(x) = |5x - 4|$$

$$f(-3) = |5(-3) - 4|$$

$$f(-3) = |-15 - 4|$$

$$f(-3) = |-19|$$

$$f(-3) = 19$$

55

$$(142) \quad f(x) = 4 - 9x \text{ and } g(x) = -2x + 9$$

$$(f+g)(x) =$$

$$f(x) + g(x) =$$

$$(4 - 9x) + (-2x + 9) =$$

$$4 - 9x - 2x + 9 =$$

$$-11x + 13 =$$

$$\text{Domain} = (-\infty, \infty)$$

$$(143) \quad f(x) = 2x^2 - 3 \text{ and } g(x) = 7x - 4$$

$$(f-g)(x) =$$

$$f(x) - g(x) =$$

$$(2x^2 - 3) - (7x - 4) =$$

$$2x^2 - 3 - 7x + 4 =$$

$$2x^2 - 7x + 1 =$$

$$\text{Domain} = (-\infty, \infty)$$

144 $f(x) = 5x + 1$ and $g(x) = 2x - 5$

56

$$\left(\frac{f}{g}\right)(x) =$$

$$\frac{f(x)}{g(x)} =$$

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

Set $2x - 5 = 0$

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

$$2x = 5$$

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

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

$$\text{Domain} = \left\{x \mid x \neq \frac{5}{2}\right\}$$

145 $f(x) = 5x^2 - 2$ and $g(x) = 4x + 1$

$$(f \cdot g)(x) =$$

$$f(x) \cdot g(x) =$$

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

$$20x^3 + 5x^2 - 8x - 2 =$$

$$\text{Domain} = (-\infty, \infty)$$

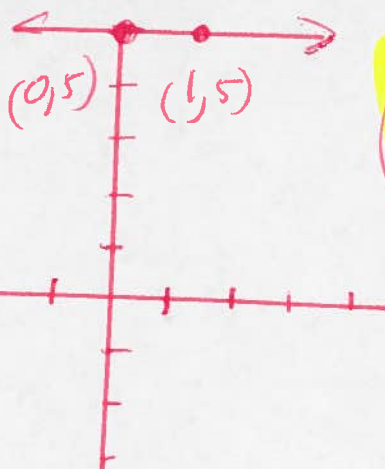
146 Graph

$$f(x) = 5$$

$$f(0) = 5$$

$$f(1) = 5$$

x	$f(x)$
0	5
1	5



57

$$\text{Domain} = (-\infty, \infty)$$

$$\text{Range} = \{5\}$$

147 Graph

$$g(x) = \sqrt{x-1}$$

$$g(1) = \sqrt{1-1}$$

$$g(1) = \sqrt{0}$$

$$g(1) = 0$$

x	$g(x)$
1	0
2	1
5	2

$$g(2) = \sqrt{2-1}$$

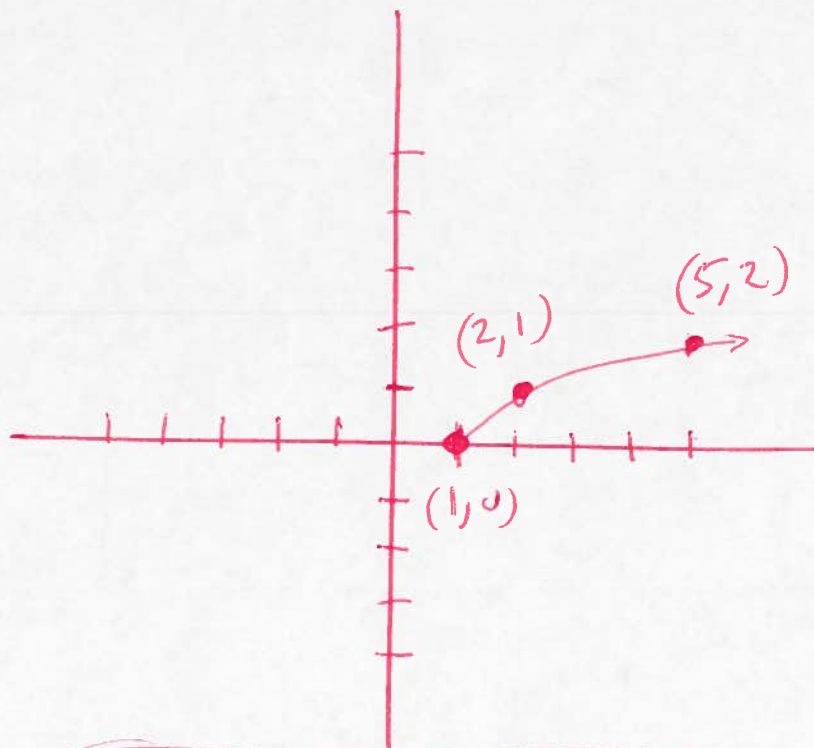
$$g(2) = \sqrt{1}$$

$$g(2) = 1$$

$$g(5) = \sqrt{5-1}$$

$$g(5) = \sqrt{4}$$

$$g(5) = 2$$



$$\text{Domain} = [1, \infty)$$

$$\text{Range} = [0, \infty)$$

148 Graph
 $f(x) = \sqrt{5-x}$

X	f(x)
1	2
4	1
5	0

58

$$f(1) = \sqrt{5-(1)}$$

$$f(1) = \sqrt{5-1}$$

$$f(1) = \sqrt{4}$$

$$f(1) = 2$$

$$f(4) = \sqrt{5-(4)}$$

$$f(4) = \sqrt{5-4}$$

$$f(4) = \sqrt{1}$$

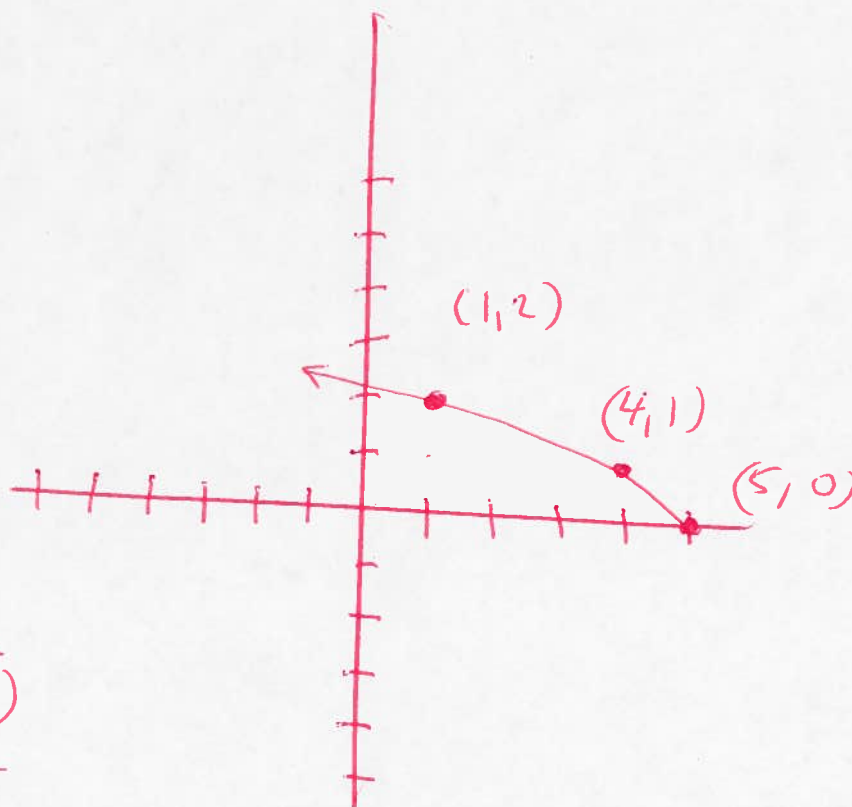
$$f(4) = 1$$

$$f(5) = \sqrt{5-(5)}$$

$$f(5) = \sqrt{5-5}$$

$$f(5) = \sqrt{0}$$

$$f(5) = 0$$



$$\text{Domain} = (-\infty, 5)$$

$$\text{Range} = [0, \infty)$$

(149) Graph
 $f(x) = (x-3)^2$

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

$$f(2) = (-1)^2$$

$$f(2) = (-1)(-1)$$

$$f(2) = 1$$

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

$$f(3) = (0)^2$$

$$f(3) = (0)(0)$$

$$f(3) = 0$$

$$f(4) = (4-3)^2$$

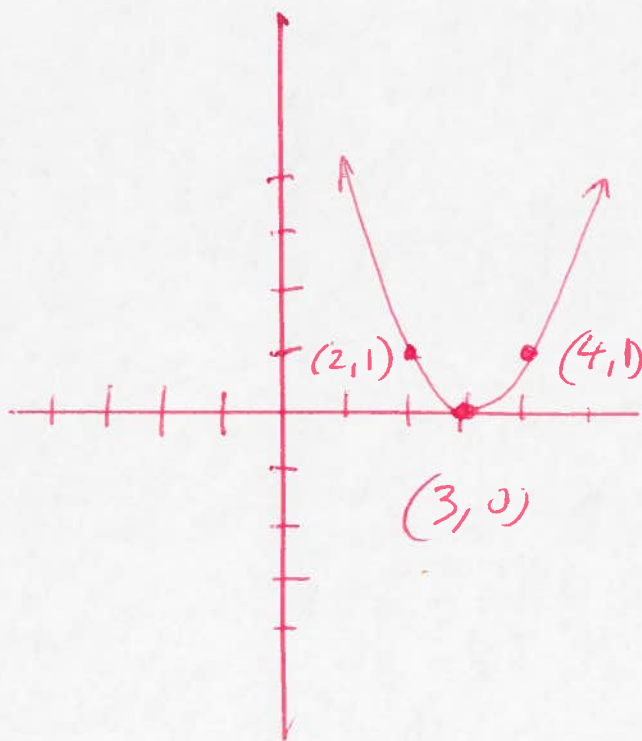
$$f(4) = (1)^2$$

$$f(4) = (1)(1)$$

$$f(4) = 1$$

x	$f(x)$
2	1
3	0
4	1

(59)



(150) Graph
 $f(x) = -x^2 + 2$

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

$$f(-1) = -(-1)(-1) + 2$$

$$f(-1) = -(1) + 2$$

$$f(-1) = -1 + 2$$

$$f(-1) = 1$$

x	$f(x)$
-1	1
0	2
1	1

(60)

