Math 0200

1.

11-9-12

Elementary and Intermediate MATH PLACEMENT TESTS

① $|-7| - |-3| =$

$(7) - (3) =$

$7 - 3 =$

$4 =$

② $|-2-(-8)| =$

$|-2+8| =$

$|6| =$

$(6) =$

$6 =$

③ $\frac{a}{x} + \frac{b}{2x} =$ $\quad LCD = 2x$

$\frac{a}{x}\left(\frac{2}{2}\right) + \frac{b}{2x} =$

$\frac{2a}{2x} + \frac{b}{2x} =$

$\frac{2a+b}{2x} =$

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

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

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

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

(5) $x = 2a + b$ then $a =$

$x - b = 2a + b - b$

$x - b = 2a$

$\frac{x-b}{2} = \frac{2a}{2}$

$\frac{x-b}{2} = a$

$\frac{x}{2} - \frac{b}{2} = a$

(6.) $x = 2a - b^2$ then $a =$

$x + b^2 = 2a - b^2 + b^2$

$x + b^2 = 2a$

$\frac{x+b^2}{2} = \frac{2a}{2}$

$\frac{x}{2} + \frac{b^2}{2} = a$

(7.) $a = bx + c$ then $x =$

$a - c = bx + c - c$

$a - c = bx$

$\frac{a-c}{b} = \frac{bx}{b}$

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

(8) $P = 2(a+b)$ then $b =$

3.

$P = 2a + 2b$

$P - 2a = 2a + 2b - 2a$

$P - 2a = 2b$

$\frac{P-2a}{2} = \frac{2b}{2}$

$\frac{P}{2} - \frac{2a}{2} = b$

$\frac{P}{2} - a = b$

(9) $\frac{ax-b}{a-1} = b$ then $x =$

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

$ax - b = ba - b$

$ax - b + b = ba - b + b$

$ax = ba$

$\frac{ax}{a} = \frac{ba}{a}$

$x = b$

(10) $P = 2(L+w)$ then $L =$

$P = 2L + 2w$

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

$P - 2w = 2L$

$\frac{P-2w}{2} = \frac{2L}{2}$

$\frac{P}{2} - \frac{2w}{2} = L$

$\frac{P}{2} - w = L$

(11) $y = 2x - 1$ then $x =$

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

$y + 1 = 2x$

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

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

(12) $kx + y = 4$ then $x =$

$kx + y - y = 4 - y$

$kx = 4 - y$

$\frac{kx}{k} = \frac{4-y}{k}$

$x = \frac{4-y}{k}$

$x = \frac{4}{k} - \frac{y}{k}$

(13) $\frac{2}{x} = \frac{2}{k} + c$ then $x =$

$\frac{2}{x}(kx) = \frac{2}{k}(kx) + c(kx)$

$2k = 2x + ckx$

$2k = x(2 + ck)$

$\frac{2k}{2+ck} = \frac{x(2+ck)}{2+ck}$

$\frac{2k}{2+ck} = x$

(4)

(14.) $ax = b - cx$ then $x =$

$ax + cx = b - cx + cx$

$ax + cx = b$

$x(a+c) = b$

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

$x = \frac{b}{a+c}$

(5.)

(15.) $x - 10 = 5x - 10$ then $x =$

$x - 10 + 10 = 5x - 10 + 10$

$x = 5x$

$x - 5x = 5x - 5x$

$-4x = 0$

$\frac{-4x}{-4} = \frac{0}{-4}$

$x = 0$

(16.) $3 + N = 2N$ then $8N =$

$3 + N - N = 2N - N$

$3 = N$

Subst

$8N =$

$8(3) =$

24

(17) $3x = 7 - 5x$ then $x =$

6.

$3x + 5x = 7 - 5x + 5x$

$8x = 7$

$\frac{8x}{8} = \frac{7}{8}$

$x = \frac{7}{8}$

(18) $1 + 2x \leq 3x - 5$ solve for x

$1 + 2x - 1 \leq 3x - 5 - 1$

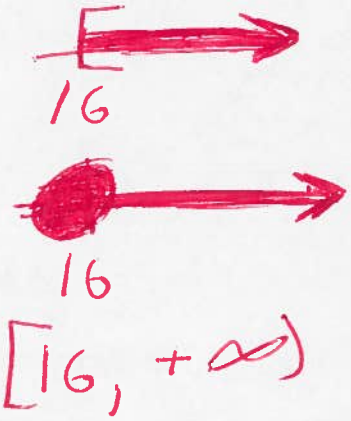
$2x \leq 3x - 6$

$2x - 3x \leq 3x - 6 - 3x$

$-1x \leq -6$

$\frac{-1x}{-1} \geq \frac{-6}{-1}$

$x \geq 6$



$[16, +\infty)$

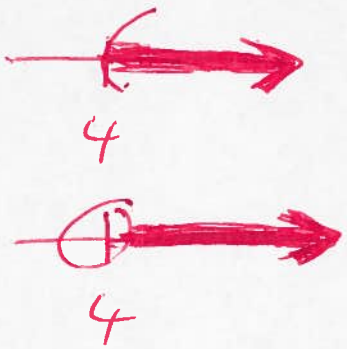
(19) $3a > a + 8$ Solve for a

$3a - a > a + 8 - a$

$2a > 8$

$\frac{2a}{2} > \frac{8}{2}$

$a > 4$



$(4, +\infty)$

(20) $\frac{x}{4} - \frac{3x}{8} > 0$ Solve for x

LCD = 8

$\frac{x}{4}(8) - \frac{3x}{8}(8) > 0(8)$

$x(2) - 3x(1) > 0$

$2x - 3x > 0$

$-1x > 0$

$\frac{-1x}{-1} < \frac{0}{-1}$

$x < 0$

$(-\infty, 0)$

(21) $0 < x - 3 < 5$ Solve for x

$0 + 3 < x - 3 + 3 < 5 + 3$

$3 < x < 8$

$(3, 8)$

(22) $(1 + xy)(1 - xy) =$

$1 - 1xy + 1xy - x^2y^2 =$

$1 - x^2y^2 =$

(23) $(x - 8y)(x - 8y) =$

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

$x^2 - 16xy + 64y^2 =$

7.

(24) $(4z+7)(2z+5) =$

$8z^2 + 20z + 14z + 35 =$

$8z^2 + 34z + 35 =$

8.

(25) $(2x+1)(1-ax) =$

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

(26) FACTOR

$a(x-y) + (x-y) =$

$a(x-y) + 1(x-y) =$

$(x-y)(a+1) =$

(27) FACTOR

$b^2 - 6b - 16 =$

16.1
8.2
4.4

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

(28) FACTOR

$25 - \frac{x^2}{4} =$

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

$(5)^2 - \left(\frac{x}{2}\right)^2 =$

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

9.

29. FACTOR

$3x^3 - 9x^2 + 6x =$

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

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

30. FACTOR

$b^2 - bc - 2c^2 =$

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

31. FACTOR

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

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

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

32. FACTOR

$\frac{a^2}{4} - \frac{1}{9} =$

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

$\left(\frac{a}{2}\right)^2 - \left(\frac{1}{3}\right)^2 =$

$\left(\frac{a}{2} + \frac{1}{3}\right)\left(\frac{a}{2} - \frac{1}{3}\right) =$

33. $a = 3$ and $b = -5$, what is $\frac{a-b}{b}$

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

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

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

$\frac{8}{-5} =$

(34) $x=5$ and $y=3$, what is $3x+5y$

10

$3x+5y=$

$3(5)+5(3)=$

$15+15=$

$30=$

(35) $(3\sqrt{2y})^2=$

$(3)^2(\sqrt{2y})^2=$

$(3)(3)(2y)=$

$9(2y)=$

$18y=$

(36) $8\sqrt{5}+3\sqrt{5}-\sqrt{5}=$

$8\sqrt{5}+3\sqrt{5}-1\sqrt{5}=$

$11\sqrt{5}-1\sqrt{5}=$

$10\sqrt{5}=$

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

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

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

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

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

(38) $\frac{x}{y} + \frac{2y}{x} - \frac{3}{xy} =$ LCD $= xy$

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

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

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

11

(39) $\frac{1}{x} + \frac{1}{x+2} =$ LCD $= x(x+2)$

$\frac{1}{x}\left(\frac{x+2}{x+2}\right) + \left(\frac{1}{x+2}\right)\left(\frac{x}{x}\right) =$

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

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

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

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

(40) $\frac{1}{x-2} + \frac{1}{x} =$ LCD $= x(x-2)$

12

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

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

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

$\frac{2x-2}{x(x-2)} =$

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

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

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

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

$\frac{4x + 4 - 2x - 8}{(x+1)(x+4)} =$

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

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

(42) $\frac{x}{y} + \frac{x-y}{y} + \frac{2x}{3y} =$ LCD = 3y

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

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

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

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

(43) $\frac{1}{x} + \frac{1}{y} =$ LCD = xy

$\frac{1}{x}\left(\frac{y}{y}\right) + \frac{1}{y}\left(\frac{x}{x}\right) =$

$\frac{1(y) + 1(x)}{xy} =$

$\frac{y + x}{xy} =$

13

(44) $\frac{2x}{3y} + \frac{x-y}{y} =$ LCD $= 3y$

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

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

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

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

14.

