aaM032o HighSchool 161 Skill

12-08-18
12-10-18
12-12-18
12-16-18
01-07-19
01-13-19
01-15-19
01-19-19

① $5(y+2) = 6(y-7)$

$5y + 10 = 6y - 42$

$5y + 10 - 10 = 6y - 42 - 10$

$5y = 6y - 52$

$5y - 6y = 6y - 52 - 6y$

$-1y = -52$

$\frac{-1y}{-1} = \frac{-52}{-1}$

$y = 52$

② $\frac{x}{5} = \frac{x}{6} + \frac{2}{5}$ LCD = 30

$\frac{x}{5}(30) = \frac{x}{6}(30) + \frac{2}{5}(30)$

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

$6x = 5x + 12$

$6x - 5x = 5x + 12 - 5x$

$1x = 12$

$x = 12$

(3) $1.1x + 4.3 = 0.7x + 1.14$

$1.1x + 4.3 - 4.3 = 0.7x + 1.14 - 4.3$

$1.1x = 0.7x - 3.16$

$1.1x - 0.7x = 0.7x - 3.16 - 0.7x$

$.4x = -3.16$

$\frac{.4x}{.4} = \frac{-3.16}{.4}$

$x = -7.9$

(4.) $5(x - 1.2) = 9.3$

$5x - 6 = 9.3$

$5x - 6 + 6 = 9.3 + 6$

$5x = 15.3$

$\frac{5x}{5} = \frac{15.3}{5}$

$x = 3.06$

5. $8(3x - 0.2) = 7x - 1.6$

$24x - 1.6 = 7x - 1.6$

$24x - 1.6 + 1.6 = 7x - 1.6 + 1.6$

$24x = 7x$

$24x - 7x = 7x - 7x$

$17x = 0$

$\frac{17x}{17} = \frac{0}{17}$

$x = 0$

6. $\frac{4}{13} = \frac{x}{39}$

$4(39) = 13(x)$ Cross mult

$156 = 13x$

$\frac{156}{13} = \frac{13x}{13}$

$12 = x$

(7.) The scale on a map states that 1 centimeter corresponds to 40 kilometers. On the map, two cities are 21 cm apart. Find the actual distance

$$\frac{1}{40} = \frac{21}{x}$$

$$1(x) = 40(21)$$

$$x = 840$$

(8.) Find the total amount in the compound interest account.

$$A = P\left(1 + \frac{r}{N}\right)^{Nt}$$

$P = \$18{,}000$

$r = 5\%$

$N = 1$ = annually

$t = 5$ years

$$A = \$18000\left(1 + \frac{.05}{1}\right)^{1t}$$

$$A = \$18000(1 + .05)^{t}$$

$$A = \$18000(1.05)^{t}$$

$$A = \$18000(1.05)^{5}$$

$$A = 18000(1.276281563)$$

$$A = \$22973.06813$$

$$= \$22973.07$$

(9.) $9x+5-9x-5 = 6x-6x-3$

$0+0 = 0-3$

$0 \neq -3$

NO solution

(10.) $2(x+5) = (2x+10)$

$2x+10 = 2x+10$

$2x+10-10 = 2x+10-10$

$2x = 2x$

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

$0 = 0$

all real numbers

(11.) $P = 2L + 2W$ $\quad L = 12, \quad P = 46$

$46 = 2(12) + 2W$

$46 = 24 + 2W$

$46 - 24 = 24 + 2W - 24$

$22 = 2W$

$\frac{22}{2} = \frac{2W}{2}$

$11 = W$

(12.) $A = P + PRT$ $\quad$ for T

$A - P = P + PRT - P$

$A - P = PRT$

$\frac{A - P}{PR} = \frac{PRT}{PR}$

$\frac{A - P}{PR} = T$

13. $-7x-8 \leq -8x-13$

$-7x-8+8 \leq -8x-13+8$

$-7x \leq -8x-5$

$-7x+8x \leq -8x-5+8x$

$1x \leq -5$

$x \leq -5$

$(-\infty, -5]$

14. $\frac{y}{2} \geq 4$

$2\left(\frac{y}{2}\right) \geq 2(4)$

$y \geq 8$

$[8, \infty)$

15. $-2(3x+14) < -8x-16$

$-6x-28 < -8x-16$

$-6x-28+28 < -8x-16+28$

$-6x < -8x+12$

$-6x+8x < -8x+12+8x$

$2x < 12$

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

$x < 6$

16. $-16x-32 \leq -4(3x+3)$

$-16x-32 \leq -12x-12$

$-16x-32+32 \leq -12x-12+32$

$-16x \leq -12x+20$

$-16x+12x \leq -12x+20+12x$

$-4x \leq 20$

$\frac{-4x}{-4} \geq \frac{20}{-4}$

$x \geq -5$

(17.) The area of a rectangle must be at least 84 square feet. If the length is 7 feet, find the minimum for the rectangles width.

$A = LW$

$LW \geq 84$

$7W \geq 84$

$\frac{7W}{7} \geq \frac{84}{7}$

$W \geq 12$

(18.) graph

$y = 2x + 4$

x	y
-1	2
0	4
1	6

$y = 2(-1) + 4$

$y = -2 + 4$

$y = 2$

$y = 2(0) + 4$

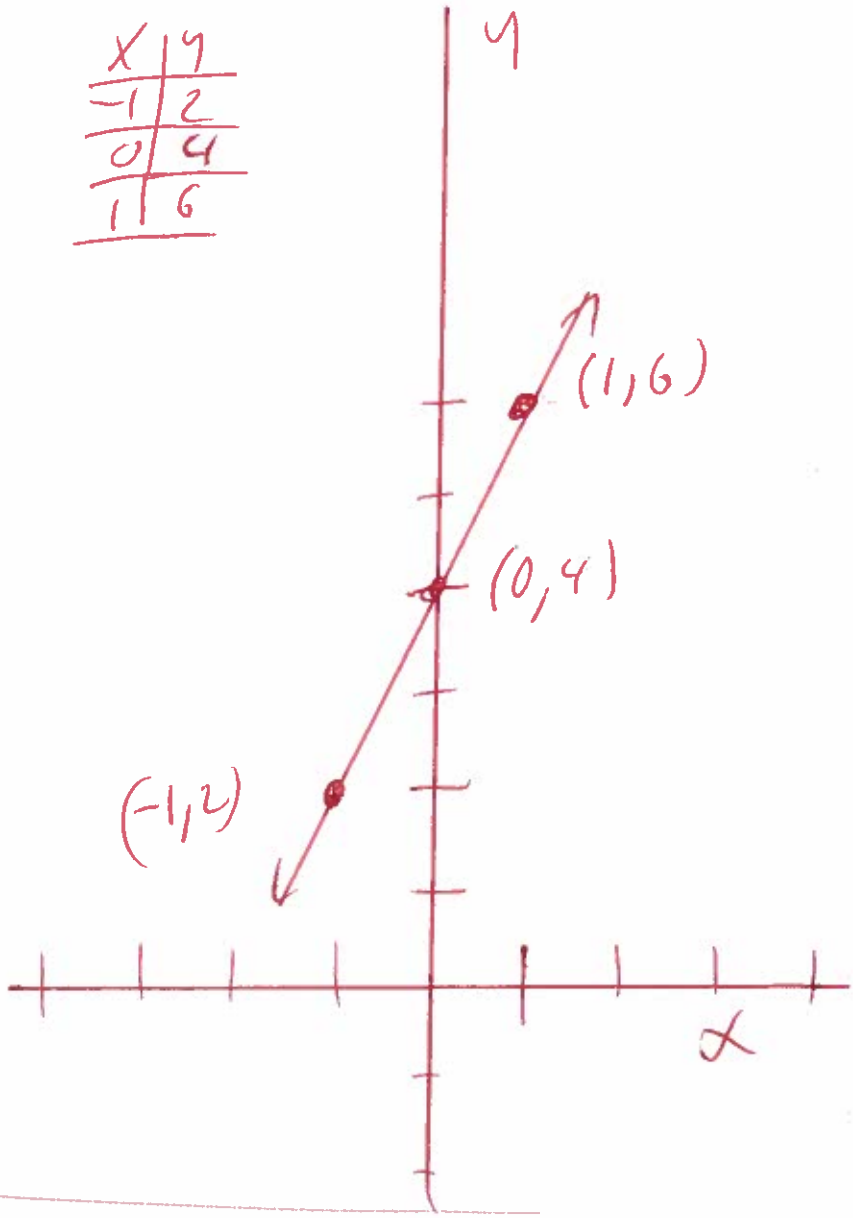
$y = 0 + 4$

$y = 4$

$y = 2(1) + 4$

$y = 2 + 4$

$y = 6$



(19) Graph

$y = -2x - 4$

$y = -2(0) - 4$

$y = 0 - 4$

$y = -4$

$y = -2(1) - 4$

$y = -2 - 4$

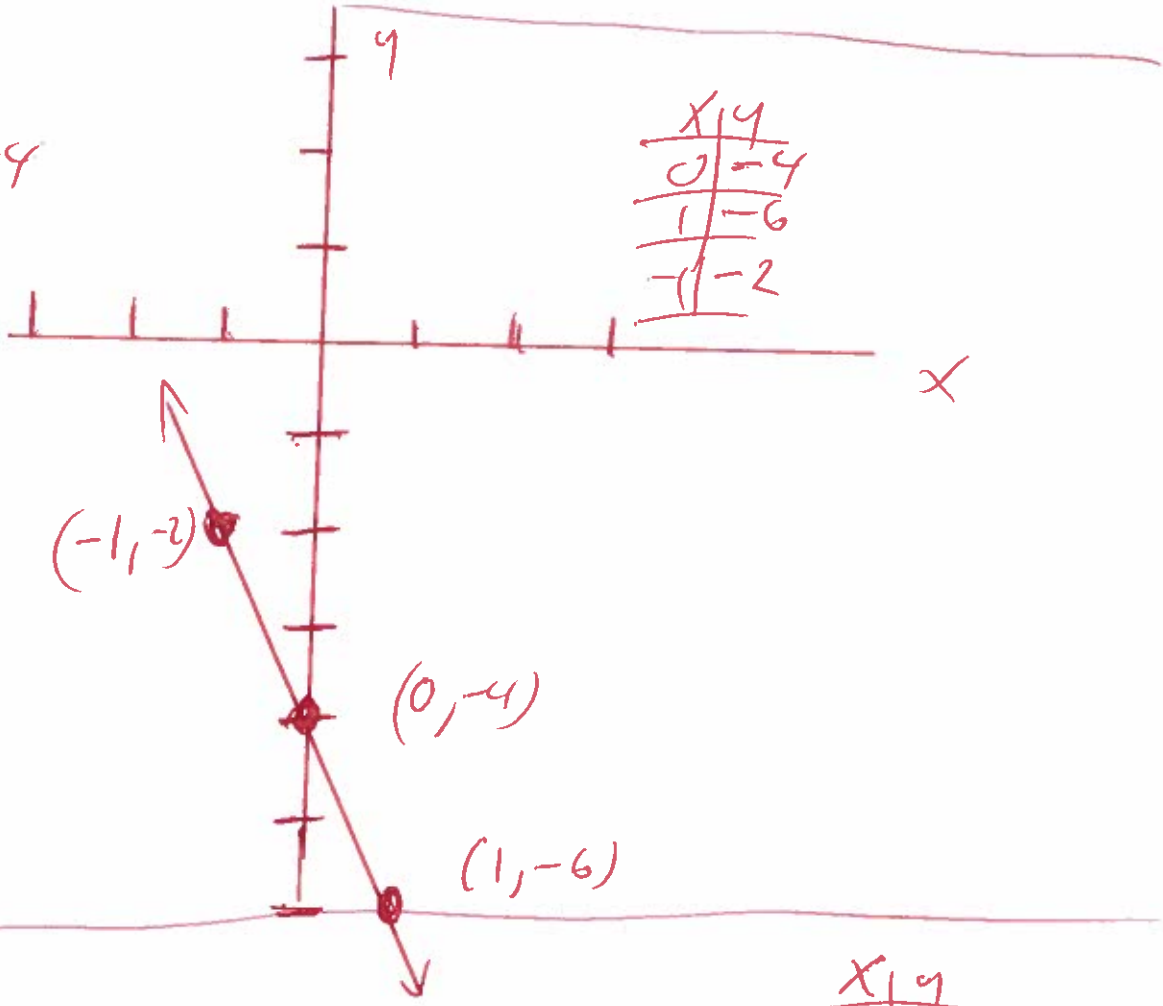
$y = -6$

$y = -2(-1) - 4$

$y = 2 - 4$

$y = -2$

x	y
0	-4
1	-6
-1	-2



(20) graph

$5y - 25x = 10$

$5y - 25x + 25x = 10 + 25x$

$5y = 10 + 25x$

$\frac{5y}{5} = \frac{10}{5} + \frac{25x}{5}$

$y = 2 + 5x$

$y = 5x + 2$

formal $y = mx + b$

$y = 5(0) + 2$

$y = 0 + 2$

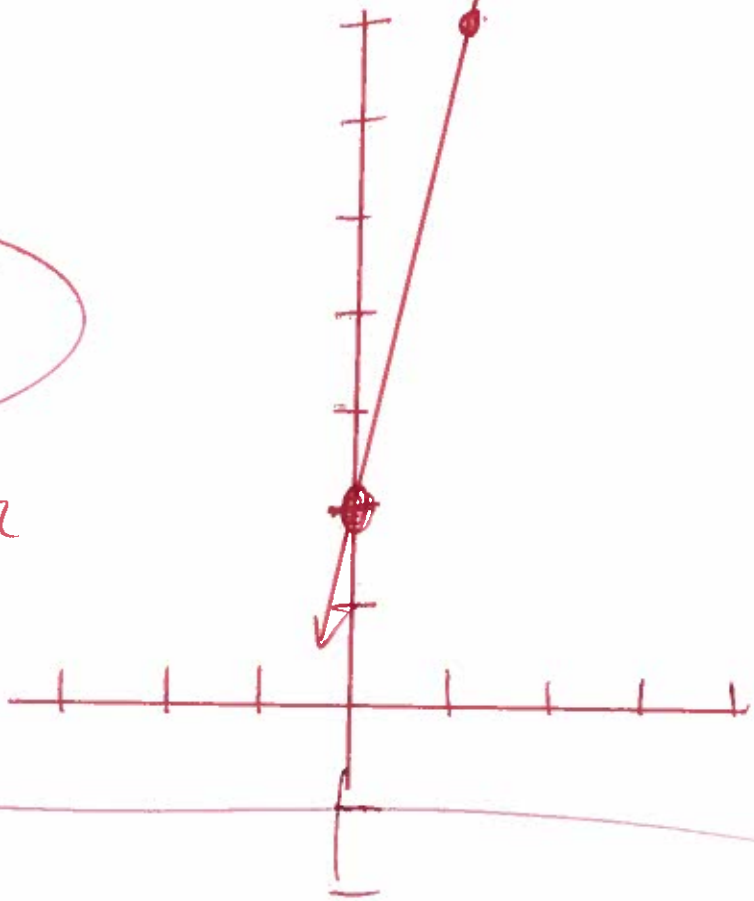
$y = 2$

$y = 5(1) + 2$

$y = 5 + 2$

$y = 7$

x	y
0	2
1	7



(21) Graph

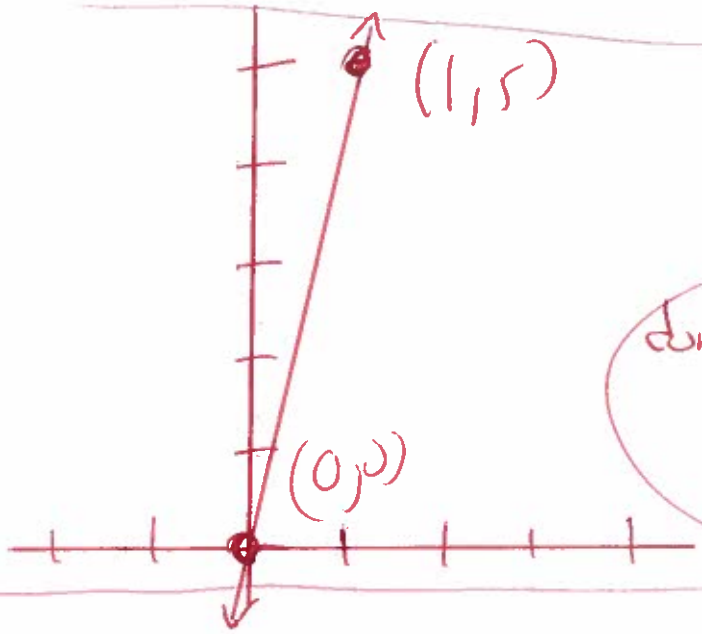
$y = 5x$

$y = 5(0)$

$y = 0$

$y = 5(1)$

$y = 5$



x	y
0	0
1	5

Domain all real numbers

$(-\infty, \infty)$

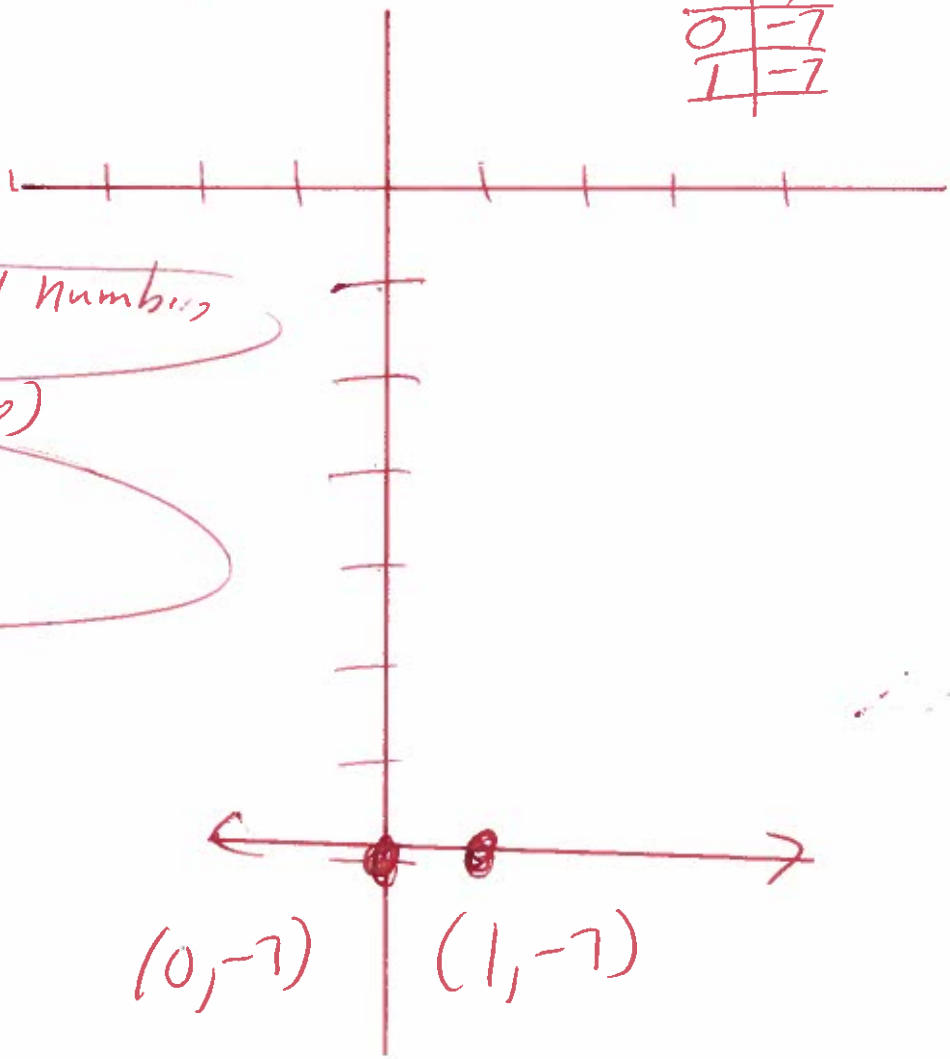
Range all Real numbers

$(-\infty, \infty)$

(22) Graph

$y = -7$

x	y
0	-7
1	-7



Domain all real numbers

$(-\infty, \infty)$

Range $= \{-7\}$

(25) graph the linear equation by finding and plotting its intercepts.

$-x+4y=-4$

find x-intercept let $y=0$

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

$-x+0=-4$

$-x=-4$

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

$x=4$ $(4,0)$ x-intercept

find y-intercept let $x=0$

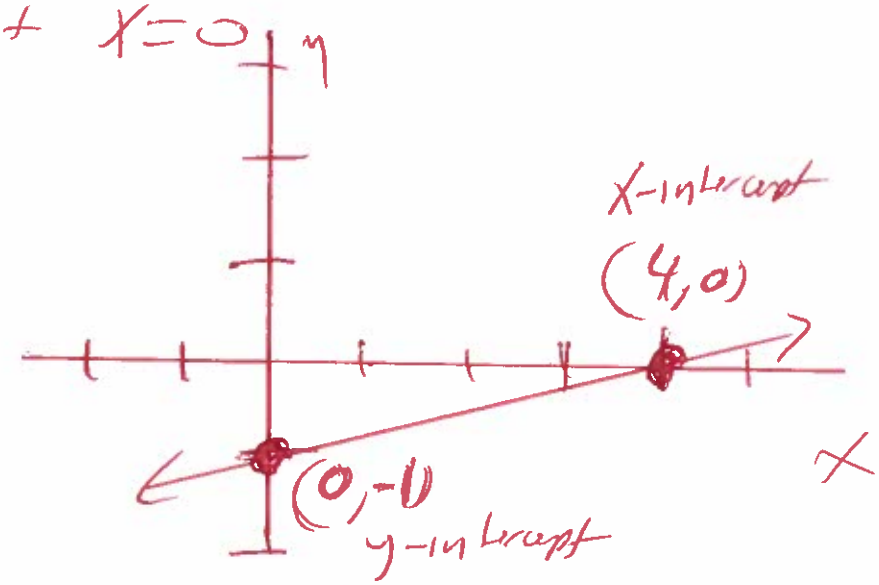
$-(0)+4y=-4$

$0+4y=-4$

$4y=-4$

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

$y=-1$ $(0,-1)$ y-intercept



(26.) graph the linear equation by finding and plotting its intercepts.