$$f(0) = -(0)^2 + 2$$

$$f(0) = -(0)(0) + 2$$

$$f(0) = -(0) + 2$$

$$f(0) = 0 + 2$$

$$f(0) = 2$$

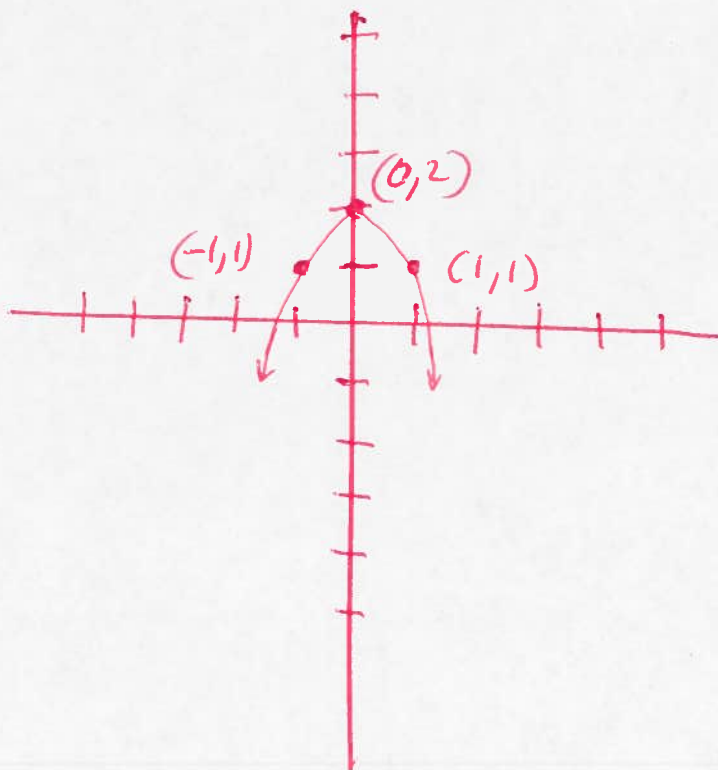
$$f(1) = -(1)^2 + 2$$

$$f(1) = -(1)(1) + 2$$

$$f(1) = -(1) + 2$$

$$f(1) = -1 + 2$$

$$f(1) = 1$$



(151) Graph

$$f(x) = (x+4)^2 - 5$$

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

$$f(-5) = (-1)^2 - 5$$

$$f(-5) = (-1)(-1) - 5$$

$$f(-5) = 1 - 5$$

$$f(-5) = -4$$

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

$$f(-4) = (0)^2 - 5$$

$$f(-4) = (0)(0) - 5$$

$$f(-4) = 0 - 5$$

$$f(-4) = -5$$

$$f(-3) = (-3+4)^2 - 5$$

$$f(-3) = (1)^2 - 5$$

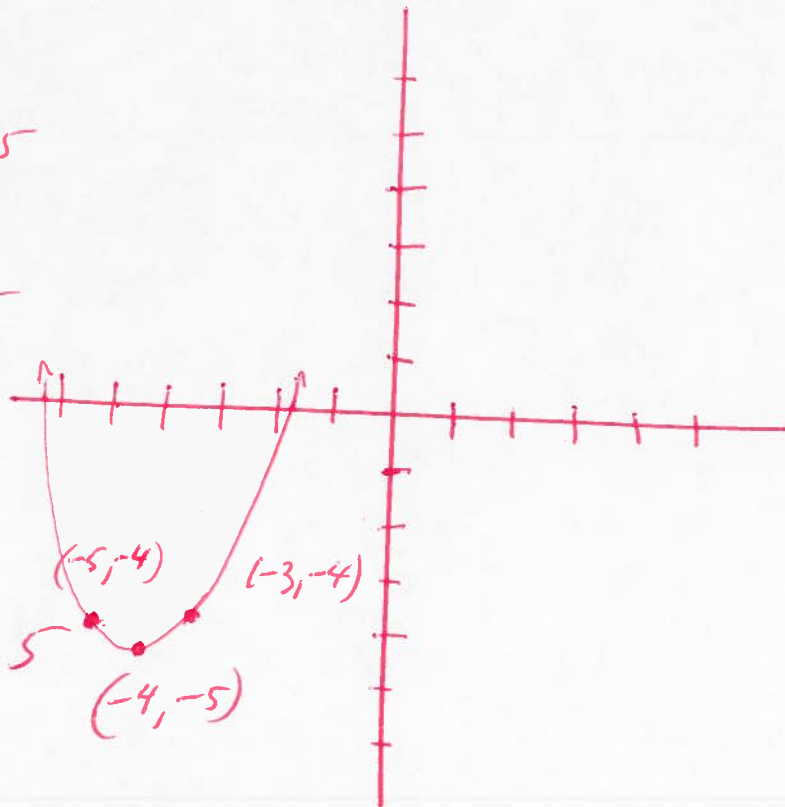
$$f(-3) = (1)(1) - 5$$

$$f(-3) = 1 - 5$$

$$f(-3) = -4$$

x	$f(x)$
-5	-4
-4	-5
-3	-4

61



152 Graph
 $g(x) = (x-3)^2$

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

$$g(2) = (-1)^2$$

$$g(2) = (-1)(-1)$$

$$g(2) = 1$$

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

$$g(3) = (0)^2$$

$$g(3) = (0)(0)$$

$$g(3) = 0$$

$$g(4) = (4-3)^2$$

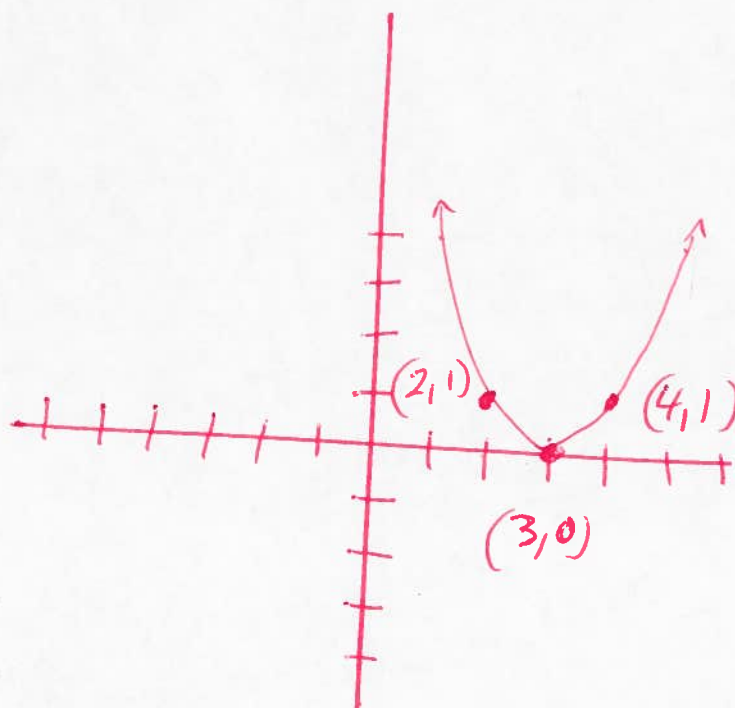
$$g(4) = (1)^2$$

$$g(4) = (1)(1)$$

$$g(4) = 1$$

x	g(x)
2	1
3	0
4	1

(64)