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

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

$\frac{\frac{ab}{1}}{\frac{ab}{a} + \frac{ab}{b}} =$

$\frac{ab}{b + a} =$

(46) $\dfrac{\frac{3}{y}-\frac{3}{x}}{\frac{1}{y^2}-\frac{1}{x^2}} =$ LCD $= x^2y^2$

15.

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

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

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

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

$$\frac{3xy}{x+y} =$$

(47) $\dfrac{5}{1+\frac{3}{x}}$ LCD = x

16.

$$\frac{\left(\frac{5}{1}\right)\left(\frac{x}{1}\right)}{\left(\frac{1}{1}+\frac{3}{x}\right)\left(\frac{x}{1}\right)} =$$

$$\frac{\frac{5x}{1}}{\frac{x}{1}+\frac{3x}{x}} =$$

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

(48) $\dfrac{1}{x}+\dfrac{1}{x+2}=\dfrac{4}{x+2}$ LCD = $x(x+2)$

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

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

$$x+2+x=4x$$

$$2x+2=4x$$

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

$$2x=4x-2$$

$$2x-4x=4x-2-4x$$

$$-2x=-2$$

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

$x=1$

17.

(49) $\frac{x+2}{3} = \frac{2x-1}{4}$ LCD = 12

$12\left(\frac{x+2}{3}\right) = 12\left(\frac{2x-1}{4}\right)$

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

$4x + 8 = 6x - 3$

$4x + 8 - 8 = 6x - 3 - 8$

$4x = 6x - 11$

$4x - 6x = 6x - 11 - 6x$

$-2x = -11$

$\frac{-2x}{-2} = \frac{-11}{-2}$

$x = \frac{11}{2}$

(50) $x + 2y = 7$ Solve for x and y

$x = 5y$ subst

$(5y) + 2y = 7$

$5y + 2y = 7$

$7y = 7$

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

$y = 1$

Subst $x = 5y$

$x = 5(1)$

$x = 5$

(x, y)

(5, 1)

18.

51. $y = 2x + 4$
$y = x - 5$

Solve for x and y

Subst

$(2x + 4) = x - 5$
$2x + 4 = x - 5$
$2x + 4 - 4 = x - 5 - 4$
$2x = x - 9$
$2x - x = x - 9 - x$
$x = -9$

Subst → $y = 2x + 4$
$y = 2(-9) + 4$
$y = -18 + 4$
$y = -14$

$(x, y) = (-9, -14)$

52. $x - y = 0$
$x + y = 2$

Solve for x and y

$2x + 0 = 2$
$2x = 2$
$\frac{2x}{2} = \frac{2}{2}$
$x = 1$

Subst → $x - y = 0$
$(1) - y = 0$
$1 - y = 0$
$1 - y - 1 = 0 - 1$
$-y = -1$
$\frac{-y}{-1} = \frac{-1}{-1}$
$y = 1$

$(x, y) = (1, 1)$

53. $x - y = 0$
$2x - y = 1$

Solve for x and y

$\begin{pmatrix} x - y = 0 \\ 2x - y = 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \end{pmatrix}$ Multip

$-x + y = 0$
$2x - y = 1$
$x + 0 = 1$

$x = 1$

Subs
$x - y = 0$
$(1) - y = 0$
$1 - y = 0$
$1 - y - 1 = 0 - 1$
$-y = -1$

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

(x, y)
$(1, 1)$

(54) $x+y=6$ Solve for x and y

$x=2y$

subst $(2y)+y=6$

$2y+y=6$

$3y=6$

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

$y=2$

subst $x=2y$

$x=2(2)$

$x=4$

$(x,y)=(4,2)$

(55.) $|x+2|=4$

$|x|=a$

$x=-a$ OR $x=a$

$x+2=-4$ OR $x+2=4$

$x+2-2=-4-2$ OR $x+2-2=4-2$

$x=-6$ OR $x=2$

(56) $|x+2|<6$

$|x|<a$

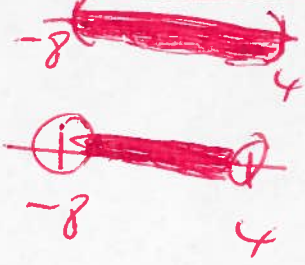
$-a<x<a$

$-6<x+2<6$

$-6-2<x+2-2<6-2$

$-8<x<4$

$(-8,4)$



(57.) $|x+2|>8$

$|x|>a$

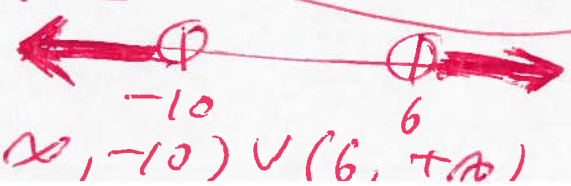
$x<-a$ OR $x>a$

$x+2<-8$ OR $x+2>8$

$x+2-2<-8-2$ OR $x+2-2>8-2$

$x<-10$ OR $x>6$

OR



$(-\infty,-10)\cup(6,+\infty)$

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

$|x| = a$
$x = -a$ OR $x = a$

$x-2 = -4$ OR $x-2 = 4$

$x-2+2 = -4+2$ OR $x-2+2 = 4+2$

$x = -2$ OR $x = 6$

20.

(59) $x^2 + x - 6 > 0$

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

$x-2 = 0$ OR $x+3 = 0$

$x-2+2 = 0+2$ OR $x+3-3 = 0-3$

$x = 2$ OR $x = -3$

Check

Ck $(x-2)(x+3) > 0$?

$(-4-2)(-4+3) > 0$?

$(-6)(-1) > 0$?

$6 > 0$ YES

$x < -3$ OR $x > 2$

$(-\infty, -3) \cup (2, +\infty)$

Ck $(x-2)(x+3) > 0$?

$(1-2)(1+3) > 0$?

$(-1)(4) > 0$?

$-4 > 0$ NO

Ck $(x-2)(x+3) > 0$?

$(3-2)(3+3) > 0$?

$(1)(6) > 0$?

$6 > 0$ YES

(60) $\frac{x+1}{x-1} > 0$

Set $x+1=0$ OR $x-1=0$

$x+1-1=0-1$ OR $x-1+1=0+1$

$x=-1$ OR $x=1$

Check

Ck $\frac{x+1}{x-1} > 0$?

$\frac{-2+1}{-2-1} > 0$?

$\frac{-1}{-3} > 0$?

$\frac{1}{3} > 0$ YES

Ck

$\frac{x+1}{x-1} > 0$?

$\frac{0+1}{0-1} > 0$?

$\frac{1}{-1} > 0$?

$-1 > 0$ NO

Ck

$\frac{x+1}{x-1} > 0$

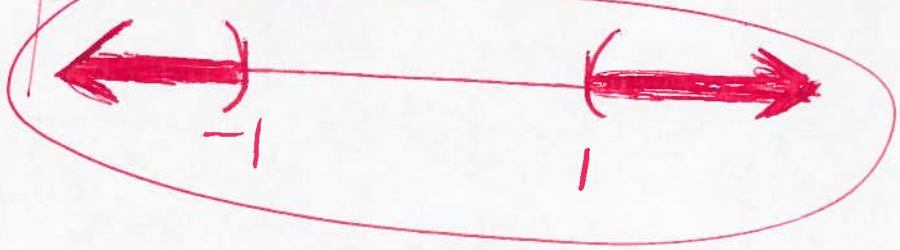
$\frac{2+1}{2-1} > 0$

$\frac{3}{1} > 0$

$3 > 0$ yes

$x < -1$ OR $x > 1$

$(-\infty, -1) \cup (1, +\infty)$



(61) $x^2 > x$

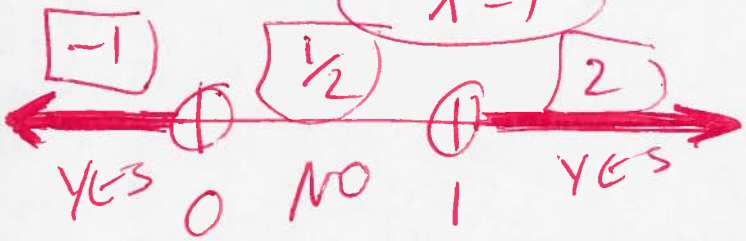
$x^2 - x > 0$

$x(x-1) > 0$

$x = 0$ OR $x - 1 = 0$

$x - 1 + 1 = 0 + 1$

$x = 1$



Check

$x(x-1) > 0$?

$-1(-1-1) > 0$?

$-1(-2) > 0$?