$-5x - y = -10$

Find x-intercept let $y = 0$

$-5x - (0) = -10$

$-5x - 0 = -10$

$-5x = -10$

$\frac{-5x}{-5} = \frac{-10}{-5}$

$x = 2$

x-intercept

$(2, 0)$

Find y-intercept let $x = 0$

$-5(0) - y = -10$

$0 - y = -10$

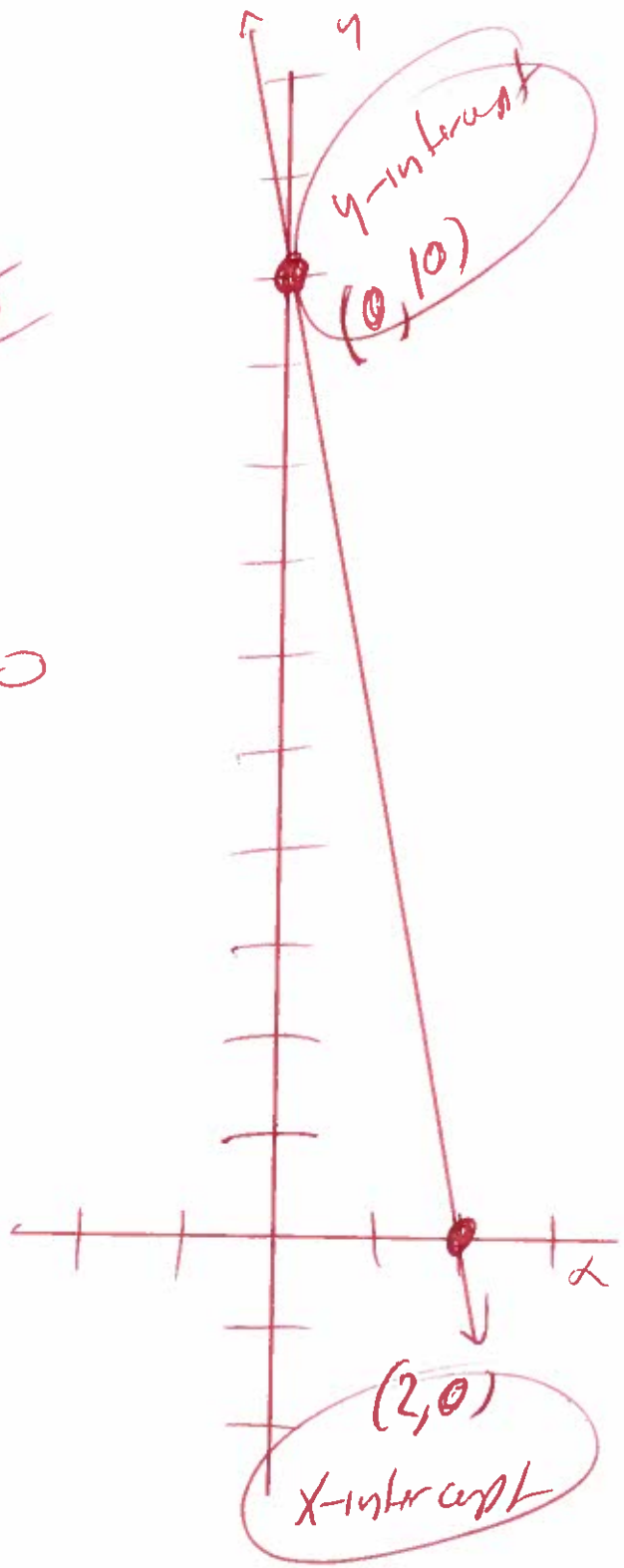
$-y = -10$

$\frac{-y}{-1} = \frac{-10}{-1}$

$y = 10$

y-intercept

$(0, 10)$



(27.) Find the slope of the line that passes through the given points.

(8, 5) and (6, 9)
x_1 y_1 x_2 y_2

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

$$m = \frac{(5) - (9)}{(8) - (6)}$$

$$m = \frac{5-9}{8-6}$$

$$m = \frac{-4}{2}$$

$$m = -2$$

(28.) Find the slope of the line that passes through the given points.

(−6, 9) and (−1, 6)
x_1 y_1 x_2 y_2

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

$$m = \frac{(9) - (6)}{(-6) - (-1)}$$

$$m = \frac{9-6}{-6+1}$$

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

(29) Find the slope of the line.

$y = -7x - 8$

$y = mx + b$ formula Slope Intercept

slope

y-intercept b

Slope $= m = -7$

y-intercept $= -8$

(30) Find the slope of the line.

$8x - 5y = 40$

$-8x - 5y - 8x = 40 - 8x$

$-5y = 40 - 8x$

$\frac{-5y}{-5} = \frac{40}{-5} - \frac{8x}{-5}$

$y = -8 + \frac{8}{5}x$

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

formula Slope Intercept

$y = mx + b$

slope $= m$

y-intercept $= b$

Slope $= m = \frac{8}{5}$

y-intercept $= -8$

(31) determine whether the pair of lines is parallel, perpendicular, or neither.

$y = -5x + 1$ $\quad m_1 = -5$ slopes

$y = 5x - 8$ $\quad m_2 = 5$

$m_1 = -5 \neq 5 = m_2$ (not) parallel

$m_1 = -5$ and $m_2 \neq \frac{1}{5}$ (not) perpendicular

Neither

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(32) determine whether the pair of lines is parallel, perpendicular, or neither.

$y = \frac{5}{2}x + 2$ $\quad m_1 = \frac{5}{2}$ slopes

$y = -\frac{2}{5}x + 5$ $\quad m_2 = -\frac{2}{5}$

$m_1 = \frac{5}{2} \neq -\frac{2}{5} = m_2$ (not) parallel

$m_1 = \frac{5}{2}$ and $m_2 = \frac{-2}{5}$ (yes) perpendicular

(33) determine whether the pair of lines is parallel, perpendicular, or neither.

$y = 4x + 4$ $\quad m_1 = 4$ $\quad$ Slopes

$x - 4y = 8 \rightarrow$ ~~$x - 4y - x = 8 - x$~~

$-4y = 8 - x$

$\frac{-4y}{-4} = \frac{8}{-4} - \frac{x}{-4}$ $\quad$ Solve for y

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

$y = \frac{1}{4}x - 2$ $\quad m_2 = \frac{1}{4}$

$m_1 = 4 \neq \frac{1}{4} = m_2$ NOT parallel

$m_1 = 4$ and $m_2 = \frac{1}{4} \neq -\frac{1}{4}$ NOT perpendicular

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(34) find the slope of the line and write the slope as a rate of change. The graph shows the total cost y (in dollars) of owning and operating a mini-van where x is the number of miles driven.

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

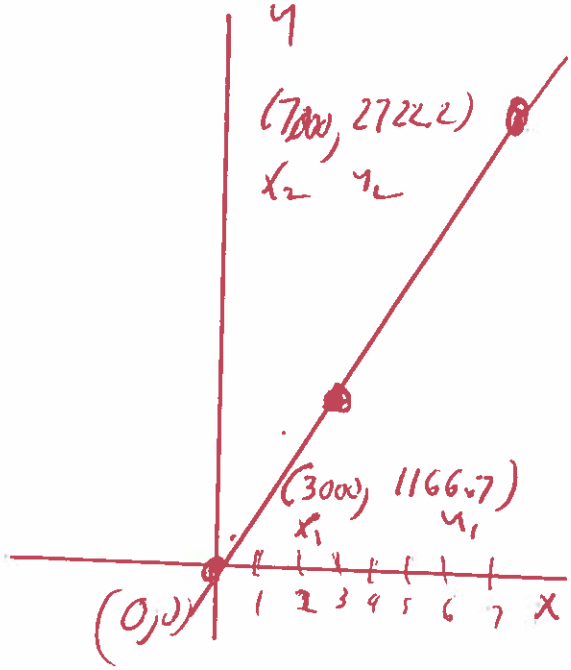
$m = \frac{(1166.7) - (2722.2)}{(3000) - (7000)}$

$m = \frac{1166.7 - 2722.2}{3000 - 7000}$

$m = \frac{-1555.5}{-4000}$

$m = .388875$

$m \approx .39$ per mile



35. Write an equation of the line with the given slope, m, and y-intercept $(0, b)$.

$m = -8 \qquad b = -2$

$y = mx + b$,

$y = -8x - 2$

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36. Find an equation of the line with the given slope that passes through the given point. Write the equation in the form $Ax + By = C$.

$m = 3 \qquad (5, 9)$, x_1, y_1

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

$y - (9) = 3(x - (5))$

$y - 9 = 3(x - 5)$

$y - 9 = 3x - 15$

$y - 9 + 9 = 3x - 15 + 9$

$y = 3x + 6$

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

$y - 3x = 6$

$-1(y - 3x) = -1(6)$ Mult

$-y + 3x = +6$

$3x - y = 6$

(37) Find an equation of the line.

Slope $= 2 = m$ through point $(5, 2)$ $\quad x_1, y_1$

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

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

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

$y - 2 = 2x - 10$

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

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

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(38) Find an equation of the line through the pair of points $(-6, 3)$ and $(0, -2)$ $\quad x_1, y_1 \quad x_2, y_2$

$y - y_1 = \frac{y_1 - y_2}{x_1 - x_2}(x - x_1)$

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

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

$y - 3 = \frac{5}{-6}(x + 6)$

$y - 3 = \frac{5x}{-6} + \frac{5(6)}{-6}$

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

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

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

$6(y) = 6\left(-\frac{5x}{6} - 2\right)$

$6y = -\frac{30}{6}x - 12$

$6y = -5x - 12$

$6y + 5x = -5x - 12 + 5x$

$6y + 5x = -12$

$5x + 6y = -12$

$-1(5x + 6y) = -1(-12)$

$\boxed{-5x - 6y = 12}$

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

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

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

$f(4) = 16 + 16 - 3$

$f(4) = 32 - 3$

$f(4) = 29$

40. $f(x) = 9x - 9$

$f(7) = 9(7) - 9$

$f(7) = 63 - 9$

$f(7) = 54$

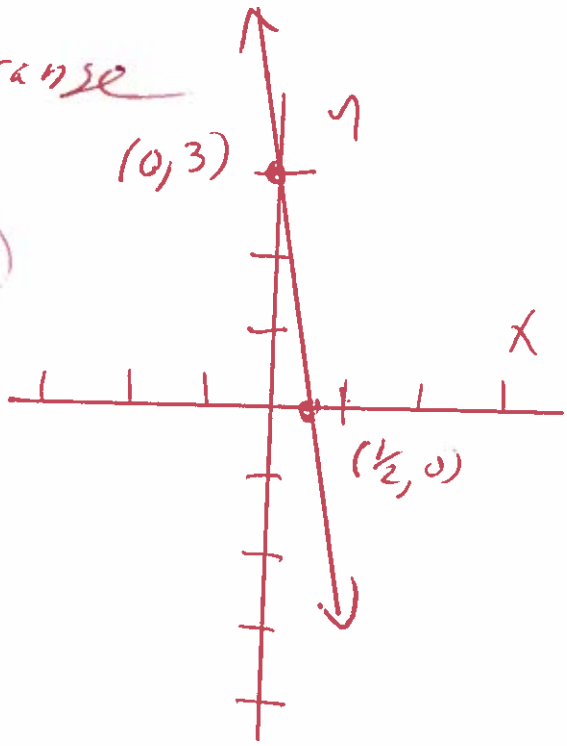
41. $f(x) = |x - 1|$

$f(19) = |19 - 1|$

$f(19) = |18|$

$f(19) = 18$

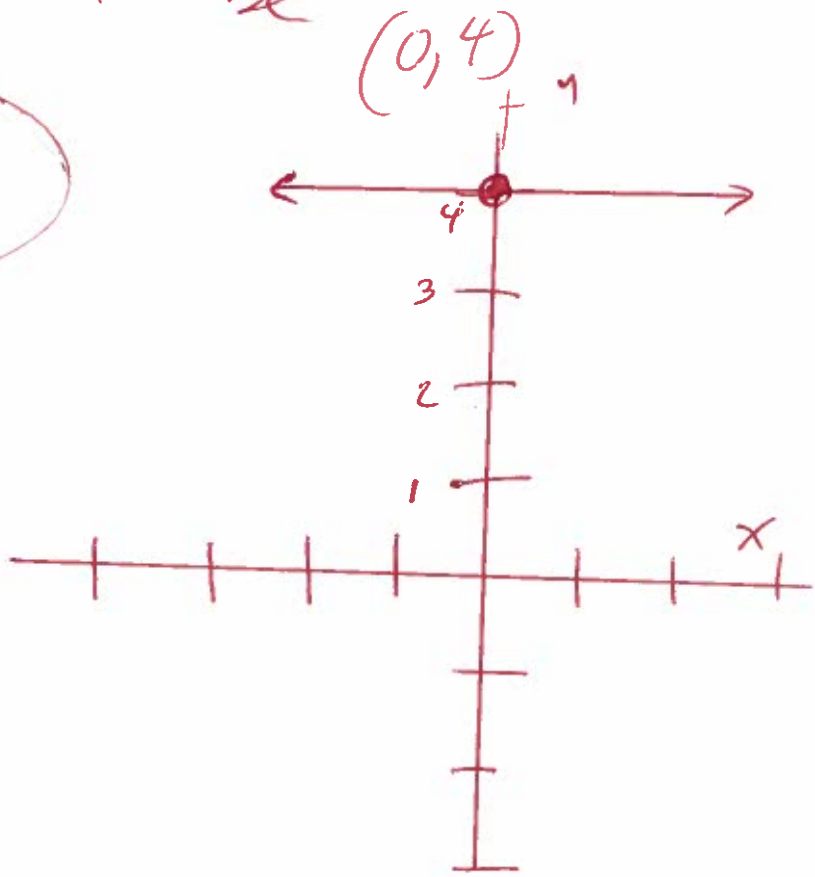
42. Find the domain and range



domain all real numbers
OR
$(-\infty, \infty)$

range all real numbers
OR $(-\infty, \infty)$

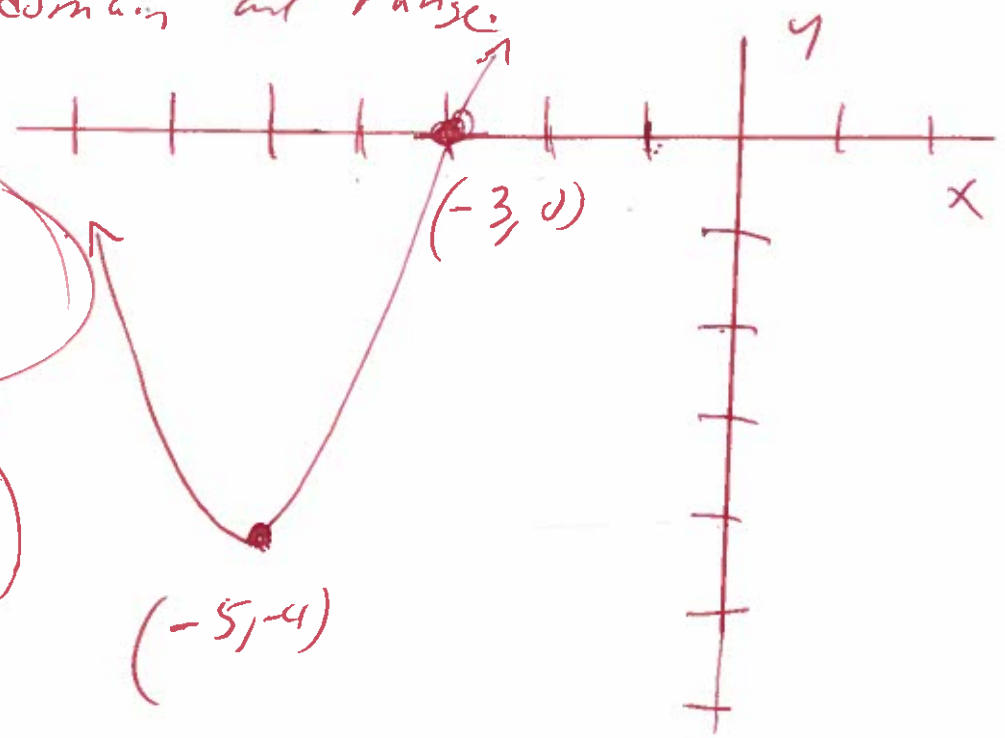
43. Find the domain and range



domain all real numbers
OR
$(-\infty, \infty)$

range $\{4\}$

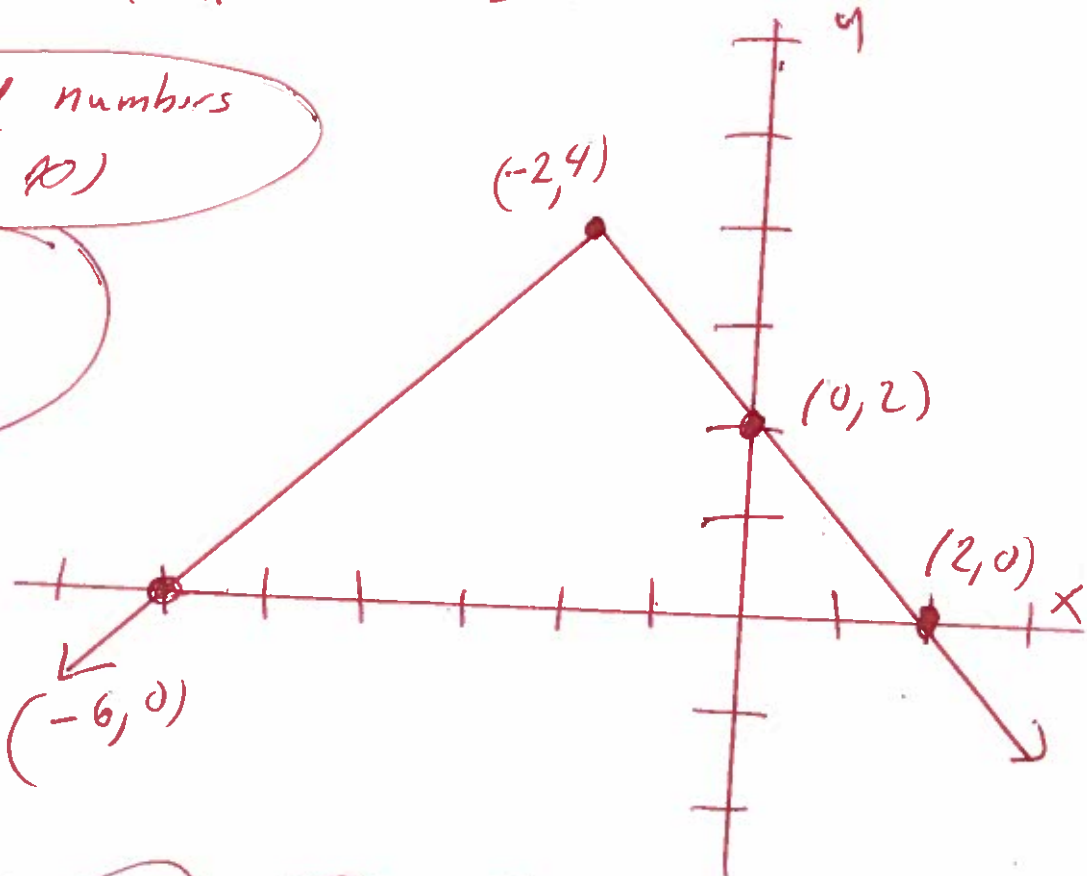
(44.) Find the domain and range.



domain
all real numbers
OR $(-\infty, \infty)$

range $[-5, \infty)$
OR
$y \geq -5$

(45.) Find the domain and range.



domain all real numbers
OR $(-\infty, \infty)$

range $(-\infty, 4]$
OR
$y \leq 4$

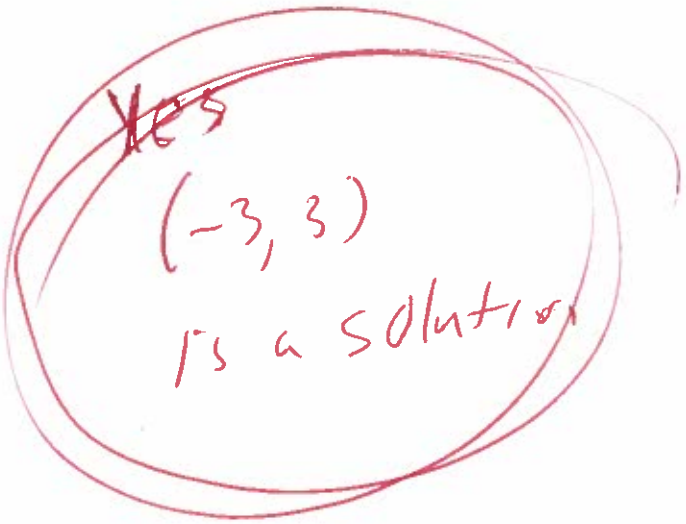
(46) determine whether the ordered pair is a solution of the system of linear equations.

(-3, 3)

x y

$x + y = 0$

$x - y = -6$



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

$-3 + 3 = 0$

$0 = 0$ Good

$(-3) - (3) = -6$

$-3 - 3 = -6$

$-6 = -6$

Good

(47.) Determine whether the ordered pair is a solution of the system of linear equations.

$(3, -4)$
$x \quad y$

$3x + y = 5$
$4x + 3y = 0$

$3(3) + (-4) = 5$
$9 - 4 = 5$
$5 = 5$ Good ✓

$4(3) + 3(-4) = 0$
$12 - 12 = 0$
$0 = 0$ Good ✓

YES
$(3, -4)$
is a
solution

(48) Determine whether the ordered pair is a solution of the system of linear equations.