153 Graph
 $f(x) = |x+3|$

$$f(-4) = |-4+3|$$

$$f(-4) = |-1|$$

$$f(-4) = 1$$

$$f(-3) = |-3+3|$$

$$f(-3) = |0|$$

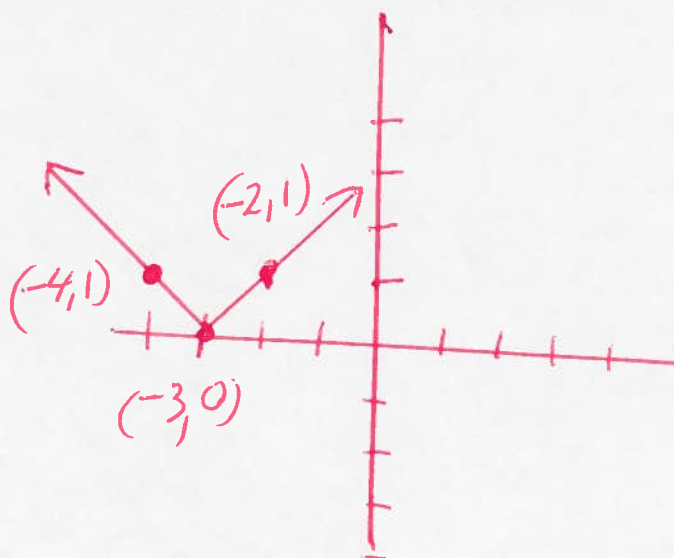
$$f(-3) = 0$$

$$f(-2) = |-2+3|$$

$$f(-2) = |1|$$

$$f(-2) = 1$$

x	$f(x)$
-4	1
-3	0
-2	1



63

154 Graph
 $g(x) = (x+3)^2 - 1$

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

$$g(-4) = (-1)^2 - 1$$

$$g(-4) = (-1)(-1) - 1$$

$$g(-4) = 1 - 1$$

$$g(-4) = 0$$

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

$$g(-3) = (0)^2 - 1$$

$$g(-3) = (0)(0) - 1$$

$$g(-3) = 0 - 1$$

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

x	$g(x)$
-4	0
-3	-1
-2	0

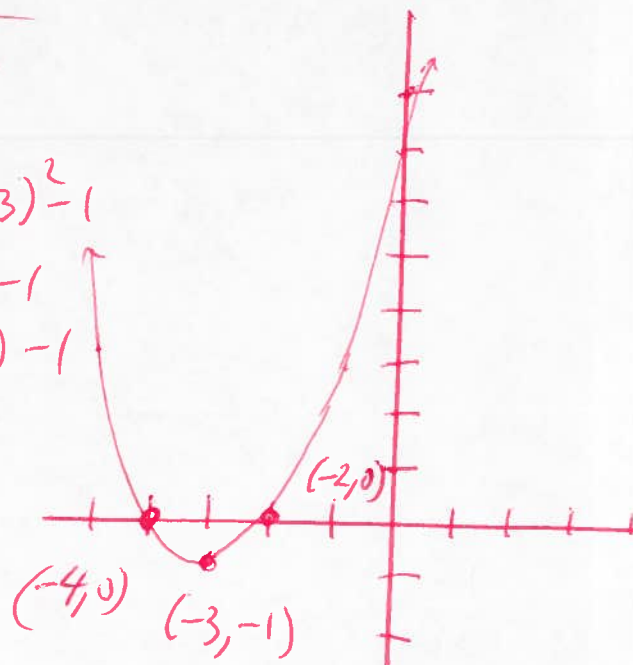
$$g(-2) = (-2+3)^2 - 1$$

$$g(-2) = (1)^2 - 1$$

$$g(-2) = (1)(1) - 1$$

$$g(-2) = 1 - 1$$

$$g(-2) = 0$$



155 Graph
 $f(x) = \sqrt{x+2} - 7$

$$f(-2) = \sqrt{-2+2} - 7$$

$$f(-2) = \sqrt{0} - 7$$

$$f(-2) = 0 - 7$$

$$f(-2) = -7$$

$$f(-1) = \sqrt{-1+2} - 7$$

$$f(-1) = \sqrt{1} - 7$$

$$f(-1) = 1 - 7$$

$$f(-1) = -6$$

$$f(2) = \sqrt{2+2} - 7$$

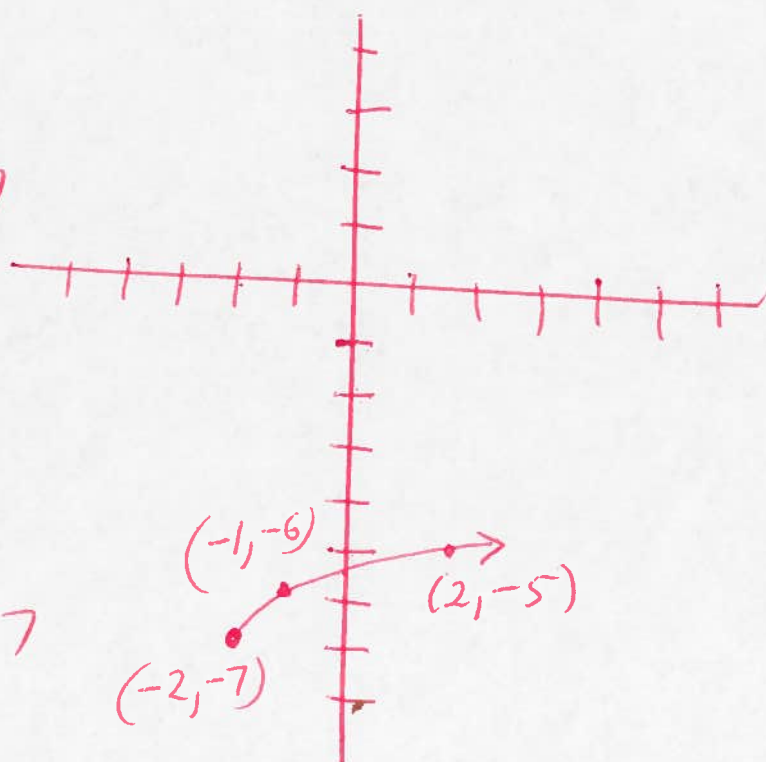
$$f(2) = \sqrt{4} - 7$$

$$f(2) = 2 - 7$$

$$f(2) = -5$$

x	$f(x)$
-2	-7
-1	-6
2	-5

64



156 Graph
 $f(x) = -\sqrt{x-6}$

$$f(6) = -\sqrt{6-6}$$

$$f(6) = -\sqrt{0}$$

$$f(6) = -(0)$$

$$f(6) = 0$$

$$f(7) = -\sqrt{7-6}$$

$$f(7) = -\sqrt{1}$$

$$f(7) = -(1)$$

$$f(7) = -1$$

$$f(10) = -\sqrt{10-6}$$

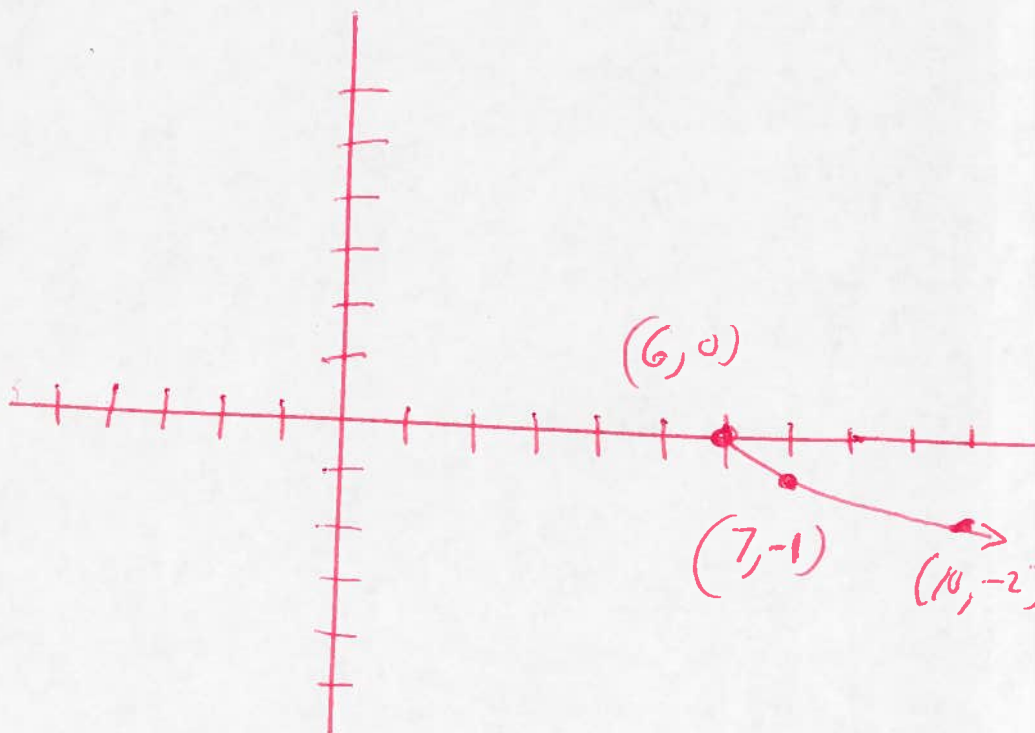
$$f(10) = -\sqrt{4}$$

$$f(10) = -(2)$$

$$f(10) = -2$$

x	$f(x)$
6	0
7	-1
10	-2

65



157

Graph

$$h(x) = -\sqrt{x+3} - 5$$

x	$h(x)$
-3	-5
-2	-6
-1	-7

66

$$h(-3) = -\sqrt{-3+3} - 5$$

$$h(-3) = -\sqrt{0} - 5$$

$$h(-3) = -(0) - 5$$

$$h(-3) = 0 - 5$$

$$h(-3) = -5$$

$$h(-2) = -\sqrt{-2+3} - 5$$

$$h(-2) = -\sqrt{1} - 5$$

$$h(-2) = -(1) - 5$$

$$h(-2) = -1 - 5$$

$$h(-2) = -6$$

$(-3, -5)$

$(-2, -6)$

$(-1, -7)$

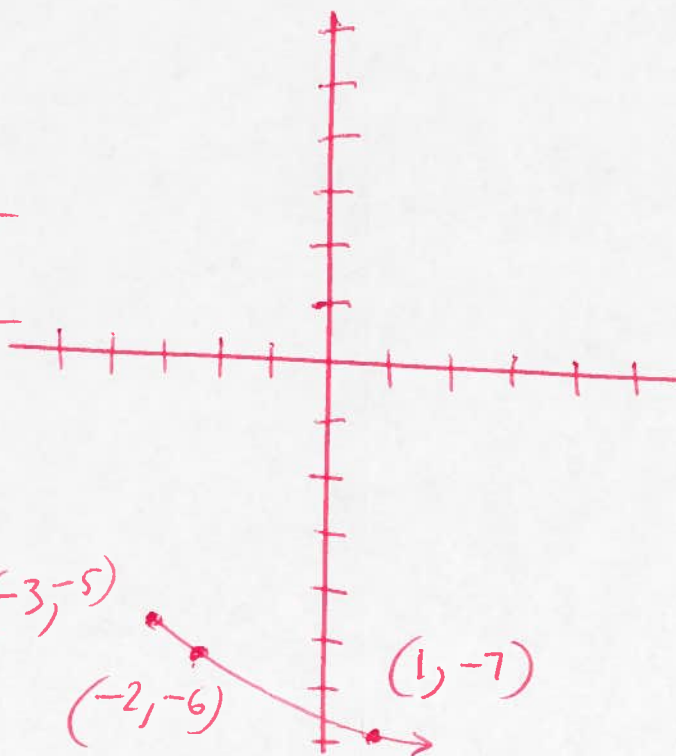
$$h(1) = -\sqrt{1+3} - 5$$

$$h(1) = -\sqrt{4} - 5$$

$$h(1) = -(2) - 5$$

$$h(1) = -2 - 5$$

$$h(1) = -7$$



$$\textcircled{158} \quad \frac{7i}{2-14i} =$$

67

$$\left(\frac{7i}{2-14i} \right) \left(\frac{2+14i}{2+14i} \right) =$$

$$\frac{14i + 98i^2}{4 + 28i - 28i - 196i^2} =$$

$$\frac{14i + 98i^2}{4 - 196i^2} =$$

$$\frac{14i + 98(-1)}{4 - 196(-1)} =$$

$$\frac{14i - 98}{4 + 196} =$$

$$\frac{14i - 98}{200} =$$

$$\frac{14i}{200} - \frac{98}{200} =$$

$$\frac{7i}{100} - \frac{49}{100} =$$

$$\frac{-49}{100} + \frac{7i}{100} =$$

$$(159) \quad \frac{5-i}{-9+4i} =$$

(67)

$$\left(\frac{5-i}{-9+4i} \right) \left(\frac{-9-4i}{-9-4i} \right) =$$

$$\frac{-45 - 20i + 9i^2 + 4i^2}{81 + 36i - 36i - 16i^2} =$$

$$\frac{-45 - 11i + 4i^2}{81 - 16i^2} =$$