$2 > 0$ YES

Ck

$x(x-1) > 0$?

$\frac{1}{2}(\frac{1}{2} - 1) > 0$?

$\frac{1}{2}(\frac{1}{2} - \frac{2}{2}) > 0$?

$\frac{1}{2}(-\frac{1}{2}) > 0$?

$-\frac{1}{4} > 0$ NO

Ck

$x(x-1) > 0$?

$2(2-1) > 0$?

$2(1) > 0$?

$2 > 0$ YES

$x < 0$ OR $x > 1$

$(-\infty, 0) \cup (1, +\infty)$

(62) simplify

$15x^2y + 4xy^2 - 2xy^2 + 3x^2y =$

$18x^2y + 2xy^2 =$

23.

(63.) simplify

$13a - 15b - a + 2b =$

$13a - 15b - 1a + 2b =$

$12a - 13b =$

(64) simplify

$(2a - 7b + 1) - (a - 7b + 2) =$

$2a - 7b + 1 - a + 7b - 2 =$

$2a - 7b + 1 - 1a + 7b - 2 =$

$a - 1 =$

(65) simplify

$(x^2 - 3x + 2) - (3x^2 - 5x - 1) =$

$x^2 - 3x + 2 - 3x^2 + 5x + 1 =$

$1x^2 - 3x + 2 - 3x^2 + 5x + 1 =$

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

(66) simplify

$7x^2 - (8x^2 - x) =$

$7x^2 - 8x^2 + x =$

$-x^2 + x =$

(67) Simplify

$2x + 3x + y =$

$5x + y =$

(68) Simplify

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

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

$1x - 3 - 3x - 6 =$

$-2x - 9 =$

(69) Simplify

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

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

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

$-11 =$

(70.) Simplify

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

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

$-18r + 2 =$

(71.) Simplify

$7x + 6 + 3x - x + 4 =$

$7x + 6 + 3x - 1x + 4 =$

$9x + 10 =$

(72) $2x-3(x-4)=-5$ Solve for x

25.

$2x-3x+12=-5$

$-1x+12=-5$

$-1x+12-12=-5-12$

$-1x=-17$

$\frac{-1x}{-1}=\frac{-17}{-1}$

$x=17$

(73.) $(3-2)-(2-3)=$ evaluate

$(1)-(-1)=$

$1+1=$

$2=$

(74) $7x-12=5x+m$ Solve for x

$7x-12+12=5x+m+12$

$7x=5x+m+12$

$7x-5x=5x+m+12-5x$

$2x=m+12$

$\frac{2x}{2}=\frac{m+12}{2}$

$x=\frac{m+12}{2}$

(75) $6 - x = 2(x-6)$ Solve for x

$6 - x = 2x - 12$

$6 - x - 6 = 2x - 12 - 6$

$-x = 2x - 18$

$-x - 2x = 2x - 18 - 2x$

$-3x = -18$

$\frac{-3x}{-3} = \frac{-18}{-3}$

$x = 6$

26.

(76) $2(2x-7) < 3x$ Solve for x

$4x - 14 < 3x$

$4x - 14 + 14 < 3x + 14$

$4x < 3x + 14$

$4x - 3x < 3x + 14 - 3x$

$x < 14$

$(-\infty, 14)$

(77) Simplify

$(12x - x) - (3y - 15y) =$

$(12x - 1x) - (3y - 15y) =$

$(11x) - (-12y) =$

$11x + 12y =$

(78) Simplify

$-2 - (-8) =$

$-2 + 8 =$

$6 =$

(79) Simplify

$-(4-6)-(2-6)=$

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

$2+4=$

$6=$

(80) $AX-X=6$ Solve for X

$AX-1X=6$

$X(A-1)=6$

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

$X=\frac{6}{A-1}$

(81) FACTOR (by Grouping)

$3X(X-8)-2(X-8)=$

$(X-8)(3X-2)=$

(82) FACTOR (by Grouping)

$12Xy-14X+18y-21=$

$(12Xy-14X)+(18y-21)=$

$2X(6y-7)+3(6y-7)=$

$(6y-7)(2x+3)=$

(83) FACTOR (by Grouping)

$12xy - 14x - 18y + 21 =$

$(12xy - 14x) + (-18y + 21) =$

$2x(6y - 7) + 3(-6y + 7) =$

$2x(6y - 7) - 3(6y - 7) =$

$(6y - 7)(2x - 3) =$

28.

(84) $2x + 1 = 4x + 9$ Solve for x

$2x + 1 - 1 = 4x + 9 - 1$

$2x = 4x + 8$

$2x - 4x = 4x + 8 - 4x$

$-2x = 8$

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

$x = -4$

(85) $2(2x + 4) = 12$ Solve for x

$4x + 8 = 12$

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

$4x = 4$

$\frac{4x}{4} = \frac{4}{4}$

$x = 1$

(86) $2x+1=4x+1$ Solve for x

29.

$2x+1-1=4x+1-1$

$2x=4x$

$2x-4x=4x-4x$

$-2x=0$

$\frac{-2x}{-2}=\frac{0}{-2}$

$x=0$

(87) $2x+2=2x+8$ Solve for x

$2x+2-x=2x+8-2$

$2x=2x+6$

$2x-2x=2x+6-2x$

$0\neq 6$ No solution

(88) $6-x=-2(6-x)$ Solve for x

$6-x=-12+2x$

$6-x-6=-12+2x-6$

$-x=2x-18$

$-x-2x=2x-18-2x$

$-3x=-18$

$\frac{-3x}{-3}=\frac{-18}{-3}$

$x=6$

(89) $2x+y=x+y$ Solve for x

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

$2x=x$

$2x-x=x-x$

$x=0$

30.

(90) $2x+4y=4x+8y$ Solve for x

$2x+4y-4y=4x+8y-4y$

$2x=4x+4y$

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

$-2x=4y$

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

$x=-2y$

(91) $(3x-2)(4x+C)=12x^2+x-6$ then $C=$

Factor $12x^2+x-6=$

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

$12x^2+9x-8x-6=$

$12x^2+x-6$

$C=3$

(92) $A^2 + N + 2B^2 = (A+B)(A+2B)$ $N =$

31.

$(A+B)(A+2B) =$

$A^2 + 2AB + AB + 2B^2 =$

$A^2 + 3AB + 2B^2 =$

$N = 3AB$

(93) $8z^2 + Cz + 35 = (4z+7)(2z+5)$ then $C =$

$(4z+7)(2z+5) =$

$8z^2 + 20z + 14z + 35 =$

$8z^2 + 34z + 35 =$

$Cz = 34z$

$\frac{Cz}{z} = \frac{34z}{z}$

$C = 34$

(94) $(x-4)(x-4) = Ax^2 + Bx + C$ $A =$, $B =$, $C =$

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

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

$x^2 - 8x + 16 =$

$1x^2 - 8x + 16 =$

$A = 1$ $B = -8$ $C = 16$

(95) $(x-6)(x+6) = Ax^2 + Bx + C$ then $A=$, $B=$, $C=$

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

$x^2 + 6x - 6x - 36 =$

$x^2 + 0x - 36 =$

$1x^2 + 0x - 36$

$A=1$, $B=0$, $C=-36$

32.

(96) $(x-4)(x+2) = Ax^2 + Bx + C$ then $A+B+C =$

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

$x^2 + 2x - 4x - 8 =$

$x^2 - 2x - 8 =$

$1x^2 - 2x - 8 =$

$A=1$, $B=-2$, $C=-8$

$A+B+C =$

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

$1 - 2 - 8 =$

$-1 - 8 =$

$-9 =$

(97) $(x-8)(x-8) = Ax^2 + Bx + C$ then $A+B+C =$

$(x-8)(x-8) =$

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

$x^2 - 16x + 64 =$

$1x^2 - 16x + 64$

$A = 1, \quad B = -16, \quad C = 64$

$A + B + C =$

$(1) + (-16) + (64) =$

$1 - 16 + 64 =$

$-15 + 64 =$

$49 =$

33.

(98) $4x - 8 = 2x$ then $12x =$

$4x - 8 + 8 = 2x + 8$

$4x = 2x + 8$

$4x - 2x = 2x + 8 - 2x$

$2x = 8$

$\frac{2x}{2} = \frac{8}{2}$

$x = 4$

Substitute

$12x =$

$12(4) = 48$

34.

(99) Simplify

$\left(\frac{6x}{2}\right)^2 =$

$(3x)^2 =$

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

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

$9x^2 =$

(100.) Simplify

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

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

$\frac{1}{4} =$

(101) Simplify

$(8-2)-(2-8) =$

$(6)-(-6) =$

$6+6 =$

$12 =$

(102) Simplify

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

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

$16x^2-12xy-12xy+9y^2 =$

$16x^2-24xy+9y^2 =$

35.