$(-3, 5)$
x, y

$4x + y = -17$

$2x + 4y = -26$

NO

$(-3, 5)$ is not a solution

$4(-3) + (5) = -17$

$-12 + 5 = -17$

$-7 \neq -17$ BAD

$2(-3) + 4(5) = -26$

$-6 + 20 = -26$

$14 \neq -26$

BAD

Solve the system by graphing

(49) $y = x - 3$

$y = 2x - 1$

x	y
-2	-5
0	-3

$y = x - 3$

$y = (-2) - 3$

$y = -2 - 3$

$y = -5$

$y = (0) - 3$

$y = 0 - 3$

$y = -3$

$y = 2x - 1$

$y = 2(-2) - 1$

$y = -4 - 1$

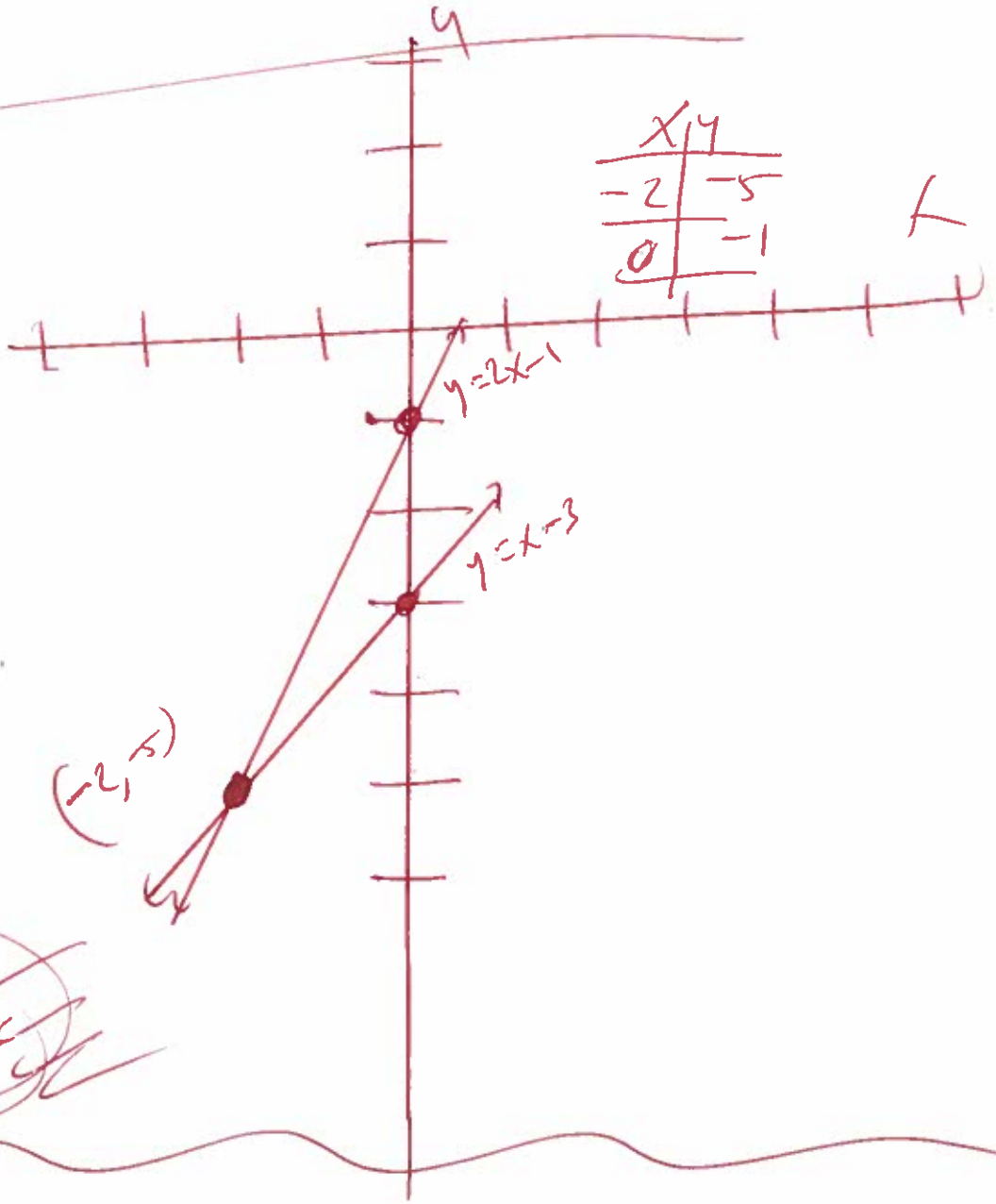
$y = -5$

$y = 2(0) - 1$

$y = 0 - 1$

$y = -1$

x	y
-2	-5
0	-1



Intersection

$(-2, -5)$

(50) $x+y=-3$ Solve by graphing

$x+y=-4$

x	y
0	-3
1	-4

$x+y=-3$

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

$y=-3-x$

$y=-x-3$

$y=-(0)-3$

$y=-0-3$

$y=-3$

$y=-(1)-3$

$y=-1-3$

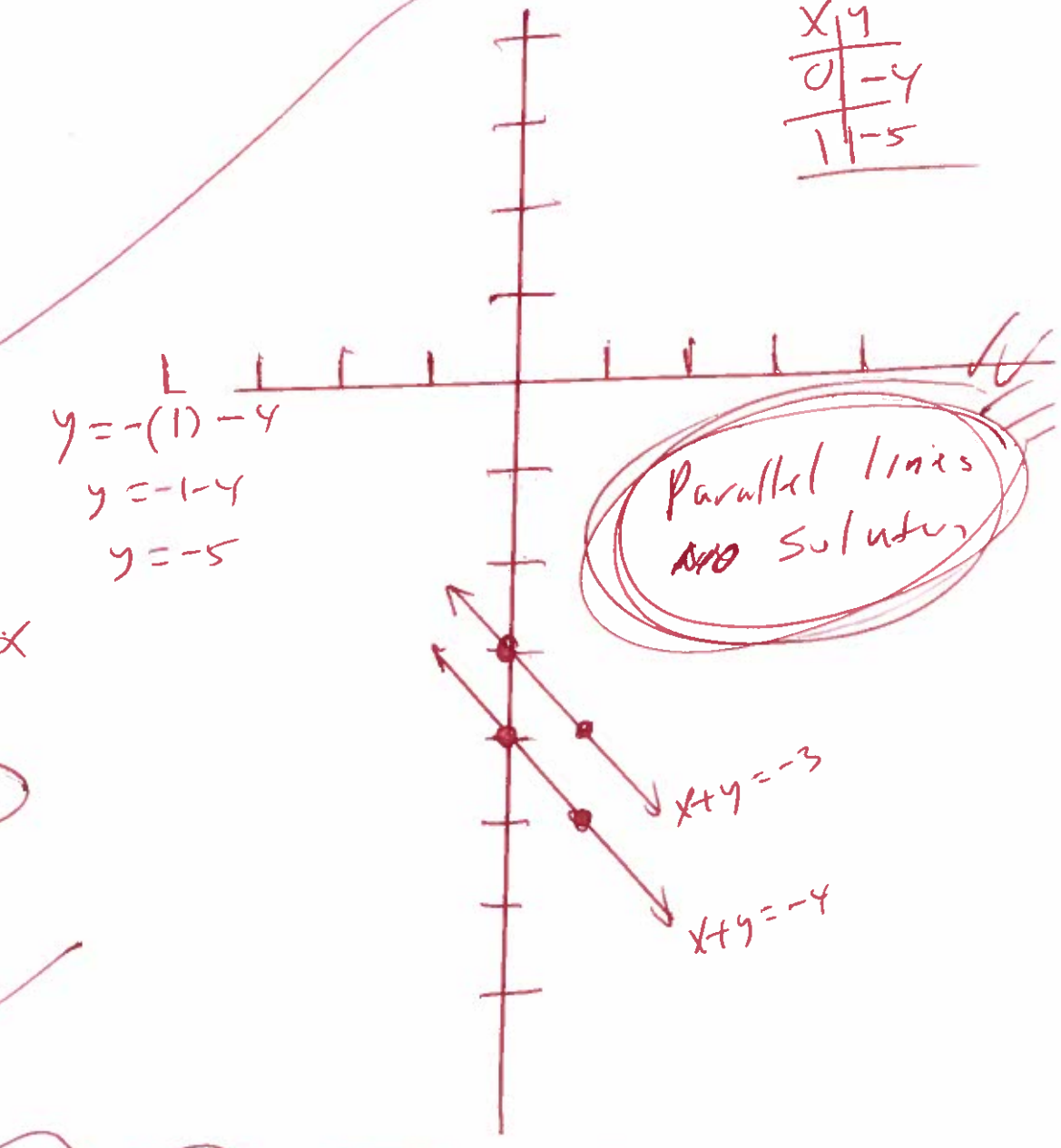
$y=-4$

x	y
0	-4
1	-5

$y=-(1)-4$

$y=-1-4$

$y=-5$



Parallel lines no solution

$x+y=-4$

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

$y=-4-x$

$y=-x-4$

$y=-(0)-4$

$y=-0-4$

$y=-4$

51.

$x + y = 56$

$y = -9x$

$x + (-9x) = 56$

$1x - 9x = 56$

$-8x = 56$

$\frac{-8x}{-8} = \frac{56}{-8}$

$x = -7$

$x + y = 56$ Subst

$-7 + y = 56$

$-7 + y + 7 = 56 + 7$

$y = 63$

$(x, y) = (-7, 63)$

(5C) $y = 4x - 1$

$4y - 20x = -24$

$4(4x-1) - 20x = -24$

$16x - 4 - 20x = -24$

$-4x - 4 = -24$

$-4x - 4 + 4 = -24 + 4$

$-4x = -20$

$\frac{-4x}{-4} = \frac{-20}{-4}$

$x = 5$

$y = 4x - 1$

$y = 4(5) - 1$

$y = 20 - 1$

$y = 19$

$(x, y) = (5, 19)$

(53) $x+5y=-1$

$-4x+4y=-44$

$\begin{pmatrix} x+5y=-1 \\ -4x+4y=-44 \end{pmatrix}\begin{pmatrix} -4 \\ 5 \end{pmatrix}$ mult

$-4x-20y=4$

$-20x+20y=-220$

$-24x+0=-216$

$-24x=-216$

$\frac{-24x}{-24}=\frac{-216}{-24}$

$x=9$

$x+5y=-1$ subst

$(9)+5y=-1$

$9+5y=-1$

$9+5y-9=-1-9$

$5y=-10$

$\frac{5y}{5}=\frac{-10}{5}$

$y=-2$

$(x, y)=(9, -2)$

(54) $-2x+y=-10$

$-3x+3y=-18$

$\begin{matrix}-2x+y=-10 \\ -3x+3y=-18\end{matrix}$ $\begin{matrix}(-3) \\ (1)\end{matrix}$ Mult

$6x-3y=30$

$-3x+3y=-18$

$3x+0=12$

$3x=12$

$\frac{3x}{3}=\frac{12}{3}$

$x=4$

$-2x+y=-10$

$-2(4)+y=-10$

$-8+y=-10$

$-8+y+8=-10+8$

$y=-2$

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

55. $3x+y=9$

$9x+3y=27$

$\begin{pmatrix} 3x+y=9 \\ 9x+3y=27 \end{pmatrix}\begin{pmatrix} -3 \\ 1 \end{pmatrix}$

$-9x-3y=-27$

$9x+3y=27$

$0+0=0$

$0=0$

Infinite number of solutions

(56)

$$-6x-24y=7$$
$$2x+8y=0$$

$$\begin{pmatrix} -6x-24y=7 \\ 2x+8y=0 \end{pmatrix}\begin{pmatrix} 1 \\ 3 \end{pmatrix}$$ Mult

$$-6x-24y=7$$
$$6x+24y=0$$

$$0+0=7$$

$$0 \neq 7$$

NO solution.

57.

$$5x+y=-58$$
$$5x-y=8$$

$$10x+0=-50$$

$$10x=-50$$

$$\frac{10x}{10}=\frac{-50}{10}$$

$$x=-5$$

$$5x+y=-58$$

$$5(-5)+y=-58$$

$$-25+y=-58$$

$$-25+y+25=-58+25$$

$$y=-33$$

$$(x, y)=(-5, -33)$$

57.

$$x - 7y = -66$$
$$-6x - 8y = -54$$

$$\begin{pmatrix} x - 7y = -66 \\ -6x - 8y = -54 \end{pmatrix} \begin{matrix} (-8) \\ (7) \end{matrix}$$

$$-8x + 56y = 528$$
$$-42x - 56y = -378$$

$$-50x + 0 = 150$$

$$-50x = 150$$

$$\frac{-50x}{-50} = \frac{150}{-50}$$

$$x = -3$$

$$x - 7y = -66$$

$$(-3) - 7y = -66$$

$$-3 - 7y = -66$$

$$+3 \quad -7y + 3 = -66 \quad +3$$

$$-7y = -63$$

$$\frac{-7y}{-7} = \frac{-63}{-7}$$

$$y = 9$$

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

(59.) $3x+7y=-13$

$7x+3y=23$

$(3x+7y=-13)(-3)$

$(7x+3y=23)(7)$

$-9x-21y=39$

$49x+21y=161$

$40x+0=200$

$40x=200$

$\frac{40x}{40}=\frac{200}{40}$

$x=5$

$3x+7y=-13$

$3(5)+7y=-13$

$15+7y=-13$

$15+7y-15=-13-15$

$7y=-28$

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

$y=-4$

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

(60) Jorge has a total of 50 coins, all of which are either dimes or nickels. The total value of the coins is $4.15. Find the number of each type of coin.

Let x = nickels,
y = dimes

$$x + y = 50$$
$$.05x + .10y = 4.15$$

$$\begin{pmatrix} x + y = 50 \\ .05x + .10y = 4.15 \end{pmatrix} \begin{pmatrix} -.10 \\ 1 \end{pmatrix}$$

$$-.10x - .10y = -5$$
$$.05x + .10y = 4.15$$

$$-.05x + 0 = -.85$$
$$-.05x = -.85$$
$$\frac{-.05x}{-.05} = \frac{-.85}{-.05}$$
$$x = 17$$

$$x + y = 50$$
$$17 + y = 50$$
$$17 + y - 17 = 50 - 17$$
$$y = 33$$

$(x, y) = (17, 33)$

there are 17 nickels
there are 33 dimes

61. Devon purchased tickets to an air show for 8 adults and 2 children. The total cost was $158. The cost of a childs ticket was $6 less than the cost of an adults ticket. Find the price of an adults ticket and a childs ticket.

$8A + 2C = 158$

$C = A - 6$

subst

$8A + 2(A-6) = 158$

$8A + 2A - 12 = 158$

$10A - 12 = 158$

$10A - 12 + 12 = 158 + 12$

$10A = 170$

$\frac{10A}{10} = \frac{170}{10}$

$A = 17$

$C = A - 6$

$C = 17 - 6$

$C = 11$

$(A, C) = (17, 11)$

Adult tickets are $17

Childrens tickets are $11

62. University Theater sold 579 tickets for a play. Tickets cost $22 per adult and $11 per senior citizen. If total receipts were $8503, how many senior citizen tickets were sold?

Let A = adult tickets
Let C = Senior citizen tickets

$A + C = 579$

$22A + 11C = 8503$

$\begin{pmatrix} A+C = 579 \\ 22A+11C = 8503 \end{pmatrix} \begin{matrix} (-11) \\ (1) \end{matrix}$

$-11A - 11C = -6369$

$22A + 11C = 8503$

$11A + 0 = 2134$

$11A = 2134$

$\frac{11A}{11} = \frac{2134}{11}$

$A = 194$

194 adult tickets

$A + C = 579$

$194 + C = 579$

$194 + C - 194 = 579 - 194$

$C = 385$

385 Senior citizen tickets

$(A, C) = (194, 385)$

63. A vendor sells hot dogs and bags of potato chips. A customer buys 3 hot dogs and 5 bags of potato chips for $13.00. Another customer buys 5 hot dogs and 2 bags of potato chips for $13.75. Find the cost of each item.

$3H + 5B = 13.00$

$5H + 2B = 13.75$

$(3H + 5B = 13.00)(-2)$

$(5H + 2B = 13.75)(5)$

$-6H - 10B = -26.00$

$25H + 10B = 68.75$

$19H + 0 = 42.75$

$19H = 42.75$

$\frac{19H}{19} = \frac{42.75}{19}$

$H = 2.25$

$\frac{5B}{5} = \frac{6.25}{5}$

$B = 1.25$

$(H, B) = (2.25, 1.25)$

Subs

$3H + 5B = 13.00$

$3(2.25) + 5B = 13.00$

$6.75 + 5B = 13.00$

$6.75 + 5B - 6.75 = 13.00 - 6.75$

$5B = 6.25$

$2.25 for a hot dog

$1.25 for a bag of potato chips

(64) $(4x^3y^3)^2 =$

$(4^1x^3y^3)^2 =$

$4^{1(2)} \quad x^{3(2)} \quad y^{3(2)} =$

$4^2x^6y^6 =$

$(4)(4)x^6y^6 =$

$16x^6y^6 =$

(65) $\dfrac{45m^3n^7}{9m^2n^5} =$

$\dfrac{(5)(9)m^{3-2}n^{7-5}}{(9)} =$

$5m^1n^2 =$

$5mn^2 =$

(66.) $7x^3(-2x^2) =$

$-14x^{3+2} =$ add powers

$-14x^5 =$

(67.) $(a+8)(a+1) =$

$a^2+1a+8a+8 =$

$a^2+9a+8 =$

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

$x^2 - 6x - 4x + 24 =$

$x^2 - 10x + 24 =$

(69) $(9z+11)^2 =$

$(9z+11)(9z+11) =$

$81z^2 + 99z + 99z + 121 =$

$81z^2 + 198z + 121$

70. $(x+12)(x^3+2x-5) =$

$x^4+2x^2-5x+12x^3+24x-60=$

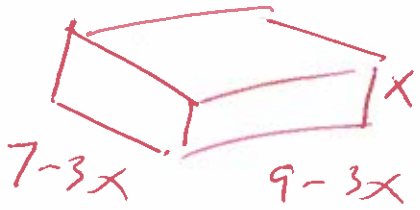
$x^4+12x^3+2x^2+19x-60=$

71. $(8x-1)(x^2-3x+1) =$

$8x^3-24x^2+8x-1x^2+3x-1=$

$8x^3-25x^2+11x-1=$

(72) Find Volume



$V = LWH$

$V = (7-3x)(9-3x)(x)$

$V = (63 - 21x - 27x + 9x^2)(x)$

$V = (63 - 48x + 9x^2)(x)$

$V = 63x - 48x^2 + 9x^3$

$V = 9x^3 - 48x^2 + 63x$

(73.) $(3a-7)^2 =$

$(3a-7)(3a-7) =$

$9a^2 - 21a - 21a + 49 =$

$9a^2 - 42a + 49 =$

(74.) $(a-1)(a+1) =$

$a^2 + 1a - 1a - 1 =$

$a^2 - 1 =$

(75.) $\dfrac{2^{-7}\, x^{-5}\, y^3}{2^{-4}\, x^{-8}\, y^6} =$

$\dfrac{2^4 x^8 y^3}{2^7 x^5 y^6} =$ reuriti

$\dfrac{x^{8-5}}{2^{7-4}\, y^{6-3}} =$

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

$\dfrac{x^3}{(2)(2)(2)\, y^3} =$

$\dfrac{x^3}{8 y^3} =$

(76) $\frac{-12x^{10} - 9x^7}{-3x^4}$ Simplify

$\frac{-12x^{10}}{-3x^4} - \frac{9x^7}{-3x^4} =$

$4x^{10-4} + 3x^{7-4} =$

$4x^6 + 3x^3 =$

(77) Factor

$30x + 10 =$

$10(3x + 1) =$

78 $21x^3 - 6x^2 + 12x =$ factor

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

79. $20x^4y + 36xy^3 =$

$20x^4y^1 + 36x^1y^3 =$ factor

$4x^1y^1(5x^3 + 9y^2) =$

factor by grouping

(80) $2x+2y+xy+12y=$

$(2x+2y)+(xy+12y)=$

$2(x+12)+y(x+12)=$

$(x+12)(2+y)=$

factor by grouping

(81) $xy+11x-8y-88=$

$(xy+11x)+(-8y-88)=$

$x(y+11)-8(y+11)=$

$(y+11)(x-8)=$

Factor

82. $x^2 - x - 42 =$

Possibly
42 · 1
21 · 2
6 · 7

$(x+6)(x-7) =$

Factor

83. $x^2 + x - 30 =$

Possibly
30 · 1
15 · 2
10 · 3
6 · 5

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

Factor

(84) $x^2 - 3x - 88 =$

$(x+8)(x-11) =$

Possible

88.1
44.2
22.4
11.8

Factor

(85.) $3x - 10 + x^2 =$

$x^2 + 3x - 10 =$

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

Possible

10.1
2.5

86. Factor $t^2 - 121 =$

$(t)^2 - (11)^2 =$

$(t+11)(t-11) =$

formula

$a^2 - b^2 =$

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

87. Factor $81x^2 - 49 =$

$(9x)^2 - (7)^2 =$

$(9x+7)(9x-7) =$

formula

$a^2 - b^2$

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

88 Solve

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

Let $x-6=0$ OR $x+4=0$

$x-6+6=0+6$ OR $x+4-4=0-4$

$x=6$ OR $x=-4$

---

89. Solve

$(2x+1)(5x-3)=0$

Let $2x+1=0$ OR $5x-3=0$

$2x+1-1=0-1$ OR $5x-3+3=0+3$

$2x=-1$ OR $5x=3$

$\frac{2x}{2}=\frac{-1}{2}$ OR $\frac{5x}{5}=\frac{3}{5}$

$x=-\frac{1}{2}$ OR $x=\frac{3}{5}$

(9) Solve

$x^2 + 2x - 80 = 0$

$(x-8)(x+10) = 0$

$x - 8 = 0$ or $x + 10 = 0$

$x - 8 + 8 = 0 + 8$ or $x + 10 - 10 = 0 - 10$

$x = 8$ or $x = -10$

80.1
40.2
20.4
10 8

Possible

(9.) Solve

$x^2 - 7x - 18 = 0$

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

$x + 2 = 0$ or $x - 9 = 0$

$x + 2 - 2 = 0 - 2$ or $x - 9 + 9 = 0 + 9$

$x = -2$ or $x = 9$

Possible

18.1
9.2
6,3

92. $x^2 + 8x + 12 = 0$

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

Let $x+2=0$ or $x+6=0$

$x+2-2 = 0-2$ OR $x+6-6 = 0-6$

$x = -2$ or $x = -6$

12.1
6.2 Possible
3.4

SOLVE

93. $x^2 - x = 72$

$x^2 - x - 72 = 72 - 72$

$x^2 - x - 72 = 0$

$(x+8)(x-9) = 0$

Let $x+8=0$ or $x-9=0$

$x+8-8 = 0-8$ OR $x-9+9 = 0+9$

$x = -8$ OR $x = 9$

72.1
36.2
18.4
9.8 Possible

Solve

94. $2x^2 - 7x - 9 = 0$

2.1

9.1
3.3
possible

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

so $2x - 9 = 0$ OR $x + 1 = 0$

$2x - 9 + 9 = 0 + 9$ OR $x + 1 - 1 = 0 - 1$

$2x = 9$ OR $x = -1$

$\frac{2x}{2} = \frac{9}{2}$

$x = \frac{9}{2}$

Solve

95. $15x^2 - 8x = 0$

$x(15x - 8) = 0$

so $x = 0$ OR $15x - 8 = 0$

OR $15x - 8 + 8 = 0 + 8$

$15x = 8$

$\frac{15x}{15} = \frac{8}{15}$

$x = \frac{8}{15}$

Solve

96) $3x^2+21x+36=0$

$3(x^2+7x+12)=0$

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

$3=0$ ~~$\neq 0$~~ or $x+3=0$ or $x+4=0$

$x+3-3=0-3$ or $x+4-4=0-4$

$x=-3$ or $x=-4$

12.1
6.2
3,4
Possible

Solve

97) $10x^3+70x^2+120x=0$

$10x(x^2+7x+12)=0$

$10x(x+3)(x+4)=0$

$10x=0$ or $x+3=0$ or $x+4=0$

$\frac{10x}{10}=\frac{0}{10}$ or $x+3-3=0-3$ or $x+4-4=0-4$

$x=0$ or $x=-3$ or $x=-4$

12.1
6.2
3,4
Possible

(98) $9x^3 - 16x = 0$ Solve

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

$x(9x^2 - 16) = 0$

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

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

$x = 0$ or $3x+4 = 0$ or $3x-4 = 0$

$3x+4-4 = 0-4$ or $3x-4+4 = 0+4$

$3x = -4$ or $3x = 4$

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

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

---

(99) $\frac{z^3}{20z^1} \cdot \frac{5}{2z^2} =$ Simplify

$\frac{5z^3}{40z^{1+2}} =$

$\frac{5z^3}{40z^3} =$

$\frac{(1)(5)z^3}{(8)(5)z^3} =$

$\frac{1}{8} =$

100 $\frac{2y}{4y+2} \cdot \frac{10y+5}{7} =$ Simplify

$\frac{2y}{2(2y+1)} \cdot \frac{5(2y+1)}{7} =$

$\frac{\cancel{2y}}{\cancel{2(2y+1)}} \cdot \frac{5(\cancel{2y+1})}{7} =$

$\frac{5y}{7} =$

101. $\frac{2x^{13}}{7x^6} \div \frac{4x}{14x^3} =$ Simplify

$\frac{2x^{13}}{7x^6} \cdot \frac{14x^3}{4x^1} =$ rewrite

$\frac{(2)(14)\,x^{13+3}}{(7)(4)\,x^{6+1}} =$

$\frac{(2)(2)(7)\,x^{16}}{(7)(2)(2)\,x^7} =$

$\frac{(\cancel{2})(\cancel{2})(\cancel{7})\,x^{16}}{(\cancel{7})(\cancel{2})(\cancel{2})\,x^7} =$