$$\frac{-45 - 11i + 4(-1)}{81 - 16(-1)} =$$

$$\frac{-45 - 11i - 4}{81 + 16} =$$

$$\frac{-49 - 11i}{97} =$$

$$\frac{-49}{97} - \frac{11}{97}i =$$

(160) Solve using the Zero Factor Property.

$$7x^2 + 19x - 6 = 0$$

$$(7x - 2)(x + 3) = 0$$

$$\begin{array}{l} 7 \cdot 1 \\ 2 \cdot \end{array}$$

$$\begin{array}{l} 6 \cdot 1 \\ 2 \cdot \end{array}$$

$$6 \cdot 9$$

Set $7x - 2 = 0$ OR $x + 3 = 0$

$$7x - 2 + 2 = 0 + 2 \quad \text{OR} \quad x + 3 - 3 = 0 - 3$$

$$7x = 2$$

$$\text{OR } x = -3$$

$$\frac{7x}{7} = \frac{2}{7}$$

$$x = \frac{2}{7}$$

$$\left\{ -3, \frac{2}{7} \right\}$$

(161) Solve using the Zero Factor Property.

$$4x^2 + 7x - 15 = 0$$

$$(4x - 5)(x + 3) = 0$$

$$\begin{array}{l} 4 \cdot 1 \\ 2 \cdot 2 \end{array}$$

$$\begin{array}{l} 15 \cdot 1 \\ 3 \cdot 5 \end{array}$$

Set $4x - 5 = 0$ OR $x + 3 = 0$

$$4x - 5 + 5 = 0 + 5 \quad \text{OR} \quad x + 3 - 3 = 0 - 3$$

$$4x = 5$$

$$\text{OR } x = -3$$

$$\frac{4x}{4} = \frac{5}{4}$$

$$x = \frac{5}{4}$$

$$\left\{ -3, \frac{5}{4} \right\}$$

162 Solve using the Zero Factor Property.

$$8x^2 + 17x - 21 = 0$$

$$8 \div 1$$

$$2 \div 4$$

$$21 \div 1$$

$$3 \div 7$$

$$(8x - 7)(x + 3) = 0$$

Set $8x - 7 = 0$ OR $x + 3 = 0$

$$8x - 7 + 7 = 0 + 7 \quad \text{OR} \quad x + 3 - 3 = 0 - 3$$

$$8x = 7$$

$$\text{OR } x = -3$$

$$\frac{8x}{8} = \frac{7}{8}$$

$$x = \frac{7}{8}$$

$$\left\{ -3, \frac{7}{8} \right\}$$

163. Solve using the Square Root Property.

$$x^2 = 25$$

$$\sqrt{x^2} = \pm \sqrt{25}$$

$$x = \pm 5$$

$$x = -5$$

OR

$$x = 5$$

$$\{ -5, 5 \}$$

164. Solve using the Square Root Property.

$$x^2 = 18$$

$$\sqrt{x^2} = \pm \sqrt{18}$$

$$x = \pm \sqrt{9 \cdot 2}$$

$$x = \pm \sqrt{9} \sqrt{2}$$

$$x = \pm 3\sqrt{2}$$

$$x = -3\sqrt{2}$$

OR

$$x = 3\sqrt{2}$$

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

$$\begin{array}{r} 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

165) Solve using the Square Root Property.

$$(x-7)^2 = 25$$

$$\sqrt{(x-7)^2} = \pm\sqrt{25}$$

$$x-7 = \pm 5$$

$$x-7 = -5 \quad \text{OR} \quad x-7 = 5$$

$$x-7+7 = -5+7 \quad \text{OR} \quad x-7+7 = 5+7$$

$$x = 2$$

OR

$$x = 12$$

$$\{2, 12\}$$

166) Solve using the Square Root Property.

$$(4x+3)^2 - 7 = 0$$

$$(4x+3)^2 - 7 + 7 = 0 + 7$$

$$(4x+3)^2 = 7$$

$$\sqrt{(4x+3)^2} = \pm\sqrt{7}$$

$$4x+3 = \pm\sqrt{7}$$

$$4x + \cancel{3} - \cancel{3} = -3 \pm \sqrt{7}$$

$$4x = -3 \pm \sqrt{7}$$

$$\cancel{4}x = \frac{-3 \pm \sqrt{7}}{\cancel{4}}$$

$$x = \frac{-3 \pm \sqrt{7}}{4}$$

$$x = \frac{-3 + \sqrt{7}}{4} \quad \text{OR} \quad x = \frac{-3 - \sqrt{7}}{4}$$

$$\left\{ \frac{-3 + \sqrt{7}}{4} \quad \text{OR} \quad \frac{-3 - \sqrt{7}}{4} \right\}$$