(103) simplify

$(2-xy)^2 =$

$(2-xy)(2-xy) =$

$4 - 2xy - 2xy + x^2y^2 =$

$4 - 4xy + x^2y^2 =$

(104) simplify

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

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

$1x^2 - 2x - 3x^2 - 6x =$

$-2x^2 - 8x =$

(105) FACTOR (GCF)

$x^3 + 6x^2 + 8x =$

$x(x^2 + 6x + 8) =$

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

(106) FACTOR (by Grouping)

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

$(2x^3 + 2x^2) + (-8x - 8) =$

$2x^2(x+1) + 8(-x-1) =$

$2x^2(x+1) - 8(x+1) =$

$(x+1)(2x^2 - 8) =$

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

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

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

(107) evaluate

$x^2 - y^2 =$ $x=-2$ and $y=-6$

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

$(-2)(-2) - (-6)(-6) =$

$(4) - (36) =$

$4 - 36 =$

$-32 =$

36.

(108) $x^2 - x = 2$ Solve for x

$x^2 - x - 2 = 0$

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

$x+1=0$ OR $x-2=0$

$x+1-1=0-1$ OR $x-2+2=0+2$

$x=-1$ OR $x=2$

(109) FACTOR

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

$25x^2 - 64y^2 =$

$(5x)^2 - (8y)^2 =$

$(5x+8y)(5x-8y) =$

(110) $y = -2x^2 - 5x + 2$ find y if $x=-4$

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

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

$y = -2(16) - 5(-4) + 2$

$y = -32 + 20 + 2$

$y = -12 + 2$

$y = -10$

37.

(111) $y = -2(x+4)^2 - 8$ find y if $x = -6$

$y = -2((-6)+4)^2 - 8$

$y = -2(-6+4)^2 - 8$

$y = -2(-2)^2 - 8$

$y = -2(-2)(-2) - 8$

$y = -2(4) - 8$

$y = -8 - 8$

$y = -16$

(112) FACTOR

$x^2 - 10x + 16 =$

$(x-2)(x-8) =$

16 · 1
8 · 2
4 · 4

(113) FACTOR

$x^2 - 4x - 12 =$

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

12 · 1
6 · 2
3 · 4

(114) FACTOR

$x^2 + 6x - 16 =$

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

16 · 1
8 · 2
4 · 4

(115) $2x^2 + 10x - 48 = 0$ solve for x

$2(x^2 + 5x - 24) = 0$

$2(x-3)(x+8) = 0$

$2 \neq 0$ OR $x - 3 = 0$ OR $x + 8 = 0$

$x - 3 + 3 = 0 + 3$ OR $x + 8 - 8 = 0 - 8$

$x = 3$ $x = -8$

(116) $x^2 - 6x - 40 = 0$ Solve for x

$(x+4)(x-10) = 0$

$x+4=0$ OR $x-10=0$

$x+4-4=0-4$ OR $x-10+10=0+10$

$x=-4$ OR $x=10$

40 · 1
20 · 2
10 · 4
8 · 5

38.

(117) FACTOR

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

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

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

8 · 1
2 · 4

(118) simplify

$$\frac{x^2-5x+6}{2x^2+4x-16} =$$

$$\frac{x^2-5x+6}{2(x^2+2x-8)} =$$

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

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

(119) Simplify

$$\frac{3x-6}{x^2-4} =$$

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

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

39.

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

(120) Simplify

$$x(x-5) - 4x(x-5) =$$
$$x^2 - 5x - 4x^2 + 20x =$$
$$1x^2 - 5x - 4x^2 + 20x =$$
$$-3x^2 + 15x =$$

(121) Simplify

$$(x-2)x + (2-x)3x =$$
$$x^2 - 2x + 6x - 3x^2 =$$
$$1x^2 - 2x + 6x - 3x^2 =$$
$$-2x^2 + 4x =$$

(122) Find the area of a circular garden with a radius of $(x-4)$ ft so $r = (x-4)$ ft

$A = \pi r^2$

$A = \pi(x-4)^2$

$A = \pi(x-4)(x-4)$

$A = \pi(x^2 - 4x - 4x + 16)$

$A = \pi(x^2 - 8x + 16)$ ft^2

(123) $x^2+3=4x$ Solve for x

$x^2+3-4x=0$

$x^2-4x+3=0$

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

$x-1=0$ OR $x-3=0$

$x-1+1=0+1$ OR $x-3+3=0+3$

$x=1$ OR $x=3$

(40.)

(124.) Simplify

$$\frac{-24x^2y^2+12xy^2+28xy}{4xy}=$$

$$\frac{-24x^2y^2}{4xy}+\frac{12xy^2}{4xy}+\frac{28xy}{4xy}=$$

$-6xy+3y+7=$

(125) FACTOR (GCF)

$8x^2y^2-4x^2y-10xy^2=$

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

(126) $-2x+1<21$ Solve for x

$-2x+1-1<21-1$

$-2x<20$

$\frac{-2x}{-2}>\frac{20}{-2}$

$x>-10$

$(-10,+\infty)$

(127) FACTOR

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

$2x^2 - 32y^2 =$

$2(x^2 - 16y^2) =$

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

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

41.

(128) $P = 2(C+W)$ then $C =$

$P = 2C + 2W$

$P - 2W = 2C + 2W - 2W$

$P - 2W = 2C$

$\frac{P-2W}{2} = \frac{2C}{2}$

$\frac{P}{2} - \frac{2W}{2} = C$

$\frac{P}{2} - W = C$

(129) $Ax + B = 3$ then $A =$

$Ax + B - B = 3 - B$

$Ax = 3 - B$

$\frac{Ax}{x} = \frac{3-B}{x}$

$A = \frac{3-B}{x}$

$A = \frac{3}{x} - \frac{B}{x}$

(130) $AX = B(X+C)$ then $X =$

$AX = BX + BC$

$AX - BX = BX + BC - BX$

$AX - BX = BC$

$X(A-B) = BC$

$\frac{X(A-B)}{(A-B)} = \frac{BC}{(A-B)}$

$X = \frac{BC}{A-B}$

42.

(131) $AB - C = CB$ then $A =$

$AB - C + C = CB + C$

$AB = CB + C$

$\frac{AB}{B} = \frac{CB+C}{B}$

$A = \frac{CB}{B} + \frac{C}{B}$

$A = C + \frac{C}{B}$

(132) $y = 2(x-2) - 10$ find y if $x = -6$

$y = 2((-6)-2) - 10$

$y = 2(-6-2) - 10$

$y = 2(-8) - 10$

$y = -16 - 10$

$y = -26$

(133) $\frac{4x}{3} = 6 - \frac{x}{4}$ Solve for x

LCD = 12

$\frac{4x}{3}(12) = \frac{6}{1}(12) - \frac{x}{4}(12)$

$4x(4) = 6(12) - x(3)$

$16x = 72 - 3x$

$16x + 3x = 72 - 3x + 3x$

$19x = 72$

$\frac{19x}{19} = \frac{72}{19}$

$x = \frac{72}{19}$

43.

(134) $-|-(-3)^2| =$ simplify

$-|-(-3)(-3)| =$

$-|-(9)| =$

$-|-9| =$

$-(9) =$

$-9 =$

(135) $2x-y=6$
$2x+y=6$

$4x+0=12$

$4x=12$

$\frac{4x}{4}=\frac{12}{4}$

$x=3$

solve for x and y

$2x-y=6$

$2(3)-y=6$

$6-y=6$

$6-y-6=6-6$

$-y=0$

$\frac{-y}{-1}=\frac{0}{-1}$

$y=0$

(x, y)

(3, 0)

44

(136) $\frac{-48x^2}{36x}$ simplify

$\frac{-4(12)x^2}{3(12)x^1}=$

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

(137) simplify

$\frac{20x^3y^4}{30x^5y^2}=$

$\frac{2(10)x^3y^4}{3(10)x^5y^2}=$

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

(138) FACTOR

$3x^2 - 27y^2 =$

$3(x^2 - 9y^2) =$

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

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

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

45

(139) Simplify

$$\frac{x}{4x-16} \div \frac{x^2-2x}{x-4} =$$

$$\frac{x}{4x-16} \cdot \frac{x-4}{x^2-2x} =$$

$$\frac{x}{4(x-4)} \cdot \frac{(x-4)}{x(x-2)} =$$

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

(140) Simplify

$$\frac{1+\frac{2}{x}}{\frac{3}{x^2}} =$$

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

LCD $= x^2$

$$\frac{\frac{x^2}{1}+\frac{2x^2}{x}}{\frac{3x^2}{x^2}} =$$

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

OR

$$\frac{x^2}{3}+\frac{2x}{3}$$

(141) $Y = mb^2$ Solve for b

$$\frac{Y}{m} = \frac{mb^2}{m}$$

$$\frac{Y}{m} = b^2$$

$$\pm\sqrt{\frac{Y}{m}} = \sqrt{b^2}$$

$$\pm\sqrt{\frac{Y}{m}} = b$$

$b = \sqrt{\frac{Y}{m}}$ OR $b = -\sqrt{\frac{Y}{m}}$

(142) $\frac{X}{2} - \frac{1}{4} = 3 + \frac{5X}{6}$ Solve for X

LCD = 12

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

$$X(6) - 1(3) = 3(12) + 5X(2)$$

$$6X - 3 = 36 + 10X$$

$$6X - 3 + 3 = 36 + 10X + 3$$

$$6X = 10X + 39$$

$$6X - 10X = 10X + 39 - 10X$$

$$-4X = 39$$

$$\frac{-4X}{-4} = \frac{39}{-4}$$

$$X = -\frac{39}{4}$$

143. $\left(\frac{x^3}{18y}\right)\left(\frac{6y}{4x^2}\right) =$ simplify

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

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

$\frac{x}{12} =$

47.