$\frac{x^{16}}{x^7} =$

$x^{16-7} =$

$x^9 =$

(102) $\frac{x^2-y^2}{x+y} \div \frac{x}{x^2-xy} =$ Simplify

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

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

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

$(x-y)(x-y) =$

$(x-y)^2 =$

(103) $\frac{x^2-8x}{x-6} + \frac{12}{x-6} =$ Simplify

Possible
12·1
6·2
3·4

$\frac{(x^2-8x)+(12)}{x-6} =$

$\frac{x^2-8x+12}{x-6} =$

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

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

$x-2 =$

(104) Graph

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

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

$f(0) = 0 + 2$

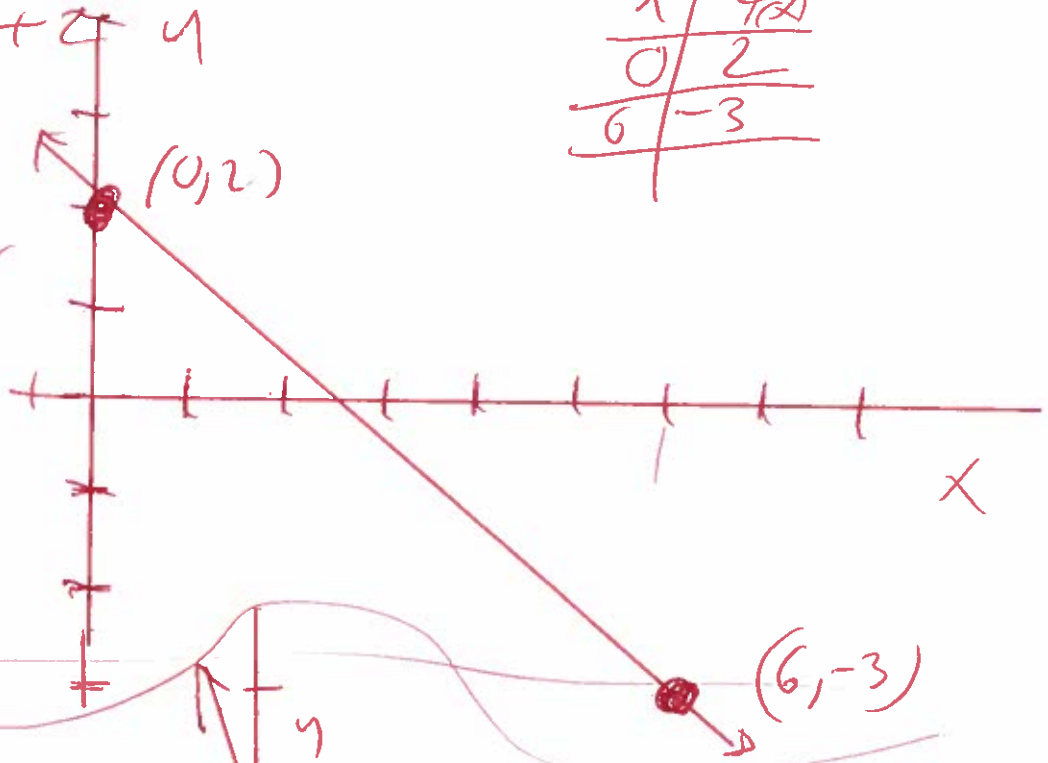
$f(0) = 2$

$f(6) = -\frac{5}{6}(6) + 2$

$f(6) = -5 + 2$

$f(6) = -3$

x	f(x)
0	2
6	-3



(105) Graph

$f(x) = -3x + 9$

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

$f(0) = 0 + 9$

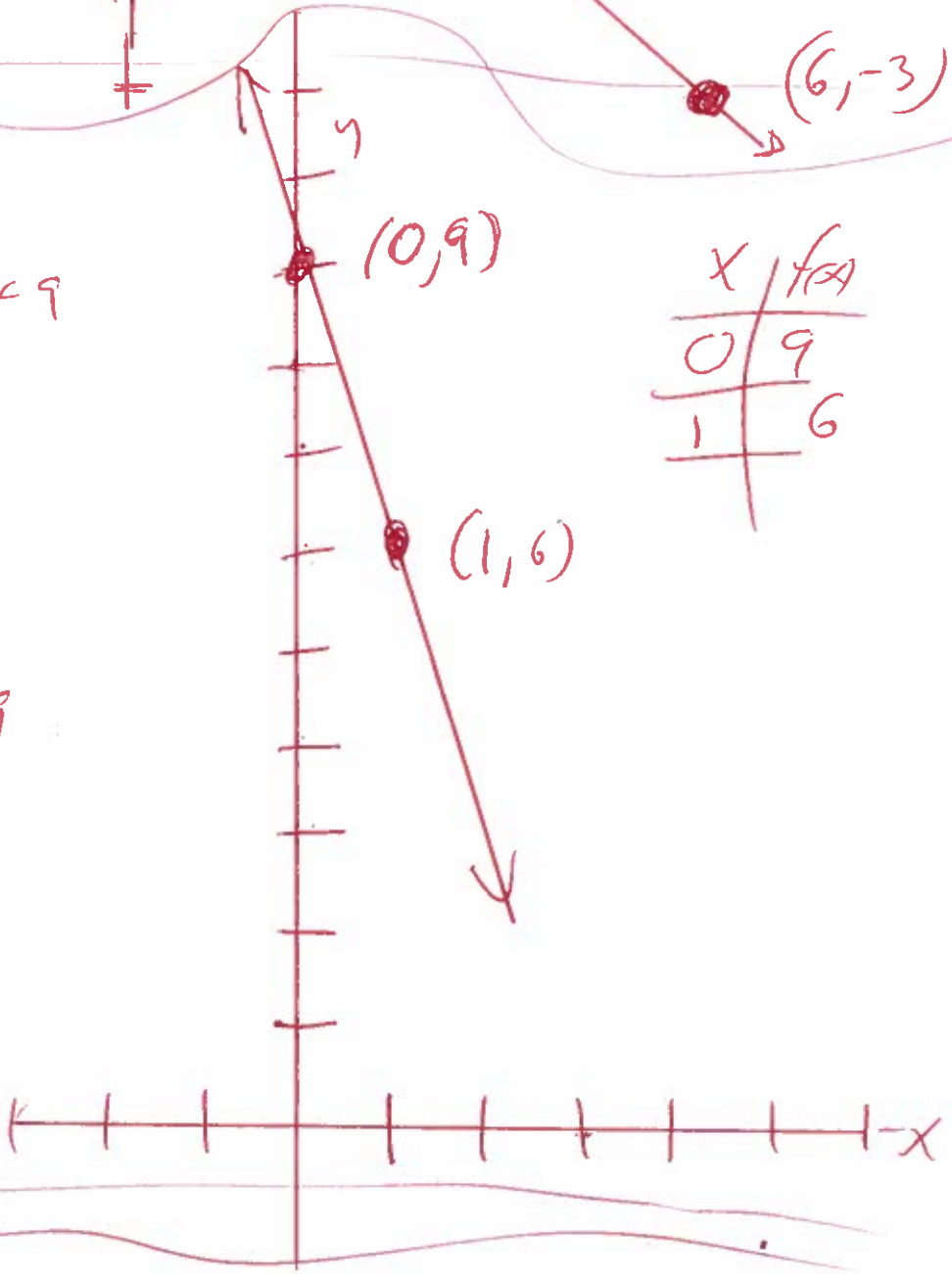
$f(0) = 9$

$f(1) = -3(1) + 9$

$f(1) = -3 + 9$

$f(1) = 6$

x	f(x)
0	9
1	6



(106) Find the equation of the line through (8, 5) parallel to $f(x) = 5x - 6$

point = $(8, 5)$, x_1, y_1

Slope = $m = 5$ ← to be parallel must be same slope

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

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

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

$y - 5 = 5x - 40$

$y - 5 + 5 = 5x - 40 + 5$

$y = 5x - 35$

(107) Find the equation of the line through (2, 4) perpendicular to $f(x) = -3x + 4$

point = $(2, 4)$, x_1, y_1

Slope = $m = \frac{1}{3}$ ← to be perpendicular

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

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

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

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

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

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

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

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

$y = \frac{1}{3}x + \frac{10}{3}$

(108) Graph

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

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

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

$f(-1) = 1 + 5$

$f(-1) = 6$

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

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

$f(0) = 0 + 5$

$f(0) = 5$

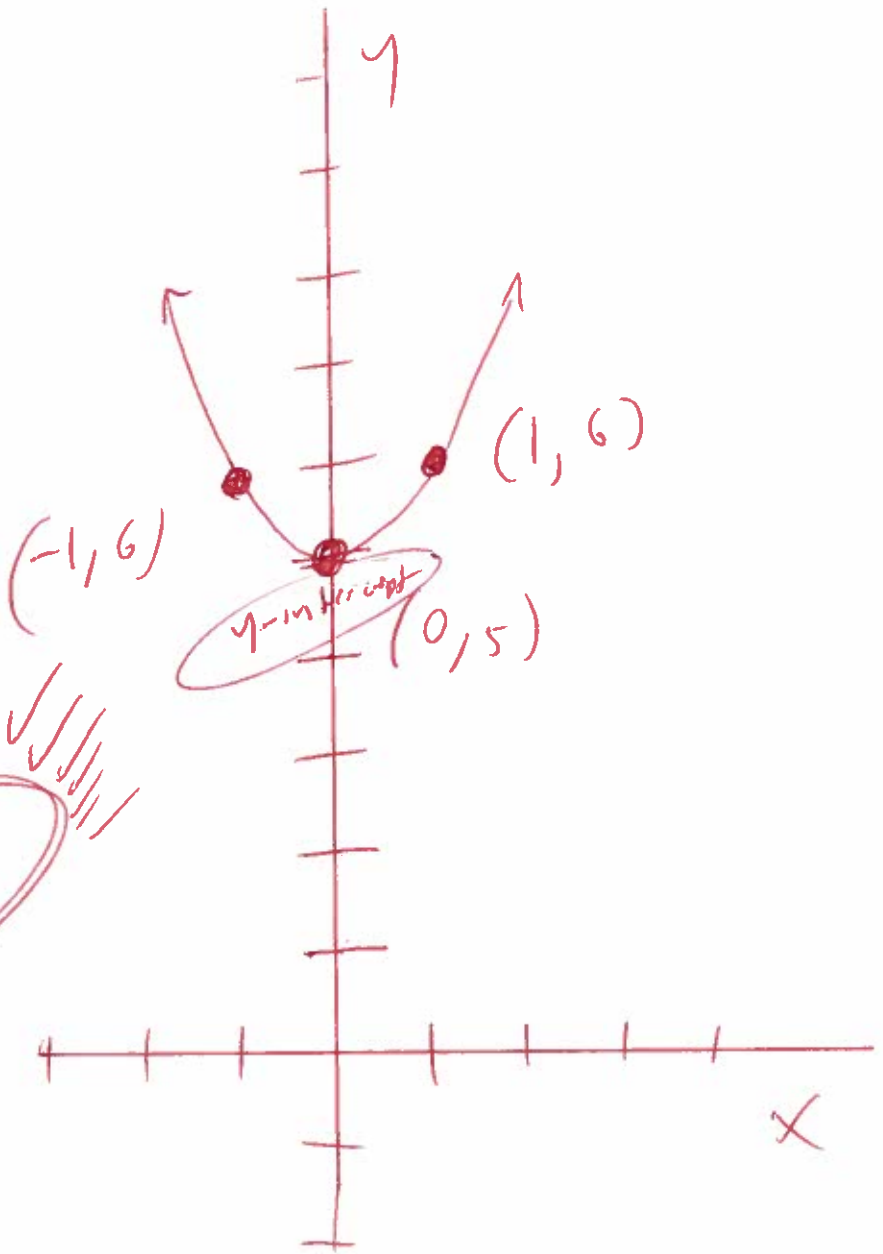
$f(1) = (1)^2 + 5$

$f(1) = (1)(1) + 5$

$f(1) = 1 + 5$

$f(1) = 6$

x	f(x)
-1	6
0	5
1	6



NO x-intercept

(10) Graph

$f(x) = \sqrt{x} + 5$

x	f(x)
0	5
1	6
4	7
9	8

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

$f(0) = 0 + 5$

$f(0) = 5$

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

$f(1) = 1 + 5$

$f(1) = 6$

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

$f(4) = 2 + 5$

$f(4) = 7$

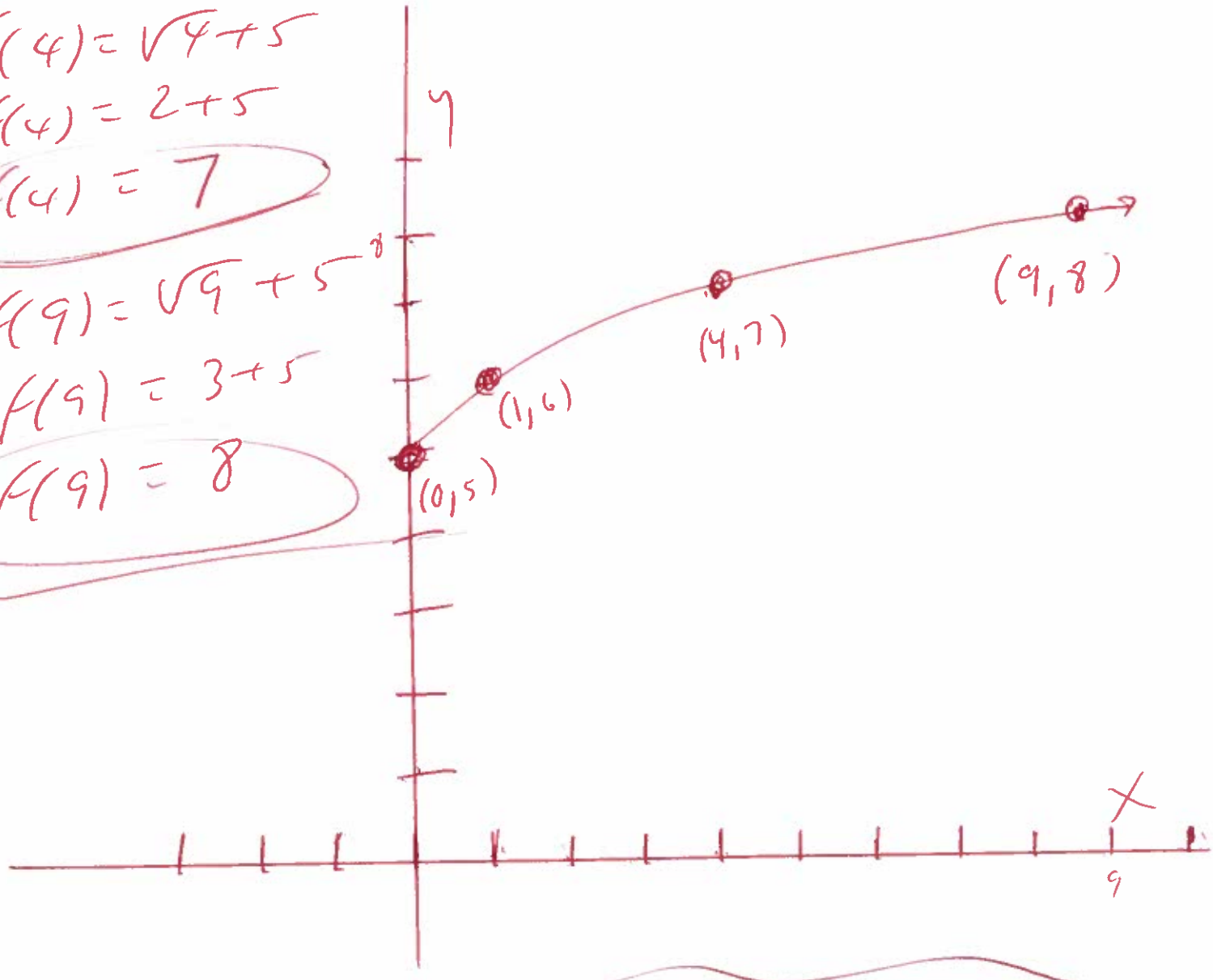
$f(9) = \sqrt{9} + 5$

$f(9) = 3 + 5$

$f(9) = 8$

Domain $[0, \infty)$

range $[5, \infty)$



(10) Graph

$f(x) = -x^2$

x	f(x)
-1	-1
0	0
1	-1

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

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

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

$f(-1) = -1$

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

$f(0) = -(0)(0)$

$f(0) = -(0)$

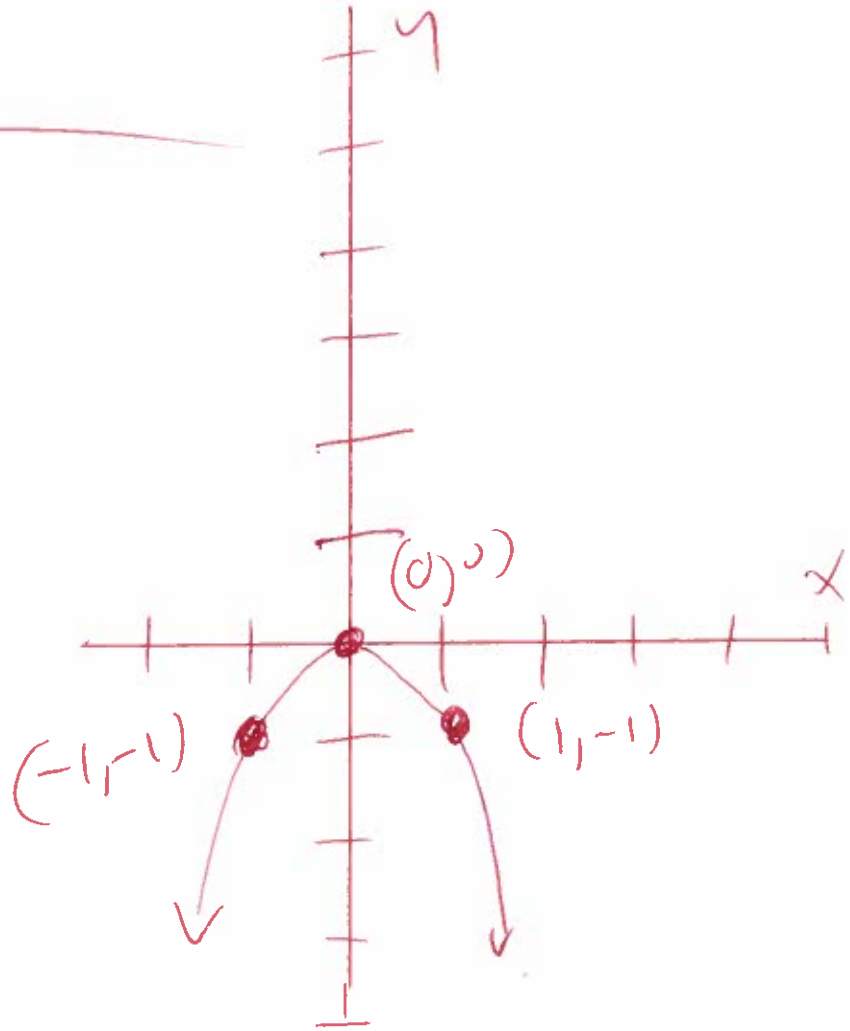
$f(0) = 0$

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

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

$f(1) = -(1)$

$f(1) = -1$



(11.) If y varies directly as x, find the direct variation equation for the situation.

$y = 3$ when $x = 21$

$y = kx$ direct variation

$3 = k(21)$

$3 = 21k$

$\frac{3}{21} = \frac{21k}{21}$

$\frac{3(1)}{3(7)} = k$

$\frac{1}{7} = k$

$y = kx$

$y = \frac{1}{7}x$

(12) The amount of water used to take a shower is directly proportional to the amount of time that the shower is in use. A shower lasting 23 minutes requires 18.4 gallons of water. Find the amount of water used in a shower lasting 7 minutes.

Let G = gallons of water
T = time in minutes

$G = kT$

direct variation

$G = 18.4$
$T = 23$

$18.4 = k(23)$

$18.4 = 23k$

$\frac{18.4}{23} = \frac{23k}{23}$

$.8 = k$

$G = .8T$ new

$G = .8(7)$ $T = 7$

$G = 5.6$ find G

5.6 gallons of water

(113) $13 \le 4t + 5 \le 29$

$13 - 5 \le 4t + 5 - 5 \le 29 - 5$

$8 \le 4t \le 24$

$\frac{8}{4} \le \frac{4t}{4} \le \frac{24}{4}$

$2 \le t \le 6$

$[2, 6]$

---

(114) $|x+3| = 6$

Formula
$|x| = a$
$x = -a$ or $x = a$

$x+3 = -6$ or $x+3 = 6$

$x+3-3 = -6-3$ or $x+3-3 = 6-3$

$x = -9$ or $x = 3$

(115.) $|x+18| < 9$

$-9 < x+18 < 9$

$-9-18 < x+18-18 < 9-18$

$-27 < x < -9$

$(-27, -9)$

$|x| < a$

$-a < x < a$

(116.) $|x+3| > 4$

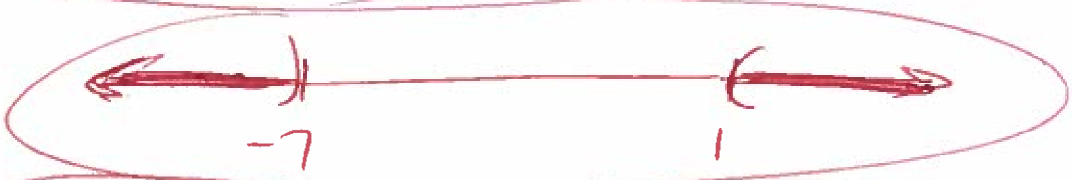
$|x| > a$

$x < -a$ or $x > a$

$x+3 < -4$ or $x+3 > 4$

$x+3-3 < -4-3$ OR $x+3-3 > 4-3$

$x < -7$ OR $x > 1$



$(-\infty, -7) \cup (1, \infty)$

(117) determine whether the ordered pair given is a solution of the linear inequality in two variables.