167) Solve by completing the square

$$x^2 - 6x + 18 = 0$$

$$x^2 - 6x = -18$$

$$x^2 - 6x + \left(\frac{1}{2}(-6)\right)^2 = -18 + \left(\frac{1}{2}(-6)\right)^2$$

$$x^2 - 6x + (-3)^2 = -18 + (-3)^2$$

$$x^2 - 6x + (-3)(-3) = -18 + (-3)(-3)$$

$$x^2 - 6x + 9 = -18 + 9$$

$$(x-3)(x-3) = -9$$

$$(x-3)^2 = -9$$

$$\sqrt{(x-3)^2} = \pm\sqrt{-9}$$

$$x-3 = \pm 3i$$

$$x - \cancel{3} + \cancel{3} = 3 \pm 3i$$

$$x = 3 \pm 3i$$

$$x = 3 - 3i \quad \text{OR} \quad x = 3 + 3i$$

$$\{ 3 - 3i, 3 + 3i \}$$

72

(168) Solve using the Zero Factor Property

$$3x^2 + 15x = -18$$

$$3x^2 + 15x + 18 = -18 + 18$$

$$3x^2 + 15x + 18 = 0$$

$$3(x^2 + 5x + 6) = 0$$

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

$$\text{Set } 3 \neq 0 \quad \text{OR} \quad x+2=0 \quad \text{OR} \quad x+3=0$$

$$x+2-2=0-2 \quad \text{OR} \quad x+3-3=0-3$$

$$x = -2$$

$$\text{OR} \quad x = -3$$

(169) Solve using the Quadratic Formula

$$5x^2 + 8x = 4$$

$$x = \frac{-8 \pm 12}{10}$$

$$5x^2 + 8x - 4 = 4 - 4$$

$$5x^2 + 8x - 4 = 0$$

$$a=5, \quad b=8, \quad c=-4$$

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

$$x = \frac{-(8) \pm \sqrt{(8)^2 - 4(5)(-4)}}{2(5)}$$

$$x = \frac{-8 \pm \sqrt{64 + 80}}{10}$$

$$x = \frac{-8 \pm \sqrt{144}}{10}$$

$$x = \frac{-8-12}{10} \quad \text{OR} \quad x = \frac{-8+12}{10}$$

$$x = \frac{-20}{10} \quad \text{OR} \quad x = \frac{4}{10}$$

$$x = -2$$

$$\text{OR} \quad x = \frac{2}{5}$$

$$\left\{ -2, \frac{2}{5} \right\}$$

(170) Solve using the Quadratic Formula.

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

$$a=1, b=2, c=-24$$

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

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-24)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{4 + 96}}{2}$$

$$x = \frac{-2 \pm \sqrt{100}}{2}$$

$$x = \frac{-2 \pm 10}{2}$$

$$x = -1 \pm 5$$

$$x = -1 - 5 \quad \text{OR} \quad x = -1 + 5$$

$$x = -6$$

OR

$$x = 4$$

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

74

(171) Solve by the Quadratic Formula.

$$x^2 + 14x + 74 = 0$$

$$a=1, b=14, c=74$$

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

$$x = \frac{-(14) \pm \sqrt{(14)^2 - 4(1)(74)}}{2(1)}$$

$$x = \frac{-14 \pm \sqrt{196 - 296}}{2}$$

$$x = \frac{-14 \pm \sqrt{-100}}{2}$$

$$x = \frac{-14 \pm 10i}{2}$$

$$x = -7 \pm 5i$$

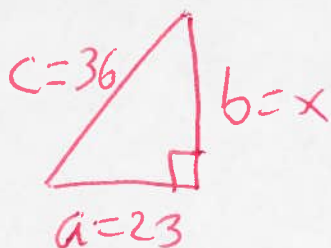
$$x = -7 - 5i \text{ OR}$$

$$x = -7 + 5i$$

$$\{-7 - 5i, -7 + 5i\}$$

75

172



$$a^2 + b^2 = c^2$$

$$(23)^2 + (x)^2 = (36)^2$$

$$529 + x^2 = 1296$$

$$\cancel{529} + x^2 - \cancel{529} = 1296 - 529$$

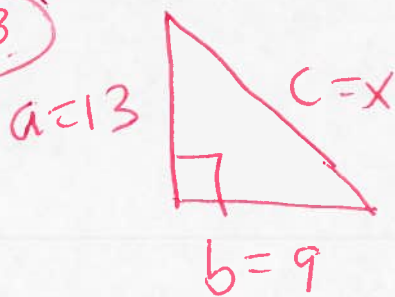
$$x^2 = 767$$

$$\sqrt{x^2} = \sqrt{767}$$

$$x = 27.6947648483$$

76

173



$$a^2 + b^2 = c^2$$

$$(13)^2 + (9)^2 = (x)^2$$

$$169 + 81 = x^2$$

$$250 = x^2$$

$$\sqrt{250} = \sqrt{x^2}$$

$$15.8113883008 = x$$

(174) $V = \frac{1}{3}s^2h$ Solve for s



$$3V = 3\left(\frac{1}{3}\right)s^2h$$

$$3V = s^2h$$

$$\frac{3V}{h} = \frac{s^2h}{h}$$

$$\frac{3V}{h} = s^2$$

$$\sqrt{\frac{3V}{h}} = \sqrt{s^2}$$

$$\sqrt{\frac{3V}{h}} = s$$

$$\frac{\sqrt{3V}}{\sqrt{h}} = s$$

$$\frac{\sqrt{3V}}{\sqrt{h}} \frac{\sqrt{h}}{\sqrt{h}} = s$$

$$\frac{\sqrt{3Vh}}{\sqrt{h}^2} = s$$

$$\frac{\sqrt{3Vh}}{h} = s$$

(175) Graph
 $y = x^2 - 9$

$$y = (-3)^2 - 9$$

$$y = (-3)(-3) - 9$$

$$y = 9 - 9$$

$$y = 0$$

$$y = (-2)^2 - 9$$

$$y = (-2)(-2) - 9$$

$$y = 4 - 9$$

$$y = -5$$

$$y = (-1)^2 - 9$$

$$y = (-1)(-1) - 9$$

$$y = 1 - 9$$

$$y = -8$$

$$y = (0)^2 - 9$$

$$y = (0)(0) - 9$$

$$y = 0 - 9$$

$$y = -9$$

x	$f(x)$
-3	0
-2	-5
-1	-8
0	-9
1	-8
2	-5
3	0

(176)