144. $x^{\frac{1}{2}} \cdot x^{\frac{3}{2}} =$ simplify

$x^{\frac{1}{2}+\frac{3}{2}} =$

$x^{\frac{1+3}{2}} =$

$x^{\frac{4}{2}} =$

$x^2 =$

145. $\left(x^{\frac{1}{4}}\right)^5 =$ simplify

$\left(x^{\frac{1}{4}}\right)^{\frac{5}{1}} =$

$x^{\frac{1}{4}\cdot\frac{5}{1}} =$

$x^{\frac{5}{4}} =$

(146) Which has $x=0$ as a solution

(a) $x(x-1)=0$ (b) $(x+1)(x-1)=0$ (c) $x^2(x-1)=0$

(a) $x(x-1)=0$

$x=0$ OR $x-1=0$ YES

$x=1$

48.

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

$x+1=0$ OR $x-1=0$

$x=-1$ OR $x=1$ NO

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

$x^2=0$ OR $x-1=0$

$\sqrt{x^2}=\sqrt{0}$ OR $x=1$

$x=0$

YES

a and c

(147) all are true for $|x|<2$ except

(a) $-\frac{3}{2}$ (b) $\frac{5}{4}$ (c) $-\frac{5}{2}$ (d) $\frac{7}{4}$

(a) $|-\frac{3}{2}|<2$

$\frac{3}{2}<2$

$1\frac{1}{2}<2$ yes

(b) $|\frac{5}{4}|<2$

$\frac{5}{4}<2$

$1\frac{1}{4}<2$ yes

(c) $|-\frac{5}{2}|<2$

$\frac{5}{2}<2$

$2\frac{1}{2}<2$ NO

(d) $|\frac{7}{4}|<2$

$\frac{7}{4}<2$

$1\frac{3}{4}<2$ yes

(148) for $0 < x <$ find the greatest

ⓐ $(-x^2)$, ⓑ x^3, ⓒ $(-x)^4$, ⓓ x^5

Let $x = \frac{1}{2}$

(49)

ⓐ $(-x^2)$

$(-(\frac{1}{2})^2)$

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

$(-\frac{1}{4})$

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

ⓑ $x^3 =$

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

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

$\frac{1}{8} =$

ⓒ $(-x)^4 =$

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

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

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

$\frac{1}{16}$

ⓓ $x^5 =$

$(\frac{1}{2})^5 =$

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

$\frac{1}{32} =$

greatest is

b $\frac{1}{8}$

(149) Find the negative

(a) $-(4-4.5)$

(b) $-(4.5-4)$

(c) $-(-4.5+4)$

(d) $-(-4-4.5)$

50.

(a) $-(4-4.5)$

$-4+4.5=$

$.5=$ positive

(c) $-(-4.5+4)=$

$4.5-4=$

$.5=$ positive

(b) $-(4.5-4)=$

$-4.5+4=$

$-.5=$ Negative

(d) $-(-4-4.5)=$

$4+4.5=$

$8.5=$ positive

(150) $\frac{2}{3x^2} - \frac{3}{x^2-2x}$

LCD $3x^2 = 3xx$

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

$\frac{2}{3x^2} - \frac{3}{x(x-2)} =$

$\frac{2}{3x^2}\left(\frac{x-2}{x-2}\right) - \frac{3}{x(x-2)}\left(\frac{3x}{3x}\right) =$

$\frac{2(x-2)}{3x^2(x-2)} - \frac{3(3x)}{3x^2(x-2)} =$

$\frac{2(x-2)-3(3x)}{3x^2(x-2)} =$

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

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

(151) $1.95x + 10 = 1.90x + 30$

$1.95x + 10 - 10 = 1.90x + 30 - 10$

$1.95x = 1.90x + 20$

$1.95x - 1.90x = 1.90x + 20 - 1.90x$

$.05x = 20$

$\frac{.05x}{.05} = \frac{20}{.05}$

$x = 400$

(152) $2x - 8y = 10$ Solve for x

$2x - 8y + 8y = 10 + 8y$

$2x = 10 + 8y$

$\frac{2x}{2} = \frac{10}{2} + \frac{8y}{2}$

$x = 5 + 4y$

$x = 4y + 5$

(153) $2(2x + 4) = 2x + 20$

$4x + 8 = 2x + 20$

$4x + 8 - 8 = 2x + 20 - 8$

$4x = 2x + 12$

$4x - 2x = 2x + 12 - 2x$

$2x = 12$

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

$x = 6$

(154) use synthetic division

$(2x^2 - 5x - 7) \div (x - 1)$

1	2	−5	−7
		2	−3
	2	−3	−10

Rem

$2x - 3 + \frac{-10}{x-1}$

OR

$2x - 3 - \frac{10}{x-1}$

(155) $\frac{m^2-16}{m^2+3m-28} \div \frac{m^2-3m-28}{m-4} =$

$\frac{m^2-16}{m^2+3m-28} \cdot \frac{m-4}{m^2-3m-28} =$

$\frac{(m+4)(m-4)}{(m-4)(m+7)} \cdot \frac{(m-4)}{(m+4)(m-7)} =$

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

(156) $\sqrt{\frac{45x^8y^6z^6}{5x^2y^4z^1}} =$

$\sqrt{9x^6y^2z^5} =$

$\sqrt{9x^6y^2z^4z^1} =$

$3x^3y^1z^2\sqrt{z^1} =$

$3x^3yz^2\sqrt{z} =$

(157) $(x+2)(x^2-3x+5)$

$x^3-3x^2+5x+2x^2-6x+10=$

$x^3-x^2-x+10=$

53

(158) $f(x)=-2x^2-4x+6$

$f(-5)=-2(-5)^2-4(-5)+6$

$f(-5)=-2(-5)(-5)-4(-5)+6$

$f(-5)=-2(25)-4(-5)+6$

$f(-5)=-50+20+6$

$f(-5)=-30+6$

$=-24$

(159) $f(x)=4x^2-8x-9$ and $g(x)=-2x^2-3x+5$

$(f-g)(x)=$

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

$(4x^2-8x-9)-(-2x^2-3x+5)=$

$4x^2-8x-9+2x^2+3x-5=$

$6x^2-5x-14=$

160. $f(x) = 2x^2 + 3x + 4$

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

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

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

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

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

$= 2x^2 - x + 3$

161. $18 - 3x \geq -12$

$18 - 3x - 18 \geq -12 - 18$

$-3x \geq -30$

$\frac{-3x}{-3} \leq \frac{-30}{-3}$

$x \leq 10$

10

10

$(-\infty, 10]$

162. $|r-2| = 5$

$|x| = a$

$x = -a$ OR $x = a$

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

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

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

163. $|x+9| < 15$

$|x| < a$

$-a < x < a$

$-15 < x + 9 < 15$

$-15 - 9 < x + 9 - 9 < 15 - 9$

$-24 < x < 6$

-24 6

-24 6

$(-24, 6)$

(164) $|x+6| > 16$

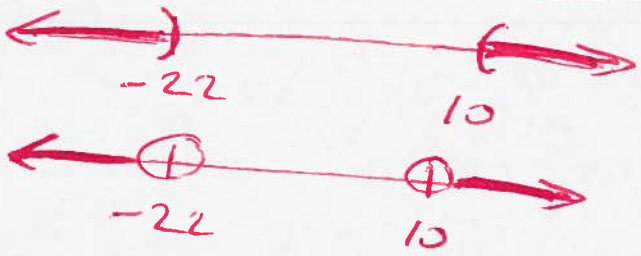
$|x| > a$
$x < -a$ OR $x > a$

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

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

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

55



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

(165) Graph $y = 2x - 2$

m = slope = 2

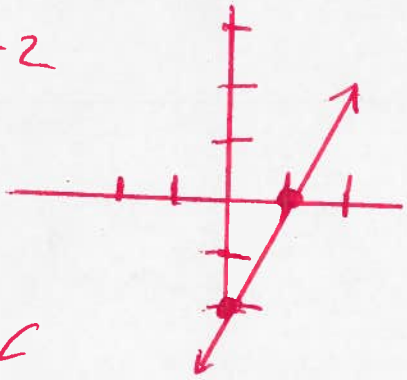
y-intercept $(0, -2)$

$y = mx + b$

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

$y = 2(1) - 2$
$y = 2 - 2$
$y = 0$

x	y
0	-2
1	0



(166) Find the slope of the line $(8, 3)$ $(-4, 4)$

x_1 y_1 x_2 y_2

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

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

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

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

(167) Find the equation of the line

$m = 3$ $(-3, 6)$ x_1 y_1

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

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

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

$y - 6 = 3x + 9$

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

$y = 3x + 15$

56

(168) $\sqrt{180} =$

$\sqrt{36 * 5} =$

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

$6\sqrt{5} =$

Primes 2, 3, 5, 7, 11, 13, ...