$2x+3y \leq -6 \qquad (3,4)$

$x \quad y$

$2(3)+3(4) \leq -6$

$6+12 \leq -6$

$18 \leq -6$ NO

(118) determine whether the ordered pair given is a solution of the linear inequality in two variables.

$x+2y > -3 \qquad (4,-3)$

$x \quad y$

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

$4-6 > -3$

$-2 > -3$ yes

(11) Graph

$x + y \leq -2$ ✓

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

$y \leq -2 - x$ ✓

$y \leq -x - 2$

$y = -x - 2$

$y = -(0) - 2$

$y = 0 - 2$

$y = -2$

$y = -(1) - 2$

$y = -1 - 2$

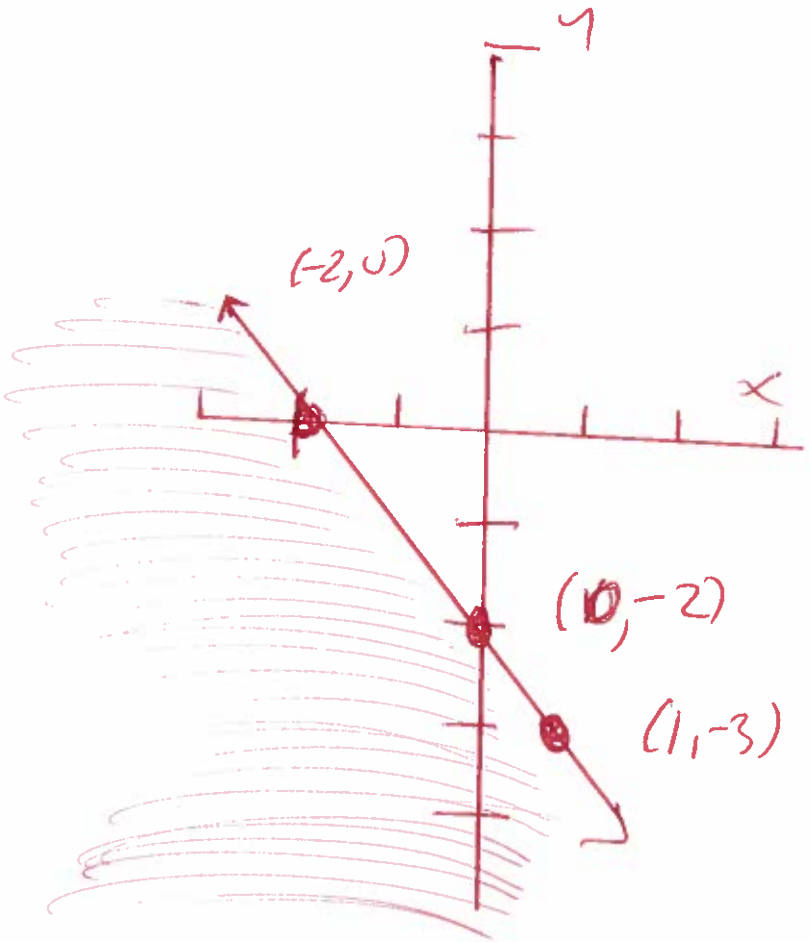
$y = -3$

$y = -(-2) - 2$

$y = 2 - 2$

$y = 0$

x	y
0	-2
1	-3
-2	0



(120) $\sqrt{16x^{10}} =$

$\sqrt[2]{16x^{10}} =$

$4x^{10/2} =$

$4x^5 =$

(121.) $256^{1/4} =$

$(2^8)^{1/4} =$

$(2^{\frac{8}{1}})^{\frac{1}{4}} =$

$2^{\frac{8}{4}} =$

$2^2 =$

$(2)(2) =$

$4 =$

Prime 2, 3, 5, 7

2 | 256
2 | 128
2 | 64
2 | 32
2 | 16
2 | 8
2 | 4
2 | 2
1

(12.) $(243x^{25})^{\frac{1}{5}} =$

$(3^5 x^{25})^{\frac{1}{5}} =$

$(3^{\frac{5}{1}} x^{\frac{25}{1}})^{\frac{1}{5}} =$

$3^{\frac{5}{1}(\frac{1}{5})} x^{\frac{25}{1}(\frac{1}{5})} =$

$3^{\frac{5}{5}} x^{\frac{25}{5}} =$

$3^1 x^5 =$

$3x^5 =$

Prime 2, 3, 5, 7

3 | 243

3 | 81

3 | 27

3 | 9

3 | 3

1

(23.) $\sqrt{20} =$

$\sqrt{4 \cdot 5} =$

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

$2\sqrt{5} =$

Prime 2, 3, 5, 7, 11...

2 | 20
2 | 10
5 | 5
1

(24.) $\sqrt{275} =$

$\sqrt{25 \cdot 11} =$

$\sqrt{25}\sqrt{11} =$

$5\sqrt{11} =$

Prime 2, 3, 5, 7, 11...

5 | 275
5 | 55
11 | 11
1

(125) $\sqrt{320k^7Q^8}$ = Prime 2, 3, 5, 7...

$\sqrt[4]{2^6 \cdot 5^1 k^6 k^1 Q^8}$ = rewrite

$2^{6/2} k^{6/2} Q^{8/2} \sqrt[4]{5^1 k^1}$ =

$2^3 k^3 Q^4 \sqrt[4]{5k}$ =

$(2)(2)(2) k^3 Q^4 \sqrt{5k}$ =

$8k^3Q^4\sqrt{5k}$ =

2	320
2	160
2	80
2	40
2	20
2	10
5	5
	1

(126) $\sqrt[3]{512x^4y^5}$ =

Prime 2, 3, 5, 7...

$\sqrt[3]{2^9 x^4 y^5}$ = rewrite

$\sqrt[3]{2^9 x^3 x^1 y^3 y^2}$ =

$2^{9/3} x^{3/3} y^{3/3} \sqrt[3]{x^1 y^2}$ =

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

$(2)(2)(2)\, xy\sqrt[3]{xy^2}$ =

$8xy\sqrt[3]{xy^2}$ =

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(127) $\sqrt{20} - \sqrt{245} =$

$\sqrt{4 \cdot 5} - \sqrt{49 \cdot 5} =$

$\sqrt{4}\sqrt{5} - \sqrt{49}\sqrt{5} =$

$2\sqrt{5} - 7\sqrt{5} =$

$-5\sqrt{5} =$

prime 2, 3, 5, 7..

2 | 20
2 | 10
5 | 5
1

5 | 245
7 | 49
7 | 7
1

(128) rationalize the denominator

$\frac{\sqrt{5} - \sqrt{6}}{\sqrt{5} + \sqrt{6}} =$

$\left(\frac{\sqrt{5} - \sqrt{6}}{\sqrt{5} + \sqrt{6}}\right)\left(\frac{\sqrt{5} - \sqrt{6}}{\sqrt{5} + \sqrt{6}}\right) =$ mult

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

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

$\frac{5 - 2\sqrt{5}\sqrt{6} + 6}{5 - 6} =$

$\frac{11 - 2\sqrt{5}\sqrt{6}}{-1} =$

$\frac{11 - 2\sqrt{5 \cdot 6}}{-1} =$

$\frac{11 - 2\sqrt{30}}{-1} =$

$\frac{11}{-1} - \frac{2\sqrt{30}}{-1} =$

$-11 + 2\sqrt{30}$

OR

$2\sqrt{30} - 11$

(129.) rationalize the numerator

$$\frac{5+\sqrt{6}}{5-\sqrt{6}} =$$

$$\left(\frac{5+\sqrt{6}}{5-\sqrt{6}}\right)\left(\frac{5-\sqrt{6}}{5-\sqrt{6}}\right) = \text{mult}$$

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

$$\frac{(5)^2 - (\sqrt{6})^2}{(5)^2 - 10\sqrt{6} + (\sqrt{6})^2} =$$

$$\frac{25 - 6}{25 - 10\sqrt{6} + 6} =$$

$$\frac{19}{31 - 10\sqrt{6}} =$$

(130) $\sqrt{x+4} = 8$

$(\sqrt{x+4})^2 = (8)^2$

$x+4 = 64$

$x+4-4 = 64-4$

$x = 60$ ✓

Check

$\sqrt{x+4} = 8$

$\sqrt{(60)+4} = 8$

$\sqrt{60+4} = 8$

$\sqrt{64} = 8$

$8 = 8$ ✓

Good

(131.) $\frac{8+7i}{9-2i} =$

Formula

$i^2 = -1$

$\left(\frac{8+7i}{9-2i}\right)\left(\frac{9+2i}{9+2i}\right) =$ Mult

$\frac{72+16i+63i+14i^2}{81+18i-18i-4i^2} =$

$\frac{72+79i+14i^2}{81-4i^2} =$

$\frac{72+79i+14(-1)}{81-4(-1)} =$

$\frac{72+79i-14}{81+4} =$

$\frac{58+79i}{85} =$

$\frac{58}{85} + \frac{79}{85}i =$

132 $(x-5)^2 = 36$

$\sqrt{(x-5)^2} = \pm\sqrt{36}$

$x-5 = \pm 6$

$x-5 = -6$ OR $x-5 = 6$

$x-5+5 = -6+5$ OR $x-5+5 = 6+5$

$x = -1$ OR $x = 11$

Check

$(x-5)^2 = 36$

$((-1)-5)^2 = 36$

$(-1-5)^2 = 36$

$(-6)^2 = 36$

$(-6)(-6) = 36$

$36 = 36$

Good

$(x-5)^2 = 36$

$((11)-5)^2 = 36$

$(11-5)^2 = 36$

$(6)^2 = 36$

$(6)(6) = 36$

$36 = 36$

Good

Gosh

$x = -1$ OR $x = 11$

(133) Solve by completing the square

$x^2 + 4x - 21 = 0$

$x^2 + 4x - 21 + 21 = 0 + 21$

$x^2 + 4x = 21$

$x^2 + 4x + \left(\frac{1}{2}(4)\right)^2 = 21 + \left(\frac{1}{2}(4)\right)^2$

$x^2 + 4x + (2)^2 = 21 + (2)^2$

$x^2 + 4x + 4 = 21 + 4$

$x^2 + 4x + 4 = 25$

$(x+2)(x+2) = 25$

$(x+2)^2 = 25$

$\sqrt{(x+2)^2} = \pm\sqrt{25}$

$x + 2 = \pm 5$

$x + 2 = -5$ or $x + 2 = 5$

$x + 2 - 2 = -5 - 2$ OR $x + 2 - 2 = 5 - 2$

$x = -7$ or $x = 3$

(134) Solve $x^2 - 2x - 48 = 0$

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

Let $x+6=0$ OR $x-8=0$

$x+6-6=0-6$ OR $x-8+8=0+8$

$x=-6$ OR $x=8$

Russ 69
48.1
24.2
12.4
6.8
3x6

Use Quad formula

$1x^2 - 2x - 48 = 0$

$a=1,\ b=-2,\ c=-48$

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

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-48)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4+192}}{2}$$

$$x = \frac{2 \pm \sqrt{196}}{2}$$

$$x = \frac{2 \pm 14}{2}$$

$$x = \frac{2}{2} \pm \frac{14}{2}$$

$x = 1 \pm 7$

$x = 1-7$ OR $x = 1+7$

$x = -6$ OR $x = 8$

135 Solve

$x^2+24x+144=0$

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

$x+12=0$ or $x+12=0$

$x+12-12=0-12$ OR $x+12-12=0-12$

$x=-12$ or $x=-12$

{-12}

OR

Use Quadratic formula

$1x^2+24x+144=0$

$a=1,\ b=24,\ c=144$

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

$$x=\frac{-(24)\pm\sqrt{(24)^2-4(1)(144)}}{2(1)}$$

$$x=\frac{-24\pm\sqrt{576-576}}{2}$$

$$x=\frac{-24\pm\sqrt{0}}{2}$$

$$x=\frac{-24\pm0}{2}$$

$$x=\frac{-24+0}{2} \text{ or } x=\frac{-24-0}{2}$$

$$x=\frac{-24}{2} \text{ or } x=\frac{-24}{2}$$

$x=-12$ OR $x=-12$

(16) $1x^2+18x+70=0$ use Quad formula

$a=1,\ b=18,\ c=70$

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

$$x=\frac{-(18)\pm\sqrt{(18)^2-4(1)(70)}}{2(1)}$$

$$x=\frac{-18\pm\sqrt{324-280}}{2}$$

$$x=\frac{-18\pm\sqrt{44}}{2}$$

$$x=\frac{-18\pm\sqrt{\ }}{2}$$

$$x=\frac{-18\pm\sqrt{4\cdot 11}}{2}$$

$$x=\frac{-18\pm\sqrt{4}\sqrt{11}}{2}$$

$$x=\frac{-18\pm 2\sqrt{11}}{2}$$

$$x=-9\pm 1\sqrt{11}$$

$$x=-9\pm\sqrt{11}$$

$x=-9-\sqrt{11}$ OR $x=-9+\sqrt{11}$

Prime 2, 3, 5, 7, 11

2 | 44

2 | 22

11 | 11

1

(37.) $1x^2 - 8x + 20 = 0$ use Quad form

$a = 1, \; b = -8, \; c = 20$

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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(20)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 80}}{2}$$

$$x = \frac{8 \pm \sqrt{-16}}{2}$$

$$x = \frac{8 \pm 4i}{2}$$

$$x = 4 \pm 2i$$

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

(138) $2x^2 - 7x - 9 = 0$

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

set $2x - 9 = 0$ OR $x + 1 = 0$

$2x - 9 + 9 = 0 + 9$ OR $x + 1 - 1 = 0 - 1$

$2x = 9$ OR $x = -1$

$\frac{2x}{2} = \frac{9}{2}$

$x = \frac{9}{2}$ OR

use Quad formula

$2x^2 - 7x - 9 = 0$

$a = 2,\ b = -7,\ c = -9$

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

$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-9)}}{2(2)}$

$x = \frac{7 \pm \sqrt{49 + 72}}{4}$

$x = \frac{7 \pm \sqrt{121}}{4}$

$x = \frac{7 \pm 11}{4}$

$x = \frac{7+11}{4}$ or $x = \frac{7-11}{4}$

$x = \frac{18}{4}$ or $x = \frac{-4}{4}$

$x = \frac{\cancel{2}(9)}{\cancel{2}(2)}$ OR $x = \frac{-4}{4}$

$x = \frac{9}{2}$ or $x = -1$

(13?) $5x^2 + 12x = -6$ Use Quick formula

$5x^2 + 12x + 6 = -6 + 6$

$5x^2 + 12x + 6 = 0$

Can not be factored must use Quadratic formula or complete square

$a = 5,\ b = 12,\ c = 6$

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

$$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(5)(6)}}{2(5)}$$

$$x = \frac{-12 \pm \sqrt{144 - 120}}{10}$$

$$x = \frac{-12 \pm \sqrt{24}}{10}$$

$$x = \frac{-12 \pm \sqrt{4 \cdot 6}}{10}$$

$$x = \frac{-12 \pm \sqrt{4}\sqrt{6}}{10}$$

$$x = \frac{-12 \pm 2\sqrt{6}}{10}$$

$$x = \frac{2(-6 \pm \sqrt{6})}{2(5)}$$

$$x = \frac{-6 \pm \sqrt{6}}{5}$$

Primes 2, 3, 5, 7..

2 | 24
2 | 12
2 | 6
3 | 3
1

$$x = \frac{-6 \pm \sqrt{6}}{5}$$

$x = \frac{-6 - \sqrt{6}}{5}$ OR $x = \frac{-6 + \sqrt{6}}{5}$

(14) graph $f(x) = x^2 - 4$

Find Zeros

$x^2 - 4 = 0$

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

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

$x+2 = 0 \quad x-2 = 0$

$x+2-2 = 0-2 \quad x-2+2 = 0+2$

$x = -2 \quad x = 2$

Zeros at $x = -2$, $x = 2$

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

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

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

$f(-2) = 4 - 4$

$f(-2) = 0$

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

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

$f(-1) = 1 - 4$

$f(-1) = -3$

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

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

$f(0) = 0 - 4$

$f(0) = -4$

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

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

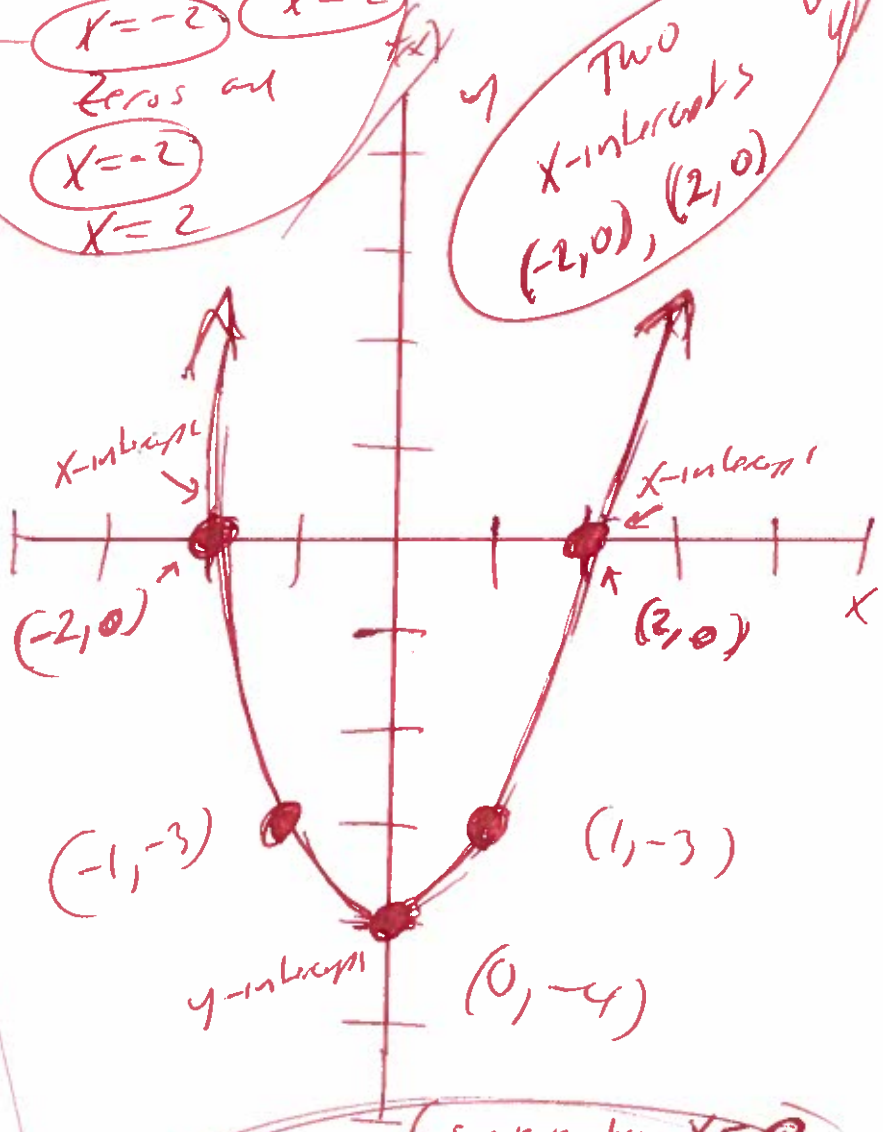
$f(1) = 1 - 4$

$f(1) = -3$

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

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

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



Two x-intercepts $(-2,0)$, $(2,0)$

axis of symmetry $x = 0$

Vertex $= (0, -4)$

axis $x = -4$

~~Contain all real~~ Number

range $y \geq -4$

(141.) graph

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

x	f(x)
-6	1
-5	0
-4	1

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

$f(-6) = (-1)^2$

$f(-6) = (-1)(-1)$

$f(-6) = 1$

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

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

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

$f(-5) = 0$

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

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

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

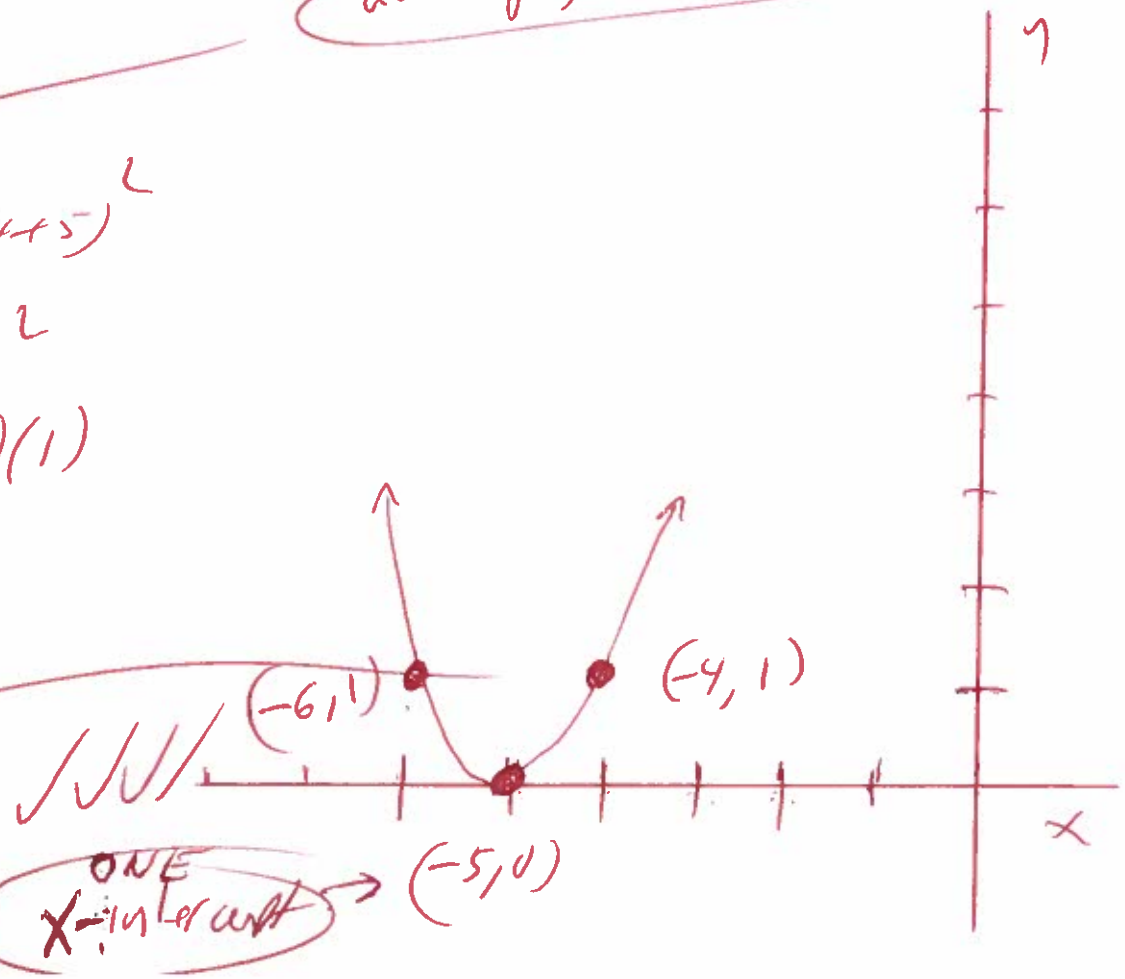
$f(-4) = 1$

domain all real numbers

range $[-5, \infty)$

Vertex $= (-5, 0)$

axis of symmetry $x = -5$



ONE x-intercept → (-5,0)