$$y = (1)^2 - 9$$

$$y = (1)(1) - 9$$

$$y = 1 - 9$$

$$y = -8$$

$$y = (2)^2 - 9$$

$$y = (2)(2) - 9$$

$$y = 4 - 9$$

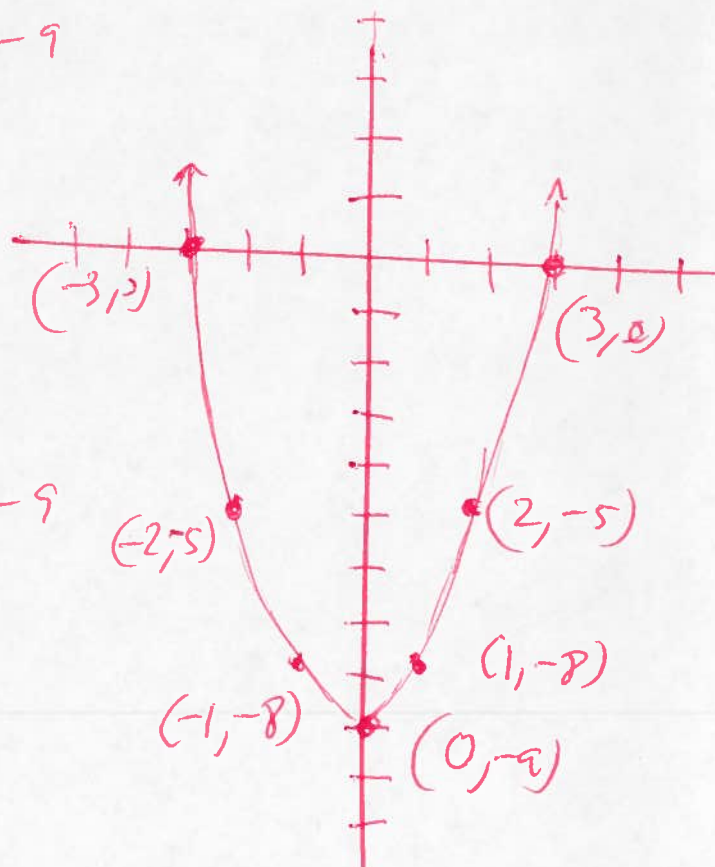
$$y = -5$$

$$y = (3)^2 - 9$$

$$y = (3)(3) - 9$$

$$y = 9 - 9$$

$$y = 0$$



(176) Graph

$$y = (x-3)^2 + 6$$

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

$$y = (-1)^2 + 6$$

$$y = (-1)(-1) + 6$$

$$y = 1 + 6$$

$$y = 7$$

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

$$y = (0)^2 + 6$$

$$y = (0)(0) + 6$$

$$y = 0 + 6$$

$$y = 6$$

x	y
2	7
3	6
4	7

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

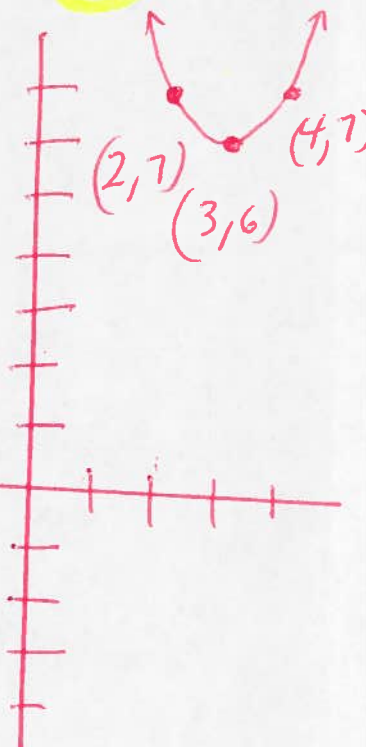
$$y = (1)^2 + 6$$

$$y = (1)(1) + 6$$

$$y = 1 + 6$$

$$y = 7$$

(19)