2	180
2	90
3	45
3	15
5	5
	1

(169) $\sqrt{169x^6yz^9} =$

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

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

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

(170) $\sqrt{3x^3}\sqrt{6x^2} =$

Primes 2, 3, 5, 7, 11, 13, ...

$\sqrt{3x^3 \cdot 6x^2} =$

$\sqrt{18x^5} =$

$\sqrt{9 * 2x^4x^1} =$

$3x^2\sqrt{2x^1} =$

2 | 18
3 | 9
3 | 3
1

57.

(171) Rationalize the denominator

$\frac{2}{8-\sqrt{3}} =$

$\left(\frac{2}{8-\sqrt{3}}\right)\left(\frac{8+\sqrt{3}}{8+\sqrt{3}}\right)$

$\frac{16+2\sqrt{3}}{64 + 8\sqrt{3} - 8\sqrt{3} - (\sqrt{3})^2} =$

$\frac{16+2\sqrt{3}}{64-(\sqrt{3})^2} =$

$\frac{16+2\sqrt{3}}{64-3} =$

$\frac{16+2\sqrt{3}}{61} =$

$\frac{16}{61} + \frac{2\sqrt{3}}{61} =$

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

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

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

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

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

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

$0 = x^2-x-6$

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

$x+2=0$ OR $x-3=0$

$x+2-2=0-2$ OR $x-3+3=0+3$

BAD $x=-2$ OR $x=3$ Good

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

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

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

$\sqrt{4} = 2$

$2 = 2$

Good

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

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

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

$\sqrt{9} = -3$

$3 \neq -3$

BAD

(173) Find distance between $(5,-2)$ $(2,2)$

x_1 y_1 x_2 y_2

$d = \sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$

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

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

$d = \sqrt{(3)^2+(-4)^2}$

$d = \sqrt{9+16}$

$d = \sqrt{25}$

$= 5$

(5.8)

(174) Simplify

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

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

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

59

(175) $\sqrt[3]{x+3} = 4$

$(\sqrt[3]{x+3})^3 = (4)^3$

$x+3 = 64$

$x+3-3 = 64-3$

$x = 61$

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

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

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

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

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

$h(-5) = 110 - 4$

$= 106$

(177) $f(x) = |5x - 4|$

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

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

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

$f(-3) = (19)$

$= 19$

(178) $f(x) = x^2 - 6$

$f(a+h) = (a+h)^2 - 6$

$f(a+h) = (a+h)(a+h) - 6$

$f(a+h) = a^2 + ah + ah + h^2 - 6$

$= a^2 + 2ah + h^2 - 6$

(179) $f(x) = x^2 + 8x - 6$

$$\frac{f(x+h) - f(x)}{h} =$$

$$\frac{((x+h)^2 + 8(x+h) - 6) - (x^2 + 8x - 6)}{h} =$$

$$\frac{(x+h)(x+h) + 8x + 8h - 6 - x^2 - 8x + 6}{h} =$$

$$\frac{x^2 + xh + xh + h^2 + 8x + 8h - 6 - x^2 - 8x + 6}{h} =$$

$$\frac{xh + xh + h^2 + 8h}{h} =$$

$$\frac{2xh + h^2 + 8h}{h} =$$

$$2x + h + 8 =$$

(180) Use the Quadratic formula

$1x^2 - 6x + 8 = 0$

$a = 1,\ b = -6,\ c = 8$

61.

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

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(8)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(8)}}{2}$$

$$x = \frac{6 \pm \sqrt{36 - 32}}{2}$$

$$x = \frac{6 \pm \sqrt{4}}{2}$$

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

$x = 3 \pm 1$

$x = 3 - 1$ OR $x = 3 + 1$

$x = 2$ OR $x = 4$

(181) $f(x) = 2x + 3$ and $g(x) = 5x + 8$

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

$f(g(x)) =$

$f(5x+8) =$

$2(5x+8)+3 =$

$10x + 16 + 3 =$

$10x + 19 =$

62.

(182) $f(x) = 2x+3$ and $g(x) = x^2 + 6x - 5$

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

$g(f(x)) =$

$g(2x+3) =$

$(2x+3)^2 + 6(2x+3) - 5 =$

$(2x+3)(2x+3) + 6(2x+3) - 5 =$

$4x^2 + 6x + 6x + 9 + 12x + 18 - 5 =$

$4x^2 + 24x + 22 =$

(183) Find Midpoint $(4, -8)$ and $(-10, 2)$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

$mid = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

$mid = \left(\frac{(4) + (-10)}{2}, \frac{(-8) + (2)}{2} \right)$

$mid = \left(\frac{4 - 10}{2}, \frac{-8 + 2}{2} \right)$

$mid = \left(\frac{-6}{2}, \frac{-6}{2} \right)$

$(-3, -3)$

(184) Find the Vertex

$f(x) = -1(x-2)^2 + 9$

Set $x-2=0$

$x-2+2=0+2$

$x=2$

$f(2) = -1((2)-2)^2+9$

$f(2) = -1(2-2)^2+9$

$f(2) = -1(0)^2+9$

$f(2) = -1(0)(0)+9$

$f(2) = 0+9$

$= 9$

Vertex $= (2, 9)$

(185) Find Vertex

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

$a=-1,\ b=4,\ c=5$

Vertex $= \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

Vertex $= \left(\frac{-(4)}{2(-1)}, f\left(\frac{-(4)}{2(-1)}\right)\right)$

Vertex $= \left(\frac{-4}{-2}, f\left(\frac{-4}{-2}\right)\right)$

Vertex $= (2, f(2))$

Vertex $= (2, -(2)^2 + 4(2) + 5)$

Vertex $= (2, -(2)(2) + 4(2) + 5)$

Vertex $= (2, -4+8+5)$

Vertex $= (2, 4+5)$

$= (2, 9)$

(186) Find the y-intercept

$f(x) = -x^2 + 4x + 5$ Let $x = 0$

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

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

$f(0) = 0 + 0 + 5$

$f(0) = 5$

$(x, y) = (0, 5)$

(187) Find the x-intercept Let $y = 0$

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

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

$0 = -x^2 + 4x + 5$

$-1(0) = -1(-x^2 + 4x + 5)$

$0 = x^2 - 4x - 5$

$0 = (x + 1)(x - 5)$

Set $x + 1 = 0$ OR $x - 5 = 0$

$x + 1 - 1 = 0 - 1$ OR $x - 5 + 5 = 0 + 5$

$x = -1$ OR $x = 5$

$(-1, 0)$ OR $(5, 0)$

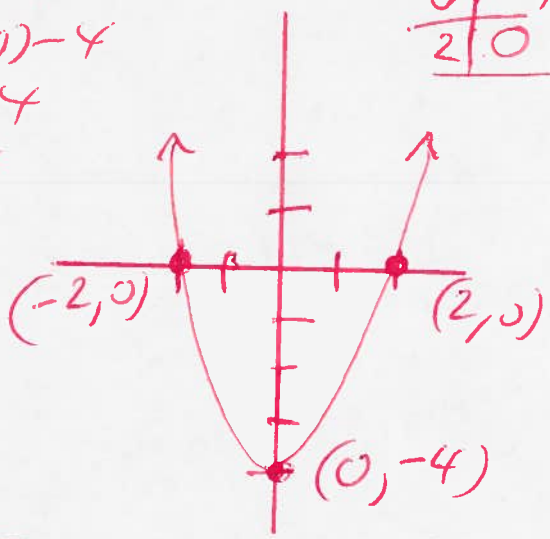
(188) Graph $f(x) = x^2 - 4$

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

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

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

x	y
-2	0
0	-4
2	0



65

(189) Graph $f(x) = -1(x-2)^2 + 9$

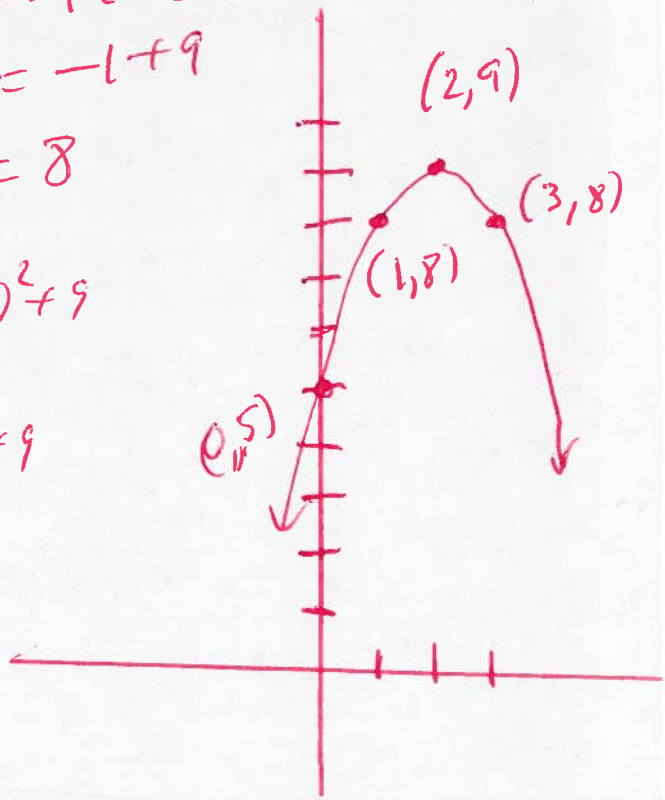
$f(1) = -1(1-2)^2 + 9$
$f(1) = -1(-1)^2 + 9$
$f(1) = -1(-1)(-1) + 9$
$f(1) = -1 + 9$
$f(1) = 8$