(14) graph

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

x	f(x)
-7	5
-6	4
-5	5

$f(-7) = (-7+6)^2+4$

$f(-7) = (-1)^2+4$

$f(-7) = (-1)(-1)+4$

$f(-7) = 1+4$

$f(-7) = 5$

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

$f(-6) = (0)^2+4$

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

$f(-6) = 0+4$

$f(-6) = 4$

Vertex = (-6, 4)

axis of symmetry $x = -6$

domain all real number

range $[4, \infty$

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

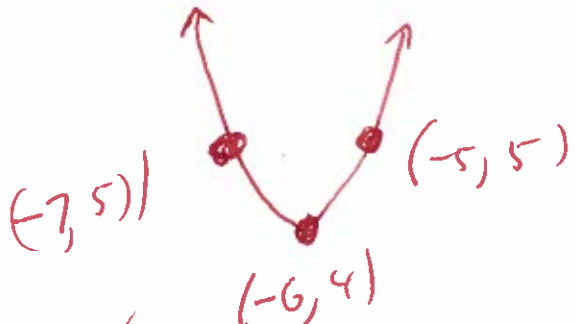
$f(-5) = (1)^2+4$

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

$f(-5) = 1+4$

$f(-5) = 5$

NO X-intercepts



(143) graph

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

x	f(x)
-1	-3
0	0
1	-3

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

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

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

$f(-1) = -3$

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

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

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

$f(0) = 0$

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

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

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

$f(1) = -3$

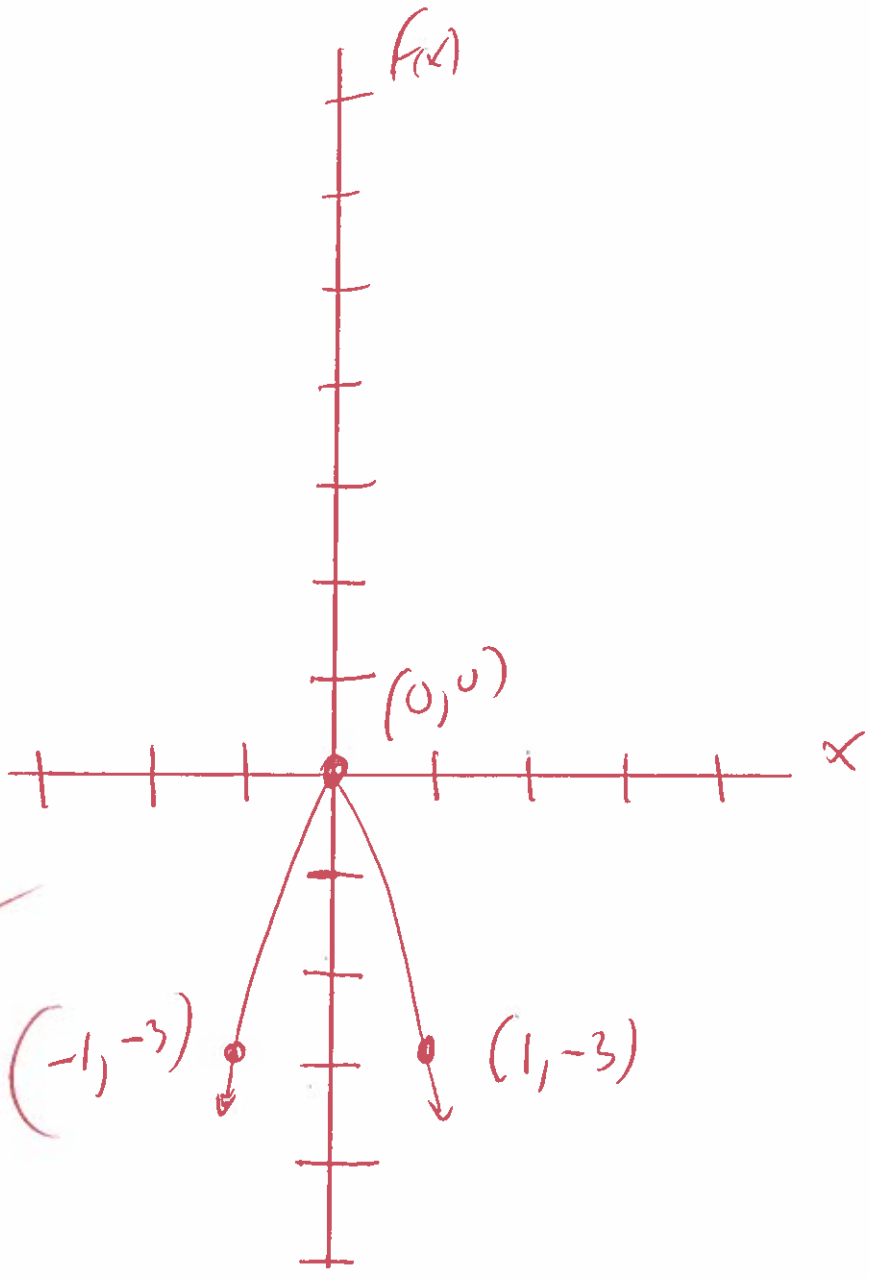
ONE x-intercept (0,0)

Vertex (0,0)

axis of symmetry $x = 0$

domain all real number

range $(-\infty, 0]$



(14) Find Vertex

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

$a = 1,\ b = 6,\ c = -4$

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

$\text{Vertex} = \left(-\frac{(6)}{2(1)},\ f\left(\frac{(6)}{2(1)}\right)\right)$

$\text{Vertex} = \left(\frac{-6}{2},\ f\left(-\frac{6}{2}\right)\right)$

$\text{Vertex} = (-3,\ f(-3))$

$\text{Vertex} = (-3,\ 1(-3)^2 + 6(-3) - 4)$

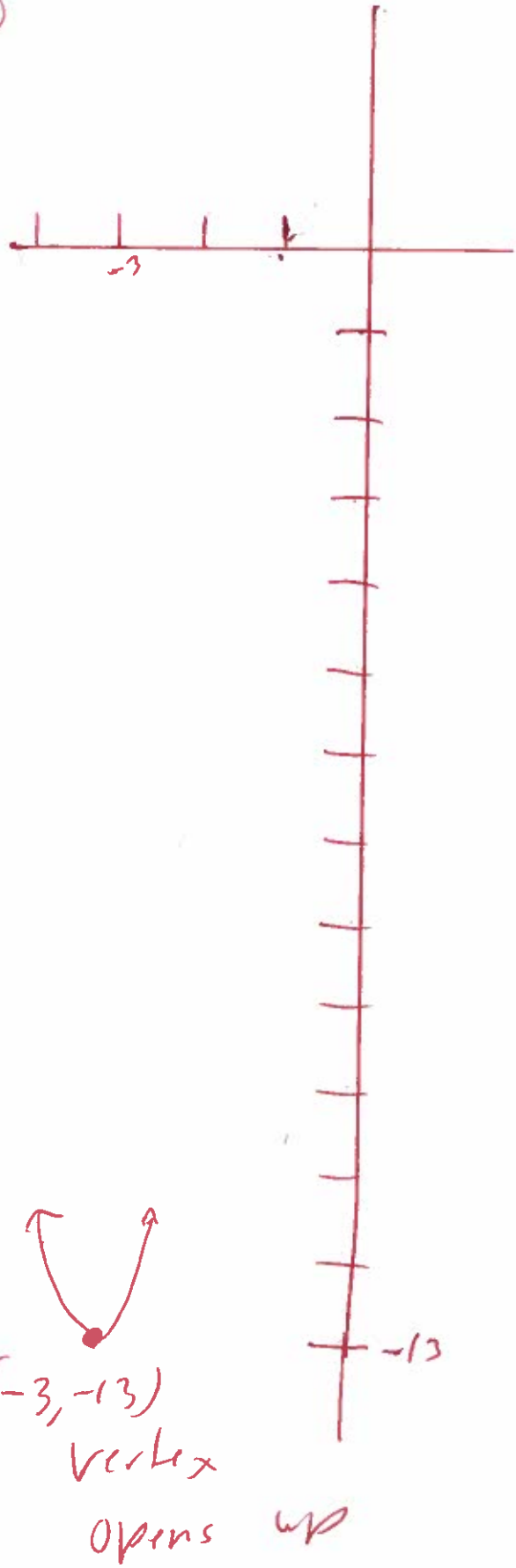
$\text{Vertex} = (-3,\ 1(-3)(-3) + 6(-3) - 4)$

$\text{Vertex} = (-3,\ 1(9) + 6(-3) - 4)$

$\text{Vertex} = (-3,\ 9 - (18 - 4)$

$\text{Vertex} = (-3,\ -9 - 4)$

$\text{Vertex} = (-3, -13)$ //



(-3, -13) Vertex

opens up

Domain all real numbers

Range $[-13, \infty)$

Axis of symmetry $x = -3$

(45) Find Vertex

$f(x) = -x^2 - 10x + 9$

$a = -1 \quad b = -10 \quad c = 9$

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

$\text{Vertex} = \left(-\frac{-(-10)}{2(-1)}, f\frac{-(-10)}{2(-1)}\right)$

$\text{Vertex} = \left(\frac{10}{-2}, f\left(\frac{10}{-2}\right)\right)$

$\text{Vertex} = (-5, f(-5))$

$\text{Vertex} = (-5, -1(-5)^2 - 10(-5) + 9)$

$\text{Vertex} = (-5, -1(-5)(-5) - 10(-5) + 9)$

$\text{Vertex} = (-5, -1(25) - 10(-5) + 9)$

$\text{Vertex} = (-5, -25 + 50 + 9)$

$\text{Vertex} = (-5, 25 + 9)$

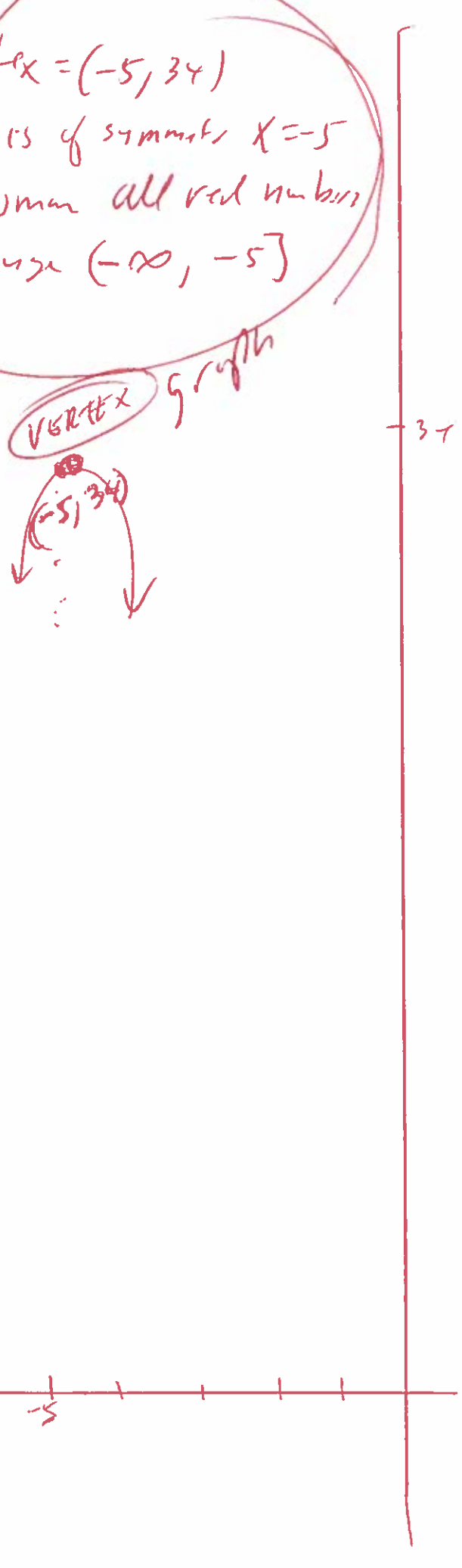
$\text{Vertex} = (-5, 34)$

Vertex $= (-5, 34)$

Axis of symmetry $x = -5$

domain all real numbers

range $(-\infty, -5]$



(146) $f(x) = 7x^2 + 14x - 9$

$a = 7, \quad b = 14, \quad c = -9$

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

$\text{vertex} = \left(\frac{-(14)}{2(7)}, f\left(\frac{(14)}{2(7)}\right)\right)$

$\text{Vertex} = \left(\frac{-14}{14}, f\left(\frac{-14}{14}\right)\right)$

$\text{Vertex} = (-1, f(-1))$

$\text{Vertex} = (-1, 7(-1)^2 + 14(-1) - 9)$

$\text{Vertex} = (-1, 7(-1)(-1) + 14(-1) - 9)$

$\text{Vertex} = (-1, 7(1) + 14(-1) - 9)$

$\text{Vertex} = (-1, 7 - 14 - 9)$

$\text{Vertex} = (-1, -7 - 9)$

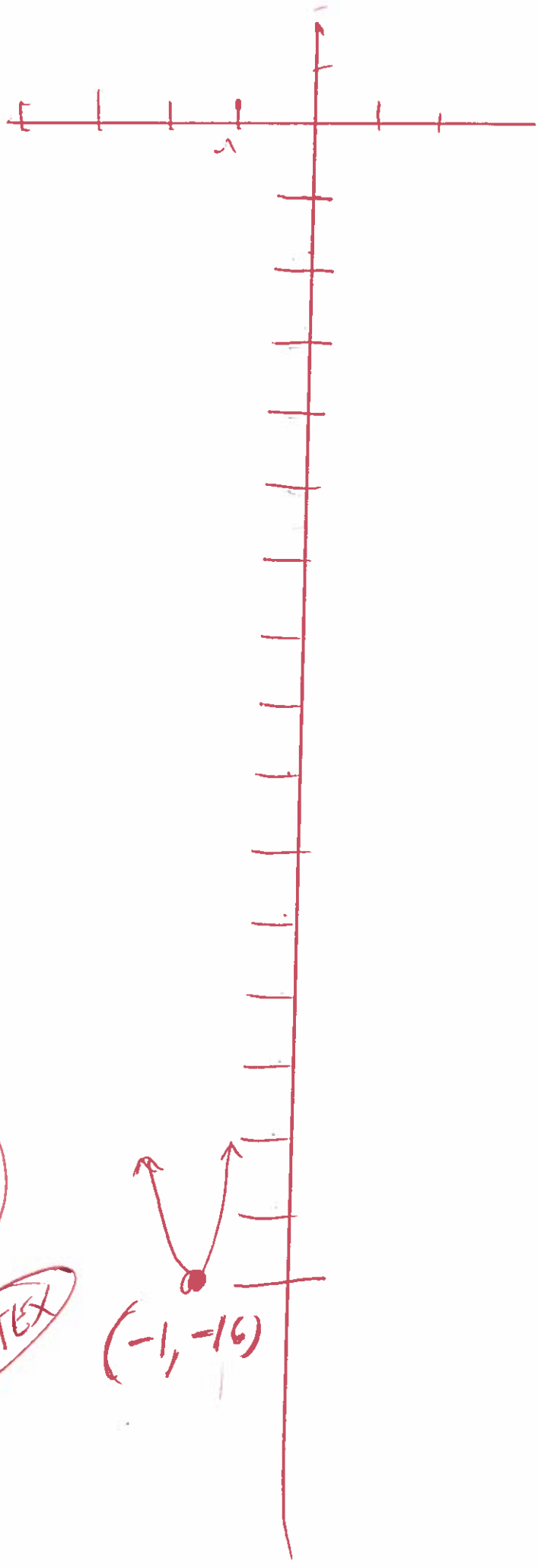
$\text{Vertex} = (-1, -16)$

Vertex $= (-1, -16)$

axis of symmetry $x = -1$

domain all real numbers

range $[-1, \infty)$



VERTEX

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

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

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

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

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

$\text{Vertex} = (-2,\ f(-2))$

$\text{Vertex} = (-2,\ (-2)^2 + 4(-2) - 5)$

$\text{Vertex} = (-2,\ (-2)(-2) + 4(-2) - 5)$

$\text{Vertex} = (-2,\ 4 - 8 - 5)$

$\text{Vertex} = (-2,\ -4 - 5)$

$\text{Vertex} = (-2,\ -9)$

find x-intercept let $y = 0$

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

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

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

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

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

$x = 1$ or $x = -5$ x-intercepts

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

find y-intercept let $x = 0$

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

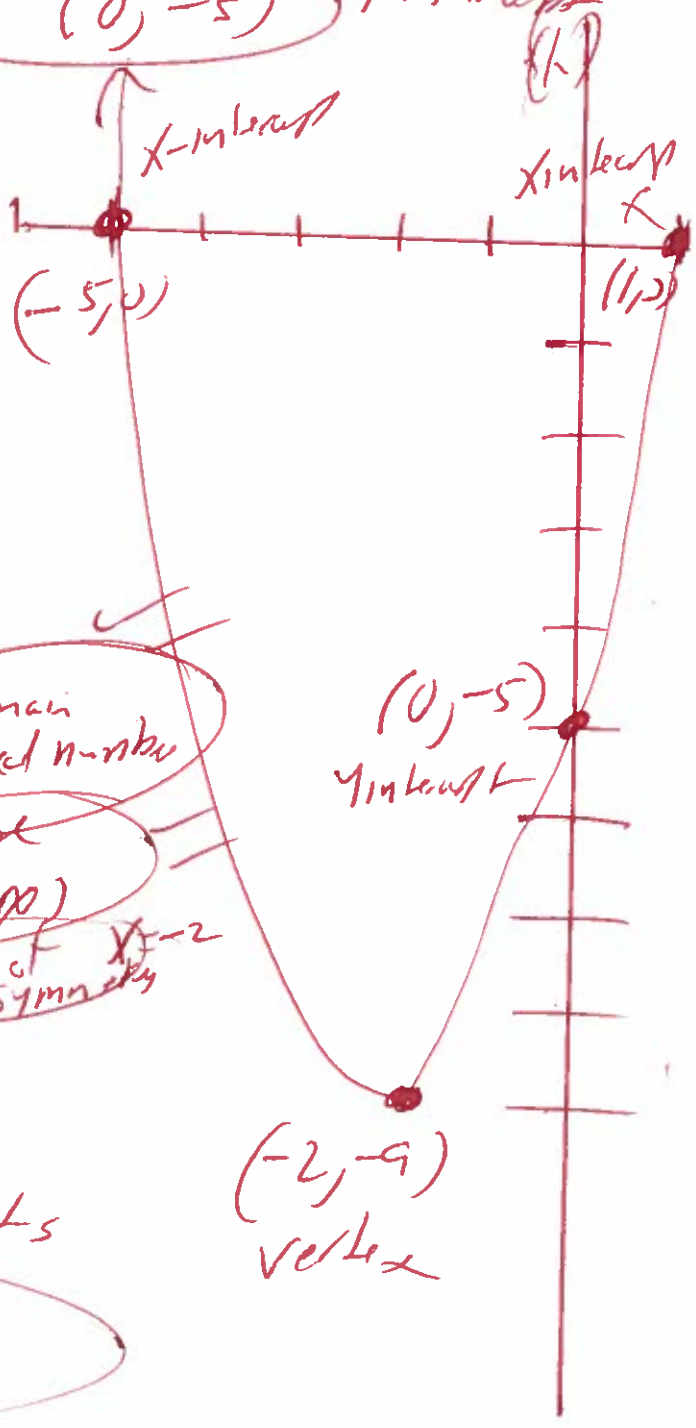
$f(0) = (0)^2 + 4(0) - 5$

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

$= 0 + 0 - 5$

$= -5$

$(0, -5)$ y-intercept



domain
all real numbers

range
$[-9, \infty)$

axis of symmetry $x = -2$

(148) $f(x) = x^2 + 6x + 5$

$a = 1, \quad b = 6, \quad c = 5$

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

$Vertex = \left(\frac{-(6)}{2(1)}, f\left(\frac{-(6)}{2(1)}\right)\right)$

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

$Vertex = (-3, f(-3))$

$Vertex = (-3, (-3)^2 + 6(-3) + 5)$

$Vertex = (-3, (-3)(-3) + 6(-3) + 5)$

$Vertex = (-3, 9 - 18 + 5)$

$Vertex = (-3, -9 + 5)$

$Vertex = (-3, -4)$

Find x-intercept let $y = 0$

$y = f(x) = x^2 + 6x + 5$

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

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

$x + 1 = 0$ or $x + 5 = 0$

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

$x = -1$ or $x = -5$

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

x-intercept

Find y-intercept let $x = 0$

$y = f(x) = x^2 + 6x + 1$

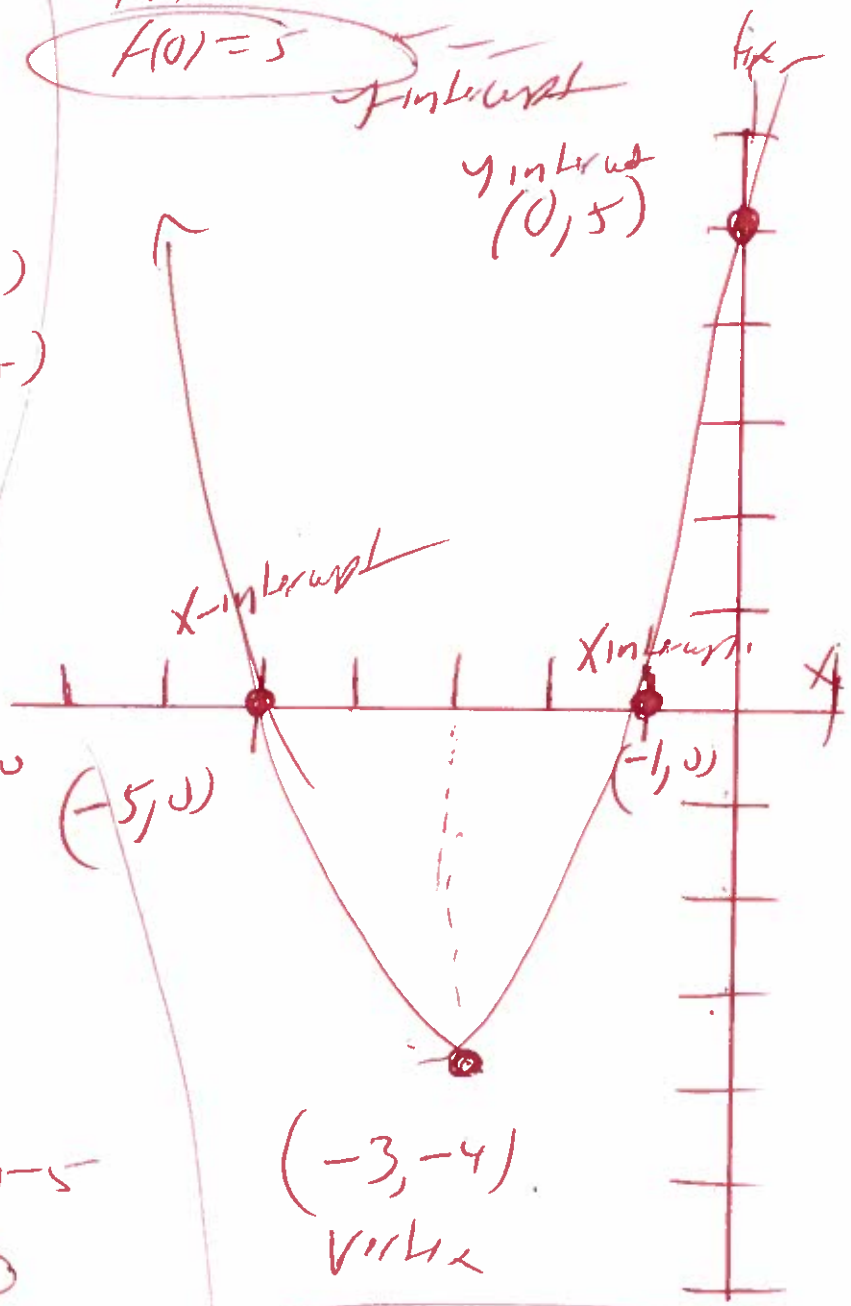
$f(0) = (0)^2 + 6(0) + 5$

$f(0) = (0)(0) + 6(0) + 5$

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

$f(0) = 5$

y-intercept



domain all real numbers
range $[-4, \infty)$
Vertex $(-3, -4)$
axis of symmetry $x = -3$