(177) Graph

$$y = (x+4)^2 + 5$$

$$y = (-5+4)^2 + 5$$

$$y = (-1)^2 + 5$$

$$y = (-1)(-1) + 5$$

$$y = 1 + 5$$

$$y = 6$$

$$y = (-4+4)^2 + 5$$

$$y = (0)^2 + 5$$

$$y = (0)(0) + 5$$

$$y = 0 + 5$$

$$y = 5$$

x	y
-5	6
-4	5
-3	6

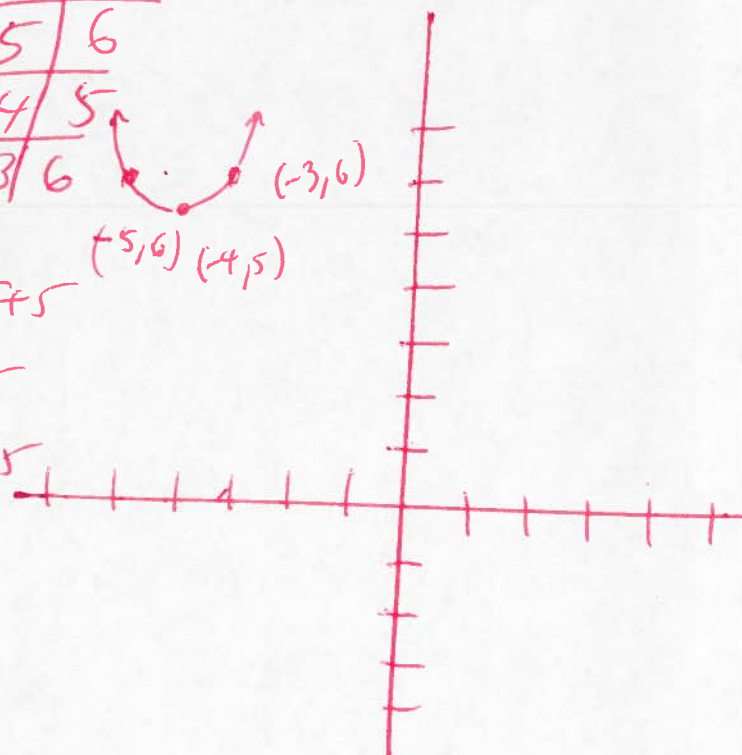
$$y = (-3+4)^2 + 5$$

$$y = (1)^2 + 5$$

$$y = (1)(1) + 5$$

$$y = 1 + 5$$

$$y = 6$$



178 Graph
 $y = (x-3)^2$

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

$$y = (-1)^2$$

$$y = (-1)(-1)$$

$$y = 1$$

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

$$y = (0)^2$$

$$y = (0)(0)$$

$$y = 0$$

$$y = (4-3)^2$$

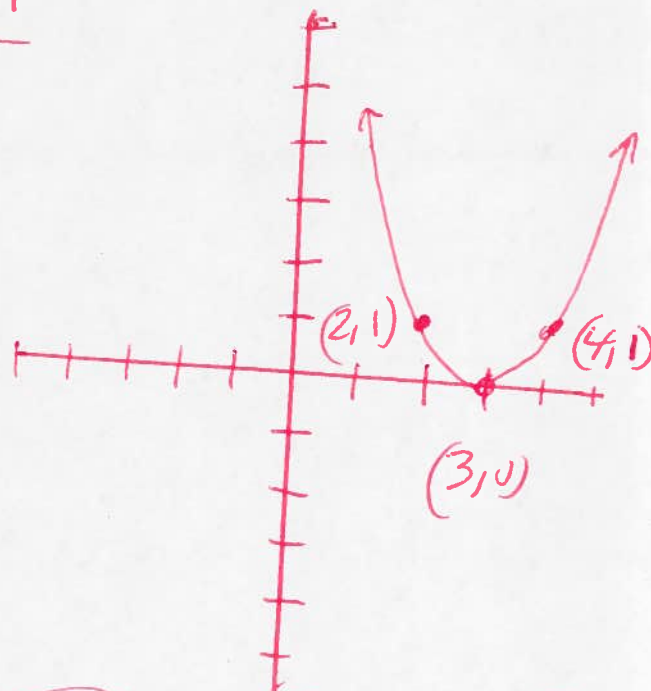
$$y = (1)^2$$

$$y = (1)(1)$$

$$y = 1$$

X	y
2	1
3	0
4	1

20



179 Graph
 $y = 3(x-4)^2 + 6$

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

$$y = 3(-1)^2 + 6$$

$$y = 3(-1)(-1) + 6$$

$$y = 3(1) + 6$$

$$y = 3 + 6$$

$$y = 9$$

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

$$y = 3(0)^2 + 6$$

$$y = 3(0)(0) + 6$$

$$y = 3(0) + 6$$

$$y = 0 + 6$$

$$= 6$$

X	y
3	9
4	6
5	9

$$y = 3(5-4)^2 + 6$$

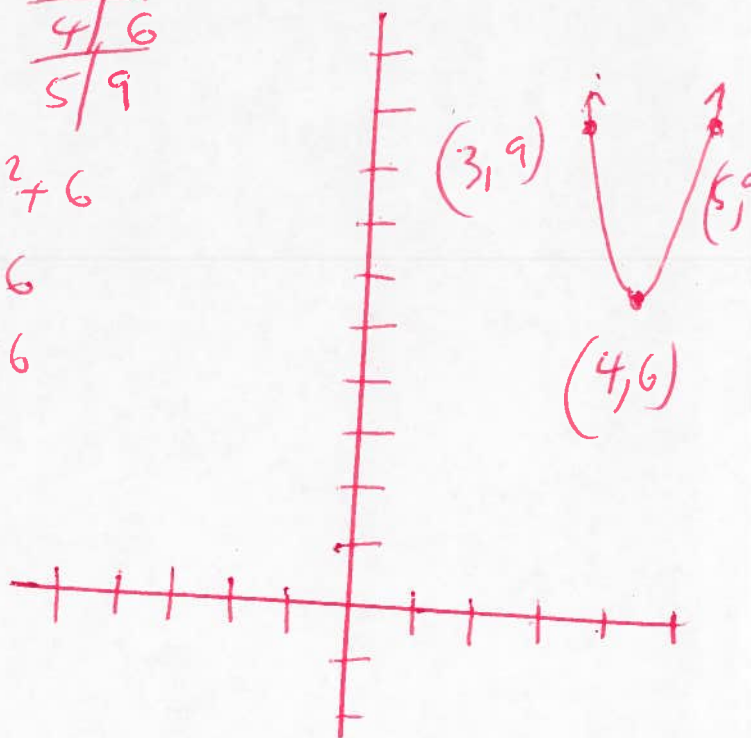
$$y = 3(1)^2 + 6$$

$$y = 3(1)(1) + 6$$

$$y = 3(1) + 6$$

$$y = 3 + 6$$

$$y = 9$$



180

Graph

$$y = 3(x-1)^2 - 5$$

$$y = 3(0-1)^2 - 5$$

$$y = 3(-1)^2 - 5$$

$$y = 3(-1)(-1) - 5$$