$f(2) = -1(2-2)^2 + 9$
$f(2) = -1(0)^2 + 9$
$f(2) = -1(0)(0) + 9$
$f(2) = 0 + 9$
$f(2) = 9$

$f(3) = -1(3-2)^2 + 9$
$f(3) = -1(1)^2 + 9$
$f(3) = -1(1)(1) + 9$
$f(3) = -1 + 9$
$f(3) = 8$

also
$f(0) = -1(0-2)^2 + 9$
$f(0) = -(-2)^2 + 9$
$f(0) = -(-2)(-2) + 9$
$f(0) = -4 + 9$
$f(0) = 5$

x	f(x)
1	8
2	9
3	8



(190) Graph

66.

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

Find Y-intercept Let $x = 0$

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

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

$= 0 + 0 + 5$

$= 5$

$(0, 5)$

Find the X-intercept Let $y = 0$

$0 = y = f(x) = -x^2 + 4x + 5$

$0 = -x^2 + 4x + 5$

$-1(0) = -1(-x^2 + 4x + 5)$

$0 = x^2 - 4x - 5$

$0 = (x + 1)(x - 5)$

Set $x + 1 = 0$ OR $x - 5 = 0$

$x + 1 - 1 = 0 - 1$ OR $x - 5 + 5 = 0 + 5$

$x = -1$ OR $x = 5$

$(-1, 0)$ OR $(5, 0)$

Find VERTEX

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

$a = -1 \quad b = 4 \quad c = 5$

Vertex $= \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

Vertex $= \left(-\frac{(4)}{2(-1)}, f\left(\frac{(4)}{2(-1)}\right)\right)$

Vertex $= \left(\frac{-4}{-2}, f\left(\frac{-4}{-2}\right)\right)$

Vertex $= (2, f(2))$

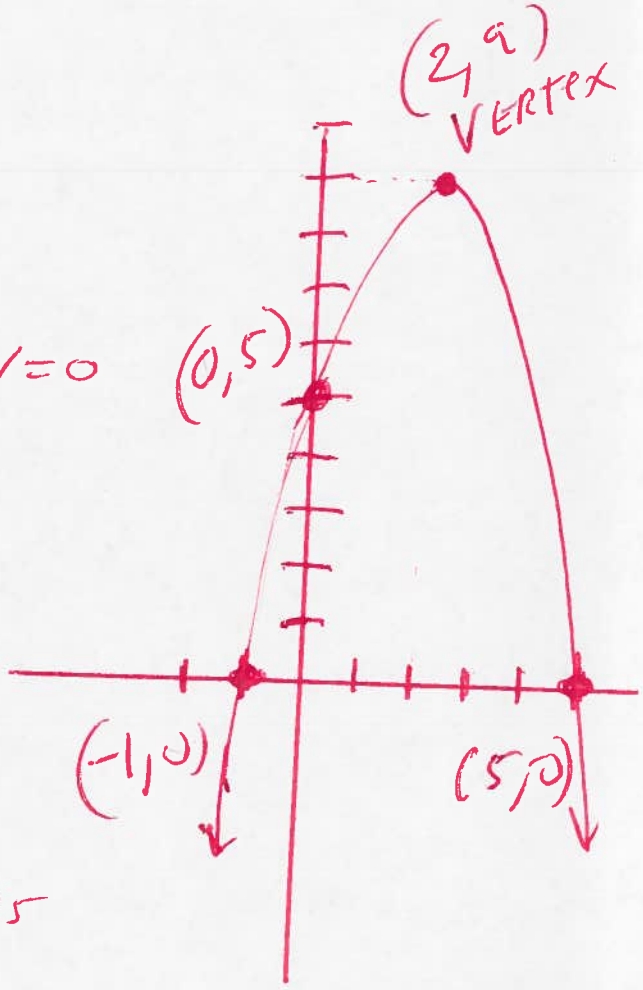
Vertex $= (2, -(2)^2 + 4(2) + 5)$

Vertex $= (2, -(2)(2) + 4(2) + 5)$

Vertex $= (2, -4 + 8 + 5)$

Vertex $= (2, 4 + 5)$

Vertex $(2, 9)$



(191) simplify

$(2+8i)(3-2i) =$

$6 - 4i + 24i - 16i^2 =$

$6 + 20i - 16i^2 =$

$6 + 20i - 16(-1) =$

$6 + 20i + 16 =$

$22 + 20i =$

$i^2 = -1$

(192) $\frac{2+i}{5-i} =$

$\left(\frac{2+i}{5-i}\right)\left(\frac{5+i}{5+i}\right) =$

$\frac{10 + 2i + 5i + i^2}{25 + 5i - 5i - i^2} =$

$i^2 = -1$

$\frac{10 + 7i + i^2}{25 - i^2} =$

$\frac{10 + 7i + (-1)}{25 - (-1)} =$

$\frac{10 + 7i - 1}{25 + 1} =$

$\frac{9 + 7i}{26} =$

$\frac{9}{26} + \frac{7i}{26} =$

193 $(x+4)^2 = -9$

$\sqrt{(x+4)^2} = \pm\sqrt{-9}$ $\quad \sqrt{-1} = i$

$x+4 = \pm 3i$

$x+4 = -3i$ OR $x+4 = 3i$

$x+4-4 = -3i-4$ OR $x+4-4 = 3i-4$

$x = -3i-4$ OR $x = 3i-4$

$x = -4-3i$ OR $x = -4+3i$

194 solve

$2x-3y = 2$

$4x-6y = 1$

$(2x-3y)(-6) = 2(-6)$ multiply

$(4x-6y)(3) = 1(3)$

$-12x+18y = -12$

$12x-18y = 3$

$0+0 = -9$

$0 \neq -9$

no solution OR $\emptyset$

(195) $\frac{x^2}{x^2-4} - \frac{8x-12}{x^2-4} =$

LCD $= x^2-4$

$\frac{(x^2)-(8x-12)}{x^2-4} =$

$\frac{x^2-8x+12}{x^2-4} =$

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

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

69

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

LCD $= (x+2)(x-2)$

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

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

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

$\frac{4x-8+1}{(x+2)(x-2)} =$

$\frac{4x-7}{(x+2)(x-2)} =$

(197) $\left(\frac{4a^3b^{-9}c^4}{-8a^5b^{-2}c^{-2}}\right)^4 =$

(70)