(149) $f(x) = -1x^2 - 6x - 5$

$a = -1, b = -6, c = -5$

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

Vertex $= \left(-\frac{(-6)}{2(-1)}, f\left(\frac{(-6)}{2(-1)}\right)\right)$

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

Vertex $= (-3, f(-3))$

Vertex $= (-3, -1(-3)^2 - 6(-3) - 5)$

Vertex $= (-3, -1(-3)(-3) - 6(-3) - 5)$

Vertex $= (-3, -1(9) - 6(-3) - 5)$

Vertex $= (-3, -9 + 18 - 5)$

Vertex $= (-3, 9 - 5)$

Vertex $= (-3, 4)$

Find y-intercept let $x = 0$

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

$f(0) = -(0)^2 - 6(0) - 5$

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

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

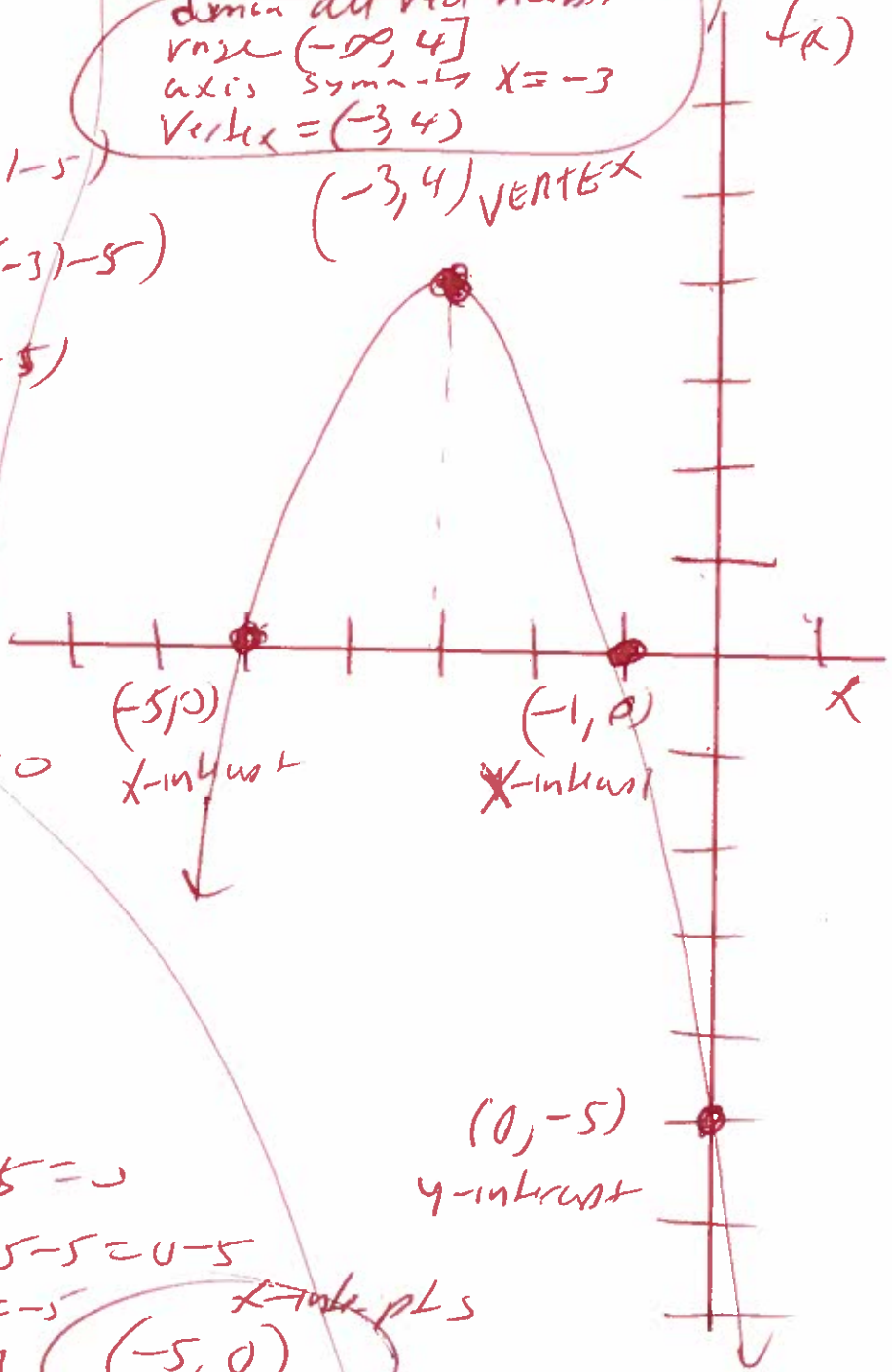
$f(0) = -5$ y-intercept

domain all real numbers

range $(-\infty, 4]$

axis symmetry $x = -3$

Vertex $= (-3, 4)$



Find x-intercept let $y = 0$

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

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

$0 = -1(x^2 + 6x + 5)$

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

$-1 \neq 0$ $x + 1 = 0$ or $x + 5 = 0$

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

$x = -1$ or $x = -5$

$(-1, 0)$ or $(-5, 0)$ x-intercepts

(15) $f(x) = 1x^2 + 6x$

$a = 1,\ b = 6,\ c = 0$

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

$\text{Vertex} = \left(-\frac{(6)}{2(1)},\ f\left(\frac{(6)}{2(1)}\right)\right)$

$\text{Vertex} = \left(\frac{-6}{2},\ f\left(-\frac{6}{2}\right)\right)$

$\text{Vertex} = (-3,\ f(-3))$

$\text{Vertex} = (-3,\ (-3)^2 + 6(-3))$

$\text{Vertex} = (-3,\ (-3)(-3) + 6(-3))$

$\text{Vertex} = (-3,\ 9 - 18)$

$\text{Vertex} = (-3,\ -9)$ ✓

Find x-intercept let $y = 0$

$y = f(x) = x^2 + 6x$

$0 = x^2 + 6x$

$0 = x(x+6)$

$x = 0$ or $x + 6 = 0$

$x + 6 - 6 = 0 - 6$

$x = -6$

$(0, 0)$ or $(-6, 0)$

x-intercepts

Find y-intercept let $x = 0$

$y = f(x) = x^2 + 6x$

$f(0) = (0)^2 + 6(0)$

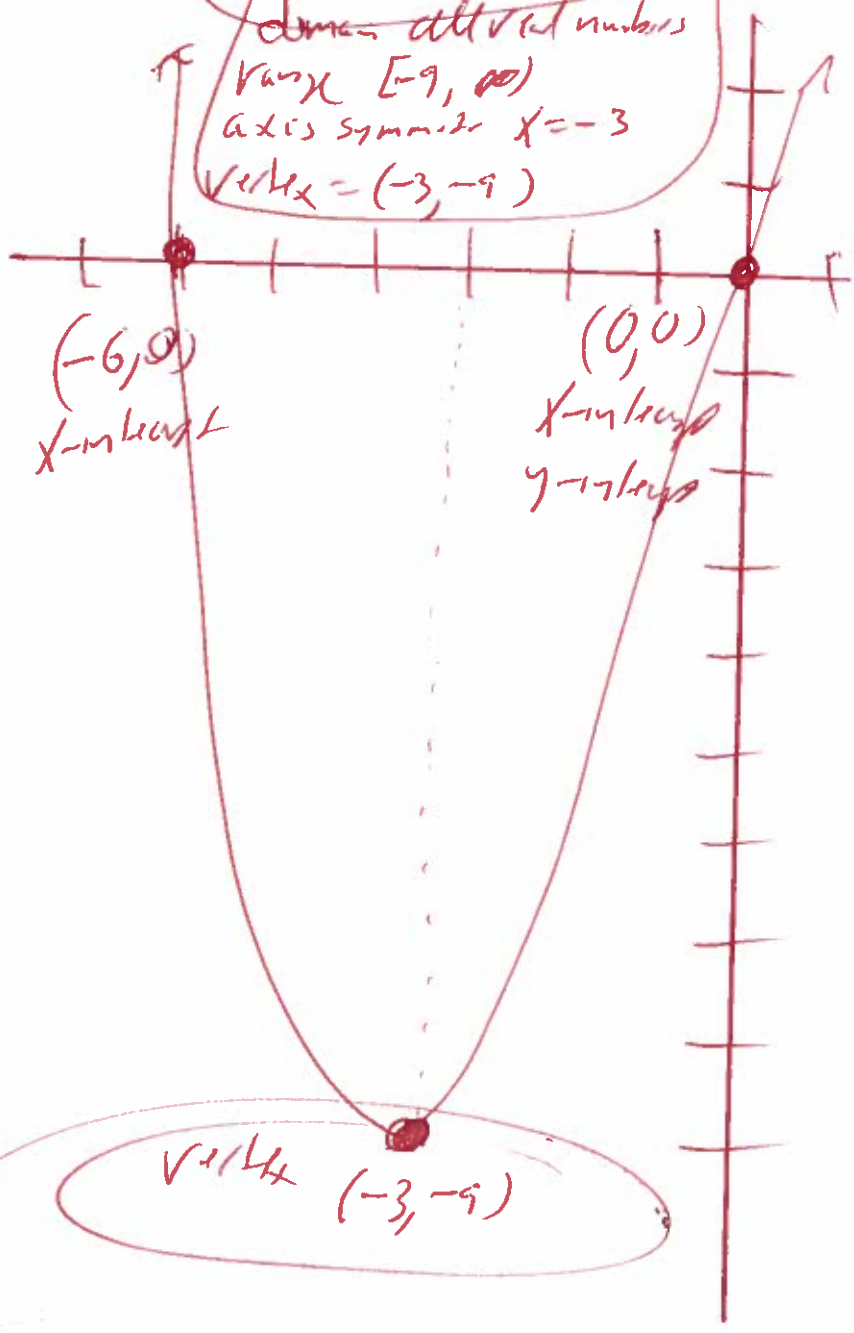
$f(0) = (0)(0) + 6(0)$

$f(0) = 0 + 0$

$f(0) = 0$

y-intercept

$(0, 0)$ ✓



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

$a = -1,\ b = -6,\ c = 0$

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

$\text{Vertex} = \left(-\frac{-(-6)}{2(-1)},\ f\frac{-(-6)}{2(-1)}\right)$

$\text{Vertex} = \left(\frac{6}{-2},\ f\left(\frac{6}{-2}\right)\right)$

$\text{Vertex} = (-3,\ f(-3))$

$\text{Vertex} = (-3,\ -(-3)^2 - 6(-3))$

$\text{Vertex} = (-3,\ -1(-3)(-3) - 6(-3))$

$\text{Vertex} = (-3,\ -1(9) - 6(-3))$

$\text{Vertex} = (-3,\ -9 + 18)$

$\text{Vertex} = (-3,\ 9)$ ✓ ✓

Find y-intercept let $x = 0$

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

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

$f(0) = -(0)(0) - 6(0)$

$f(0) = -(0) - 0$ ✓

$f(0) = 0$ ✓ y-intercept

domain all real numbers

range $(-\infty, 9]$

axis of symmetry $x = -3$

~~Vertex~~ $\text{Vertex} = (-3, 9)$

Find x-intercept let $y = 0$

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

$0 = -x^2 - 6x$

$0 = -1x(x + 6)$

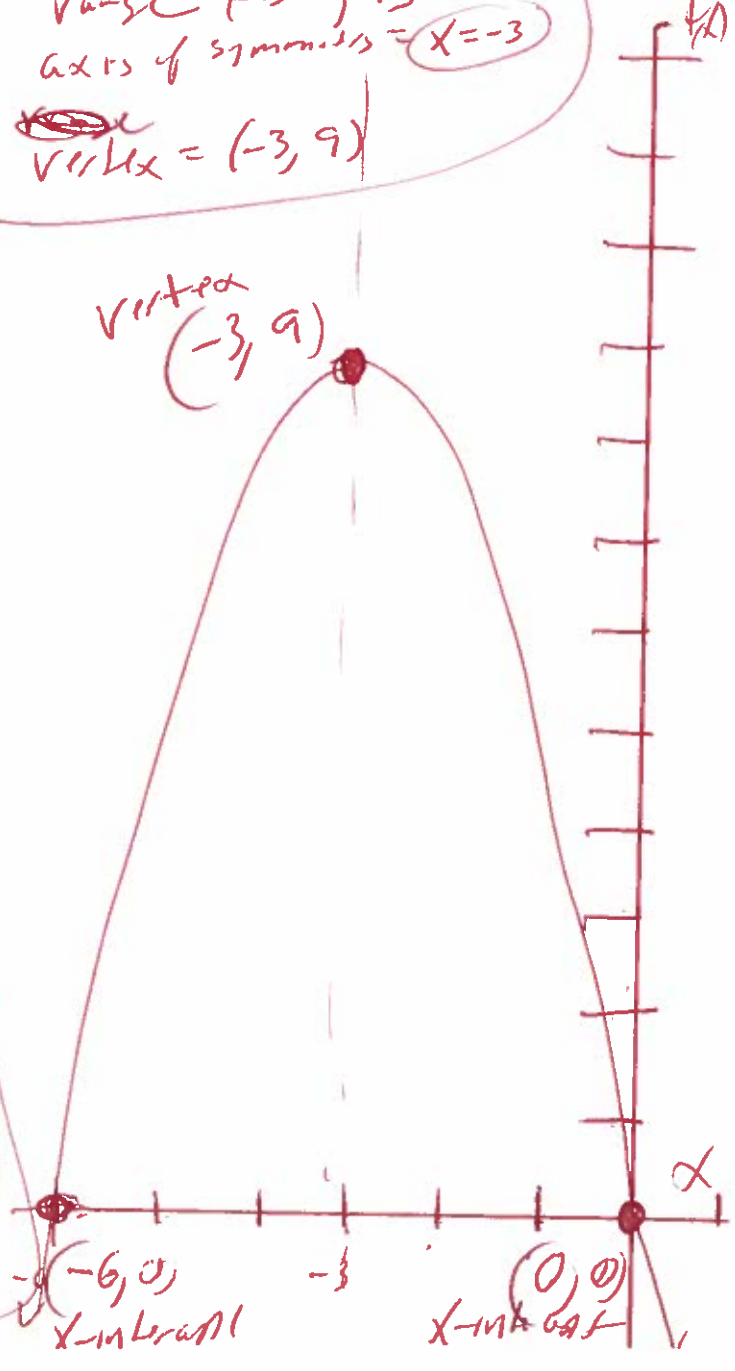
$-1x = 0$ or $x + 6 = 0$

$\frac{-1x}{-1} = \frac{0}{-1}$ or $x + 6 - 6 = 0 - 6$

$x = 0$ or $x = -6$

$(0, 0)$ or $(-6, 0)$

x-intercepts



152. $f(x) = x^2 - 4$

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

$a = 1,\ b = 0,\ c = -4$

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

$\text{Vertex}_x = \left(-\frac{(0)}{2(1)},\ f\ -\frac{(0)}{2(1)}\right)$

$\text{Vertex}_x = \left(\frac{0}{2},\ f\left(\frac{0}{2}\right)\right)$

$\text{Vertex}_x = (0,\ f(0))$

$\text{Vertex}_x = (0,\ (0)^2 - 4)$

$\text{Vertex}_x = (0,\ (0)(0) - 4)$

$\text{Vertex}_x = (0,\ 0 - 4)$

$\text{Vertex}_x = (0, -4)$

Find x-intercept let $y = 0$

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

$0 = x^2 - 4$

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

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

$x + 2 = 0$ or $x - 2 = 0$

$x + 2 - 2 = 0 - 2$ or $x - 2 + 2 = 0 + 2$

$x = -2$ or $x = 2$

x-intercepts

$(-2, 0)$ or $(2, 0)$

Formula

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

Find y-intercept let $x = 0$

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

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

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

$f(0) = 0 - 4$

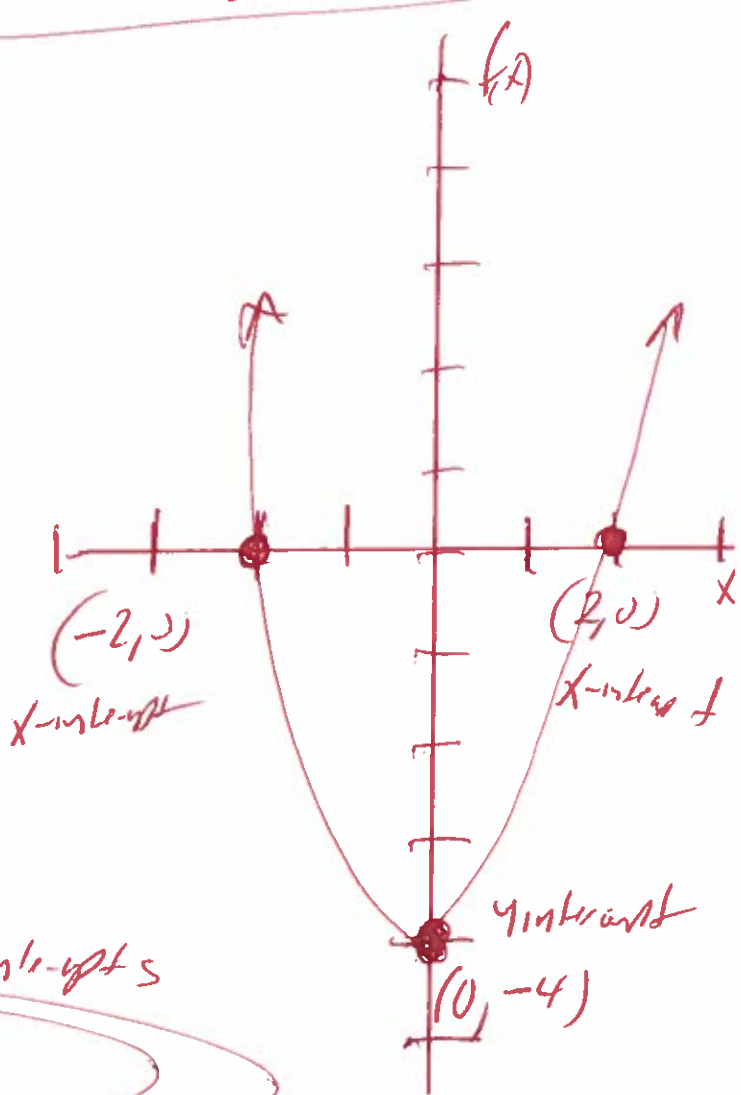
$f(0) = -4$ y-intercept

domain all real numbers

range $[-4, \infty)$

axis of symmetry $x = 0$

$\text{Vertex}_x = (0, -4)$



153 $f(x) = x^2 - 8x + 7$

$a = 1, \quad b = -8, \quad c = 7$

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

$Vert_x = \left(\frac{-(-8)}{2(1)}, \quad f\left(\frac{-(-8)}{2(1)}\right)\right)$