$$y = 3(1) - 5$$

$$y = 3 - 5$$

$$y = -2$$

$$y = 3(1-1)^2 - 5$$

$$y = 3(0)^2 - 5$$

$$y = 3(0)(0) - 5$$

$$y = 3(0) - 5$$

$$y = 0 - 5$$

$$y = -5$$

x	y
0	-2
1	-5
2	-2

81

$$y = 3(2-1)^2 - 5$$

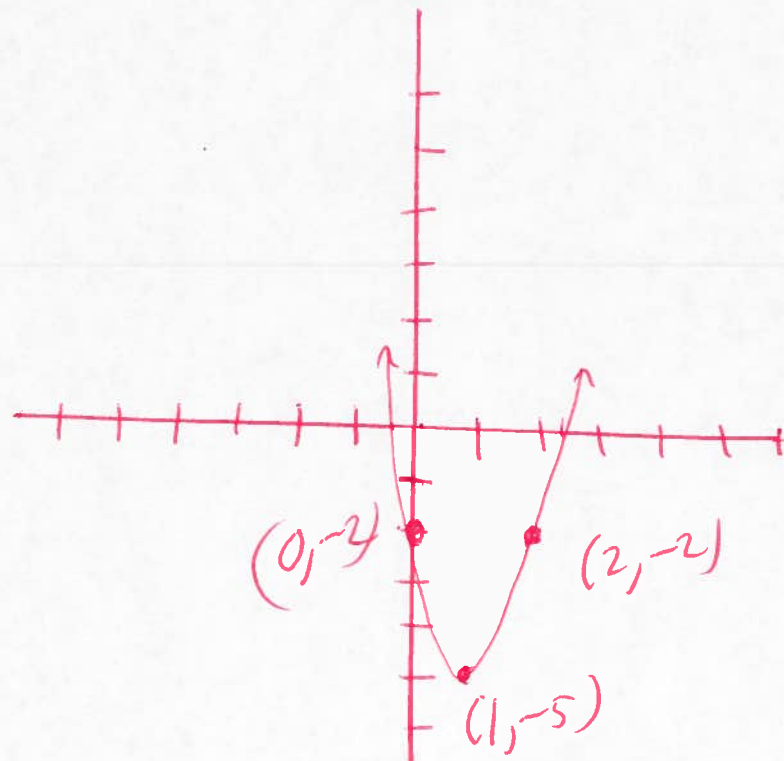
$$y = 3(1)^2 - 5$$

$$y = 3(1)(1) - 5$$

$$y = 3(1) - 5$$

$$y = 3 - 5$$

$$y = -2$$



(181) Find Max

$$h(x) = -16x^2 + 64x$$

$$a = -16 \quad b = 64 \quad c = 0$$

$$\text{Max} = \text{Vertex} = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$$

$$= \left(-\frac{64}{2(-16)}, f\left(-\frac{64}{2(-16)}\right)\right)$$

$$= \left(-\frac{64}{-32}, f\left(-\frac{64}{-32}\right)\right)$$

$$= (2, f(2))$$

$$= (2, -16(2)^2 + 64(2))$$

$$= (2, -16(2)(2) + 64(2))$$

$$= (2, -64 + 128)$$

$$= (2, 64)$$

max

82

(182) Find Max

$$d(x) = -16x^2 + 40x + 50$$

$$a = -16 \quad b = 40 \quad c = 50$$

$$\text{Max} = \text{Vertex} = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$$

$$= \left(-\frac{40}{2(-16)}, f\left(-\frac{40}{2(-16)}\right)\right)$$

$$= \left(-\frac{40}{-32}, f\left(-\frac{40}{-32}\right)\right)$$

$$= (1.25, f(1.25))$$

$$= (1.25, -16(1.25)^2 + 40(1.25) + 50)$$

$$= (1.25, -16(1.25)(1.25) + 40(1.25) + 50)$$

$$= (1.25, -16(1.5625) + 50 + 50)$$

$$(1.25, -25 + 50 + 50)$$

$$(1.25, 75)$$

max