$\left(\frac{4a^3c^4b^2c^2}{-8a^5b^9}\right)^4 =$

$\left(\frac{4a^3c^6b^2}{-8a^5b^9}\right)^4 =$

$\left(\frac{1c^6}{-2a^{5-3}b^{9-2}}\right)^4 =$

$\left(\frac{c^6}{-2a^2b^7}\right)^4 =$

$\frac{c^{24}}{(-2)^4a^8b^{28}} =$

$\frac{c^{24}}{16a^8b^{28}} =$

(198) Graph $f(x) = x^2$ and $g(x) = (x-1)^2 + 4$

71

x	f(x)
-1	1
0	0
1	1

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

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

$f(-1) = 1$

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

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

$f(0) = 0$

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

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

$f(1) = 1$

x	g(x)
0	5
1	4
2	5

$g(0) = (0-1)^2 + 4$

$g(0) = (-1)^2 + 4$

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

$g(0) = 1 + 4$

$g(0) = 5$

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

$g(1) = (0)^2 + 4$

$g(1) = (0)(0) + 4$

$g(1) = 0 + 4$

$g(1) = 4$

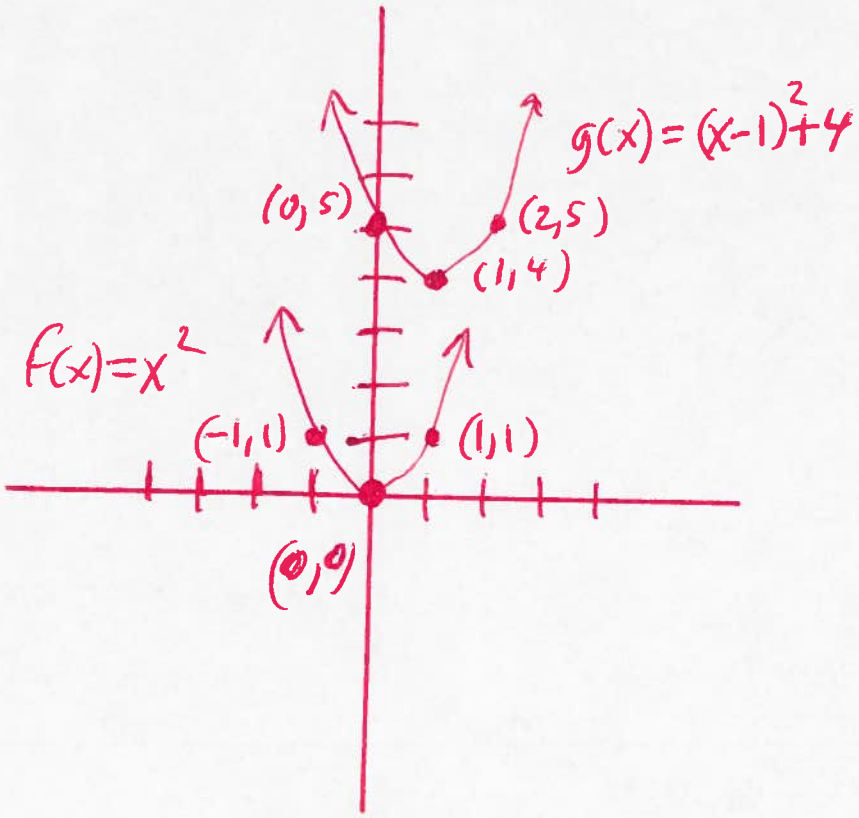
$g(2) = (2-1)^2 + 4$

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

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

$g(2) = 1 + 4$

$g(2) = 5$



(199) Find the MAX

$f(x) = -250x^2 + 2500x + 50000$

$a = -250, \quad b = 2500, \quad c = 50000$

17

$\text{Vertex} = \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

$\text{Vertex} = \left(\frac{-(2500)}{2(-250)}, f\left(\frac{-(2500)}{2(-250)}\right)\right)$

$\text{Vertex} = \left(\frac{-2500}{-500}, f\left(\frac{-2500}{-500}\right)\right)$

$\text{Vertex} = (5, f(5))$

$\text{Vertex} = (5, -250(5)^2 + 2500(5) + 50000)$

$\text{Vertex} = (5, 56250)$ use a graphing calculator

(200) solve

$2^{x+1} = 16$

$(2)^{x+1} = (2)^4$

$x + 1 = 4$

$x + 1 - 1 = 4 - 1$

$x = 3$

(201) Determine the ordered pair that is a solution

$4x + 2y = 8$

(A) $(0, 2)$ (B) $(2, 4)$ (C) $(1, 2)$ (D) $(2, 1)$

x, y x, y x, y x, y

(A) $4x + 2y = 8$?

$4(0) + 2(2) = 8$?

$0 + 4 = 8$?

$4 \neq 8$? NO

13.

(B) $4x + 2y = 8$?

$4(2) + 2(4) = 8$?

$8 + 8 = 8$?

$16 \neq 8$ NO

(C) $4x + 2y = 8$

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

$4 + 4 = 8$

$8 = 8$ YES

(D) $4x + 2y = 8$?

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

$8 + 2 = 8$?

$10 \neq 8$ NO

(202) You have a total of 100 nickels and dimes. The value is $9.50. How many nickels and dimes do you have?

$N + D = 100$

$.05N + .10D = 9.50$

$(N+D)(-.10) = 100(-.10)$

$(.05N + .10D)(1) = 9.50(1)$

$-.10N - .10D = -10.00$

$.05N + .10D = 9.50$

$-.05N = -.50$

$\frac{-.05N}{-.05} = \frac{-.50}{-.05}$

$N = 10$

Substitute

$N + D = 100$

$(10) + D = 100$

$10 + D - 10 = 100 - 10$

$D = 90$

$(N, D) = (10, 90)$

14

(203) $f(x) = 4x^2 - 3$ and $g(x) = 5x + 4$

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

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

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

$20x^3 + 16x^2 - 15x - 12 =$

15.

(204) $f(x) = 3x - 6$ and $g(x) = x^2 - 4$

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

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

$\frac{3x - 6}{x^2 - 4} =$

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

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

205 Are lines $Y_1 = 2x+1$ and $Y_2 = -2x+8$ parallel, perpendicular, or neither

slope $= m_1 = 2$ $\quad m_2 = -2$

NOT parallel since $m_1 \neq m_2$

NOT perpendicular since $m_2 \neq -\frac{1}{m_1}$

Neither

16.

Examples of parallel lines

$Y_1 = 2x+3$ $\quad Y_2 = 2x-7$

$Y_1 = \frac{1}{3}x+1$ $\quad Y_2 = \frac{1}{3}x+11$

$Y_1 = -\frac{2}{3}x-1$ $\quad Y_2 = -\frac{2}{3}x+1$

$Y_1 = -2x+1$ $\quad Y_2 = -2x+9$

Examples of perpendicular lines

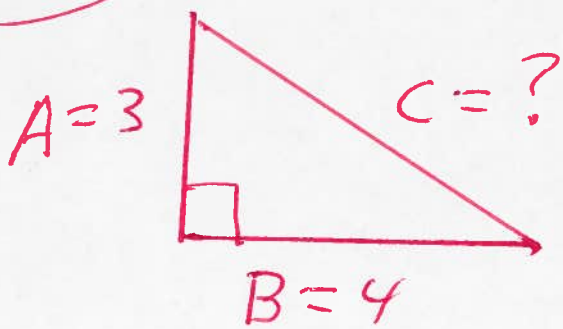
$Y_1 = 2x+1$ $\quad Y_2 = -\frac{1}{2}x+3$

$Y_1 = -\frac{2}{5}x+1$ $\quad Y_2 = \frac{5}{2}x+9$

$Y_1 = \frac{3}{2}x+1$ $\quad Y = -\frac{2}{3}x+9$

$Y_1 = 4x-3$ $\quad Y_2 = -\frac{1}{4}x+3$

206 use Pythagorean Theorem



$A^2 + B^2 = C^2$

$(3)^2 + (4)^2 = C^2$

$9 + 16 = C^2$

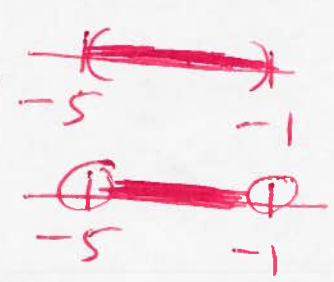
$25 = C^2$

$\sqrt{25} = \sqrt{C^2}$

$5 = C$

(207) Solve

$$-4 < 2x+6 < 4$$
$$-4-6 < 2x+6-6 < 4-6$$
$$-10 < 2x < -2$$
$$\frac{-10}{2} < \frac{2x}{2} < \frac{-2}{2}$$
$$-5 < x < -1$$



$(-5, -1)$

77.

(208) Find the equation of the line through $(10, 800)$ and $(12, 900)$.

(x_1, y_1) (x_2, y_2)

$$y - y_1 = \frac{y_1 - y_2}{x_1 - x_2}(x - x_1)$$

$$y - (800) = \frac{(800)-(900)}{(10)-(12)}(x-(10))$$

$$y - 800 = \frac{800-900}{10-12}(x-10)$$

$$y - 800 = \frac{-100}{-2}(x-10)$$

$$y - 800 = 50(x-10)$$

$$y - 800 = 50x - 500$$

$$y - 800 + 800 = 50x - 500 + 800$$

$$y = 50x + 300$$

78.

(209) $(4+5\sqrt{6})(4-5\sqrt{6}) =$

$16 - 20\sqrt{6} + 20\sqrt{6} - 25(\sqrt{6})^2 =$

$16 - 25(\sqrt{6})^2 =$

$16 - 25(6) =$

$16 - 150 =$

$-134 =$

(210.) Find the slope, Y-intercept, and graph. $y = 2x + 4$

$y = mx + b$

slope $= m$

Y-intercept $(0, b)$

Slope $= m = 2$

Y-int $= (0, 4)$

$y = 2x + 4$

$y = 2(0) + 4$

$y = 0 + 4$

$y = 4$

X	Y
0	4
1	6

$y = 2x + 4$

$y = 2(1) + 4$

$y = 2 + 4$

$y = 6$