$Vert_x = \left(\frac{8}{2}, \quad f\left(\frac{8}{2}\right)\right)$

$Vert_x = (4, \quad f(4))$

$Vert_x = (4, \quad (4)^2 - 8(4) + 7)$

$Vert_x = (4, \quad (4)(4) - 8(4) + 7)$

$Vert_x = (4, \quad 16 - 32 + 7)$

$Vert_x = (4, \quad -16 + 7)$

$Vert_x = (4, -9)$

Find x-intercept let $y = 0$

$y = f(x) = x^2 - 8x + 7$

$0 = x^2 - 8x + 7$

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

set $x - 1 = 0$ OR $x - 7 = 0$

$x - 1 + 1 = 0 + 1$ OR $x - 7 + 7 = 0 + 7$

$x = 1$ OR $x = 7$

$(1, 0)$ OR $(7, 0)$ x-intercepts

Find y-intercept let $x = 0$

$y = f(x) = x^2 - 8x + 7$

$f(0) = (0)^2 - 8(0) + 7$

$f(0) = (0)(0) - 8(0) + 7$

$f(0) = 0 - 0 + 7$

$f(0) = +7$ y-intercept

$(0, 7)$

$(0, 7)$ y-intercept

domain all real numbers

range $[-9, \infty)$

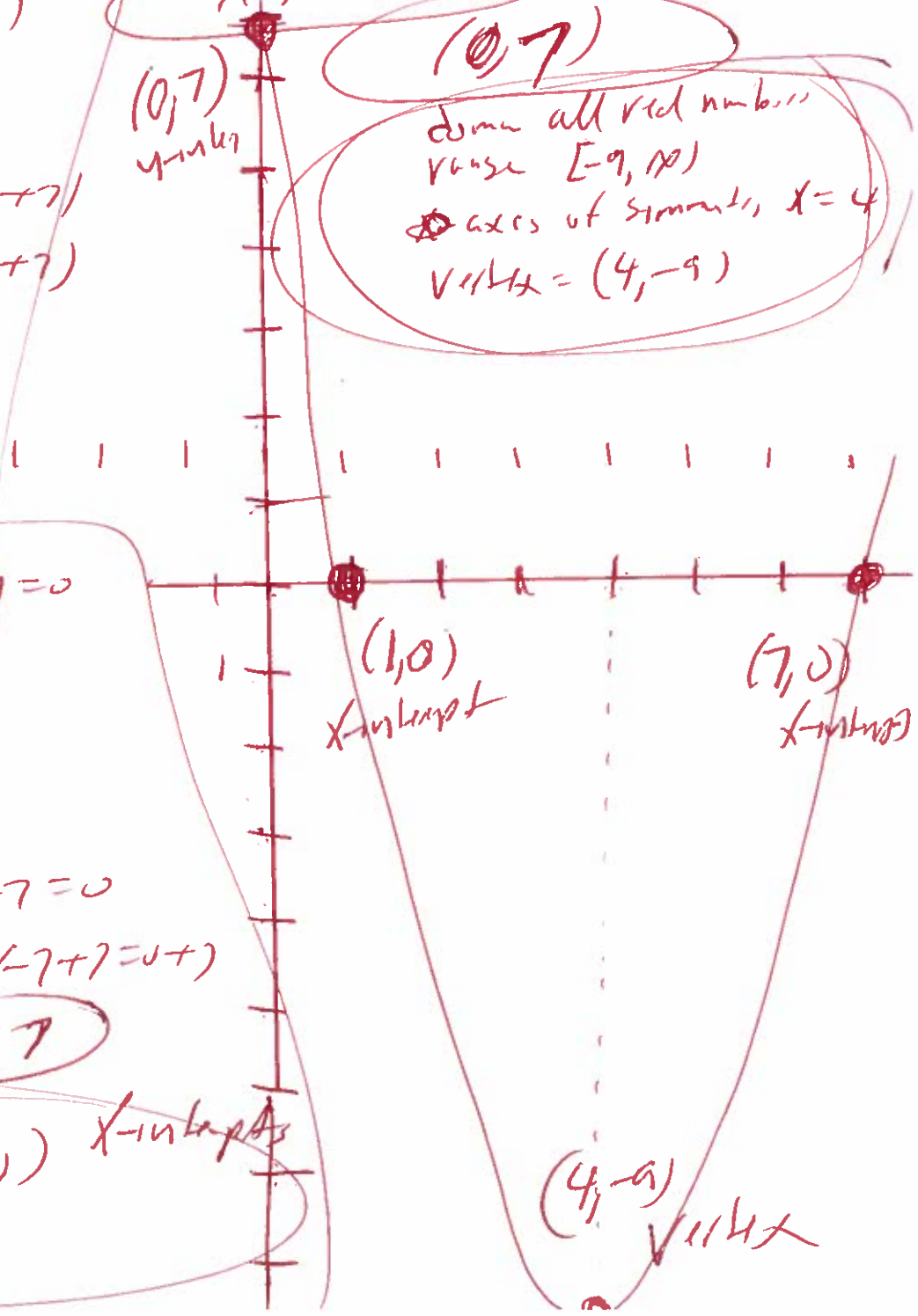
axes of symmetry $x = 4$

$Vert_x = (4, -9)$

$(1, 0)$ x-intercept

$(7, 0)$ x-intercept

$(4, -9)$ $Vert_x$



(154) $f(x) = 4^x$

Graph

$f(-2) = 4^{-2}$

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

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

$f(-2) = \frac{1}{16}$

$f(-1) = 4^{-1}$

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

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

$f(0) = 4^0$

$f(0) = 1$ 4 to zero power is 1

$f(1) = 4^1$

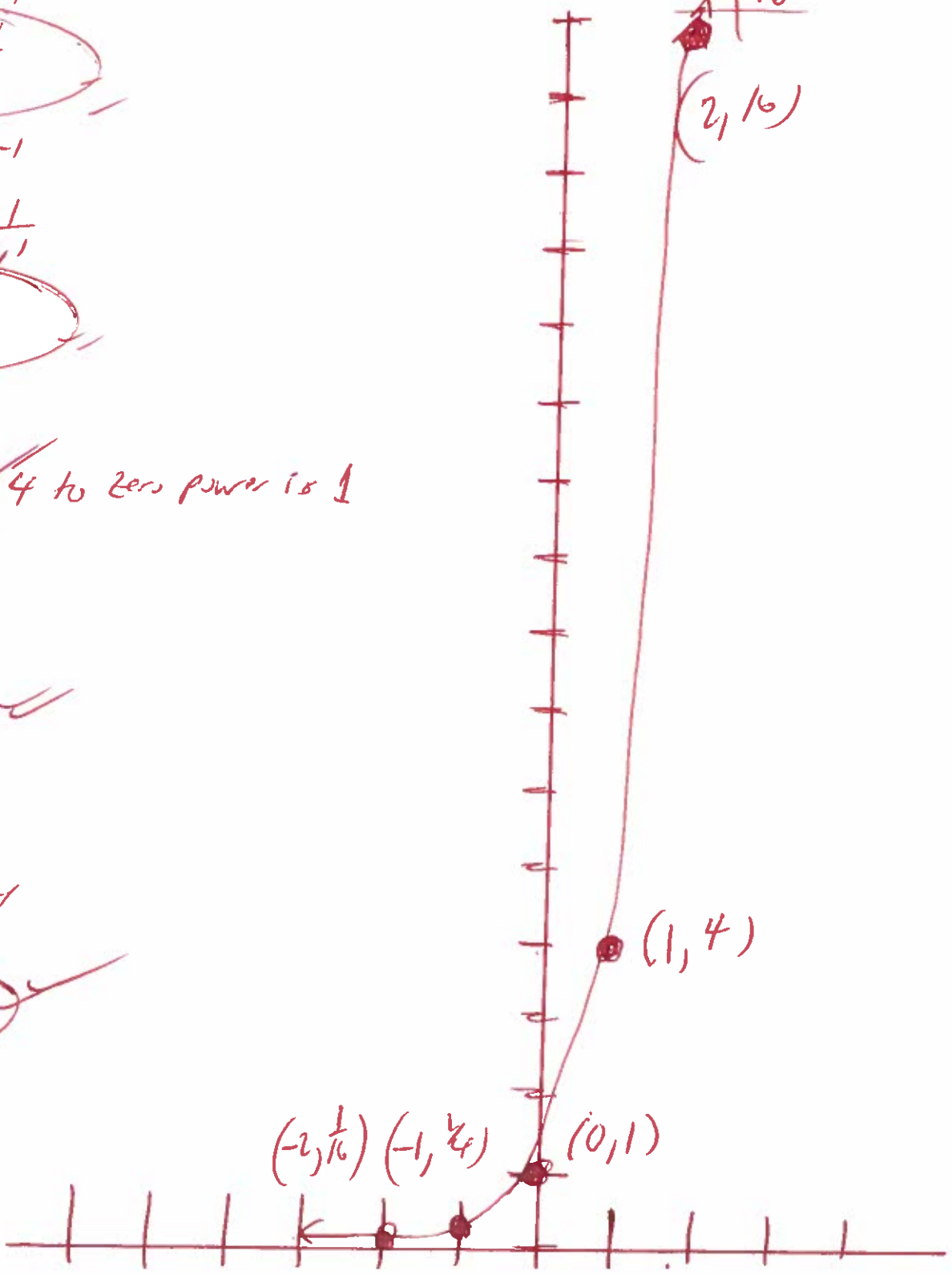
$f(1) = 4$

$f(2) = 4^2$

$f(2) = 4 \cdot 4$

$f(2) = 16$

x	f(x)
-2	1/16
-1	1/4
0	1
1	4
2	16



(155) $f(x) = \left(\frac{1}{2}\right)^x$

Graph

x	f(x)
-2	4
-1	2
0	1
1	1/2
2	1/4

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

$f(-2) = (2^{-1})^{-2}$ rewrite

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

$f(-2) = 2^2$

$f(-2) = 2 \cdot 2$

$f(-2) = 4$

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

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

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

$f(-1) = 2^1$

$f(-1) = 2$

$f(0) = \left(\frac{1}{2}\right)^0$

$f(0) = 1$ $\frac{1}{2}$ to zero power is 1

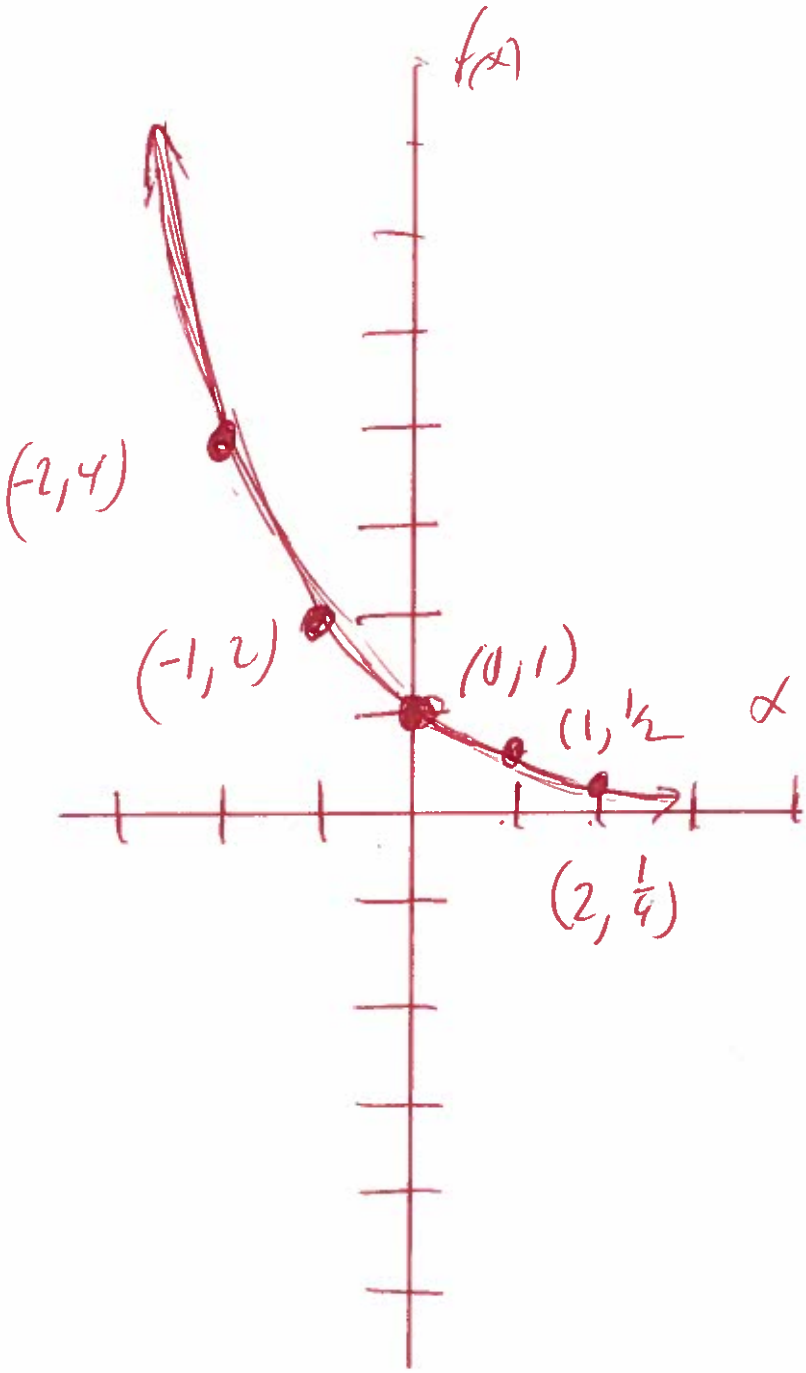
$f(1) = \left(\frac{1}{2}\right)^1$

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

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

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

$f(2) = \frac{1}{4}$



156.

$f(x) = 4^x$

Graph

$f(-2) = 4^{-2}$

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

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

$f(-2) = \frac{1}{16}$

$f(-1) = 4^{-1}$

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

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

$f(0) = 4^0$

$f(0) = 1$ 4 to zero power is 1

$f(1) = 4^1$

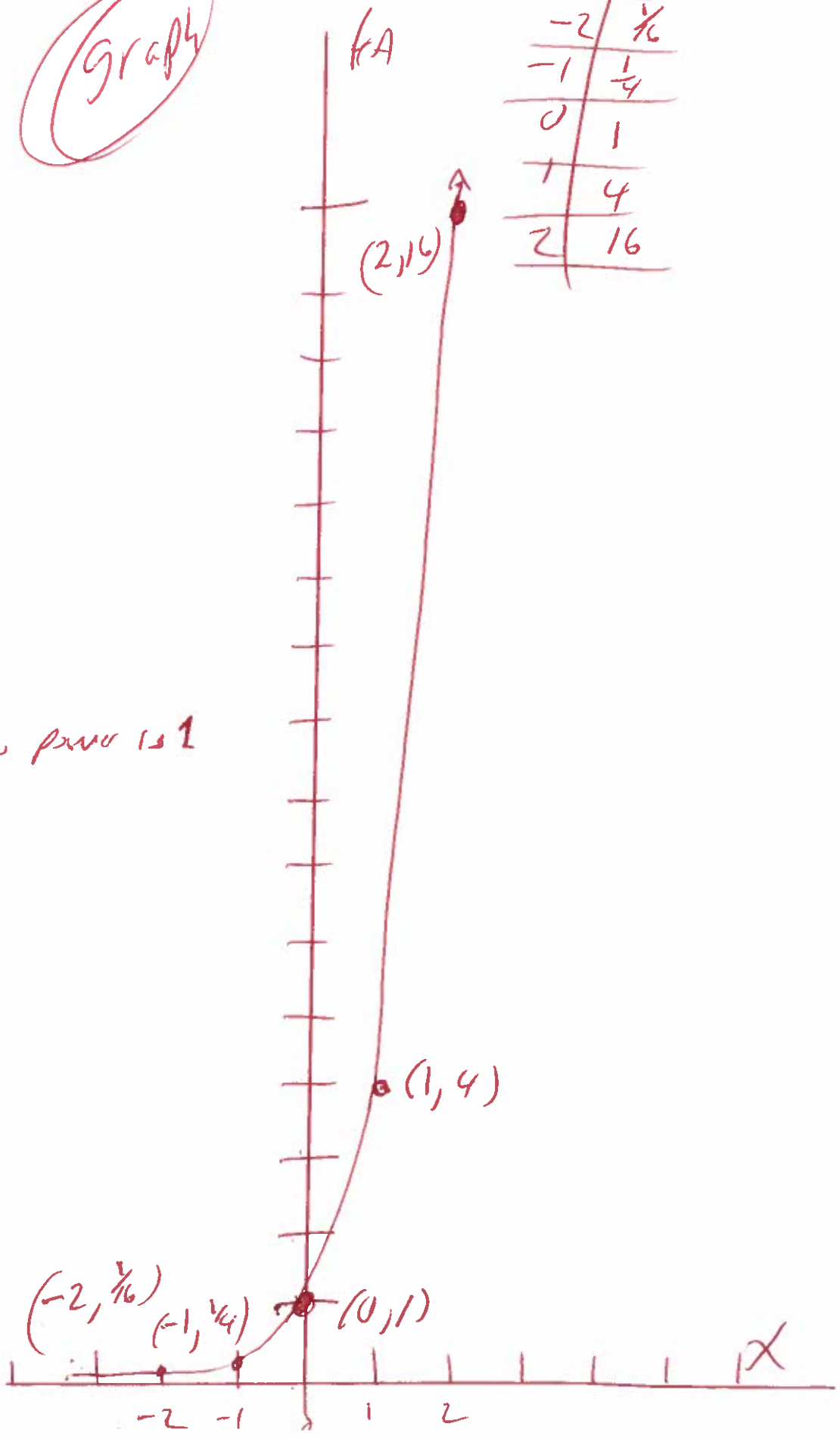
$f(1) = 4$

$f(2) = 4^2$

$f(2) = 4 \cdot 4$

$f(2) = 16$

x	f(x)
-2	1/16
-1	1/4
0	1
1	4
2	16



157. $f(x) = \left(\frac{1}{5}\right)^x$ Graph

x	f(x)
-1	5
0	1
1	1/5

$f(-1) = \left(\frac{1}{5}\right)^{-1}$

$f(-1) = \frac{1^{-1}}{5^{-1}}$

$f(-1) = \frac{5^1}{1^1}$ rewrite

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

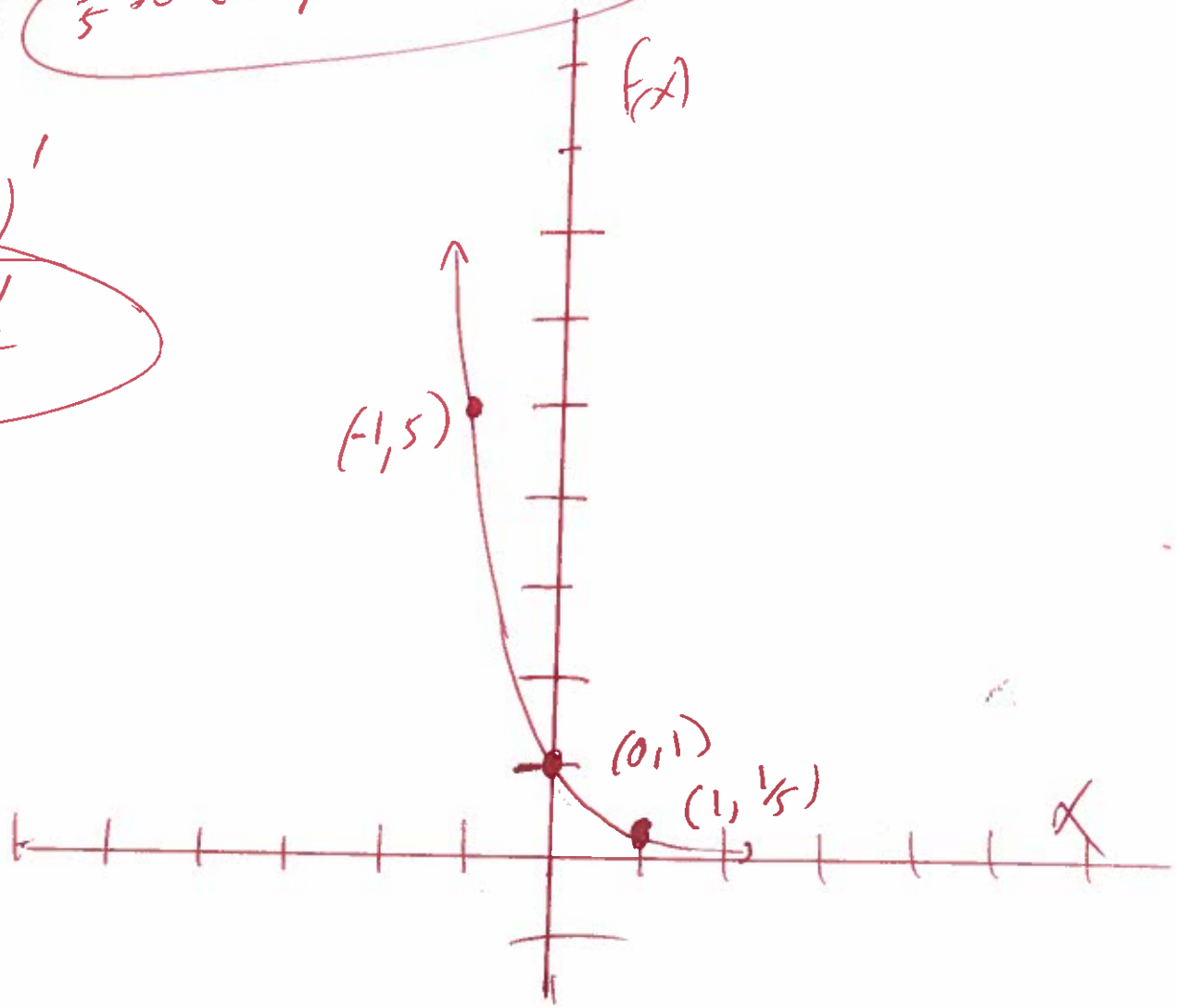
$f(-1) = 5$

$f(0) = \left(\frac{1}{5}\right)^0$

$f(0) = 1$ $\frac{1}{5}$ to zero power is 1

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

$f(1) = \frac{1}{5}$



(158) four bacteria are placed in a petri dish. The population will triple every day. The formula for the number of bacteria in the dish t is $N(t) = 4(3)^t$, where t is the number of days after the four bacteria are placed in the dish. How many bacteria are in the dish five days after the four bacteria are placed in the dish?

$$N(t) = 4(3)^t$$

$$N(5) = 4(3)^5$$

$$N(5) = 4(3)(3)(3)(3)(3)$$

$$N(5) = 4(243)$$

$$N(5) = 972 \text{ bacteria}$$

(159) write the first five terms of the sequence.

$a_n = n - 4$

$a_1 = (1) - 4 = 1 - 4 = -3$ ✓

$a_2 = (2) - 4 = 2 - 4 = -2$ ✓

$a_3 = (3) - 4 = 3 - 4 = -1$ ✓

$a_4 = (4) - 4 = 4 - 4 = 0$ ✓

$a_5 = (5) - 4 = 5 - 4 = 1$ ✓

(160.) write the first five terms of the sequence.

$a_n = n^2 - n$

$a_1 = (1)^2 - (1) = (1)(1) - (1) = 1 - 1 = 0$ ✓

$a_2 = (2)^2 - (2) = (2)(2) - (2) = 4 - 2 = 2$ ✓

$a_3 = (3)^2 - (3) = (3)(3) - (3) = 9 - 3 = 6$ ✓

$a_4 = (4)^2 - (4) = (4)(4) - (4) = 16 - 4 = 12$ ✓

$a_5 = (5)^2 - (5) = (5)(5) - (5) = 25 - 5 = 20$ ✓

(161.) write the first five terms of the sequence.

$a_n = 2n - 2$

$a_1 = 2(1) - 2 = 2 - 2 = 0$ ✓

$a_2 = 2(2) - 2 = 4 - 2 = 2$ ✓

$a_3 = 2(3) - 2 = 6 - 2 = 4$ ✓

$a_4 = 2(4) - 2 = 8 - 2 = 6$ ✓

$a_5 = 2(5) - 2 = 10 - 2 = 8$ ✓