II. **(8 points) Translate the verbal expression into a variable expression in terms of a single variable. Do not simplify.**

21. Five times the total of four less than twice a number and three more than the number.

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

II. **(8 points) Translate the verbal expression into a variable expression in terms of a single variable. Do not simplify.**

21. Five times the difference of four more than twice a number and three less than the number.

$5[(2x+4)-(x-3)]$

III. **(10 points) Write a linear (single variable) equation to describe the word problem. Do not solve.**

22. 60 pounds of delicious Jamaican Blue Mountain coffee that costs $32 per pound are mixed with 100 pounds of Fakin' Blue Discount Coffee. How much is the Fakin' Blue worth per pound if the coffee blend costs $15 per pound?

thing	amount	price per pound	total cost
JBM	60	32	60(32)
FBD	100	x	100x
blend	160	15	160(15)

$60(32)+100x=160(15)$

III. **(10 points) Write a linear (single variable) equation to describe the word problem. Do not solve.**

22. 60 pounds of delicious Jamaican Blue Mountain coffee are mixed with 100 pounds of Fakin' Blue Discount Coffee that costs $3 per pound. How much is the Jamaican Blue Mountain coffee worth per pound if the coffee blend costs $15 per pound?

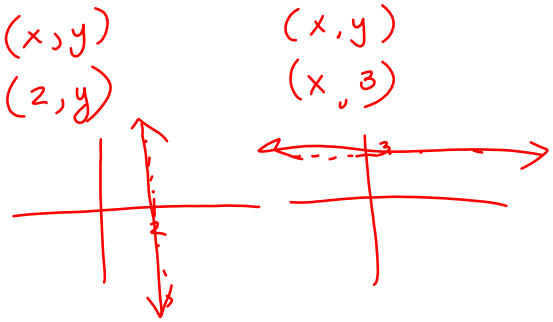
thing	amount	price per pound	total cost
JBM	60	x	60x
FBD	100	3	100(3)
blend	160	15	160(15)

$60x+100(3)=160(15)$

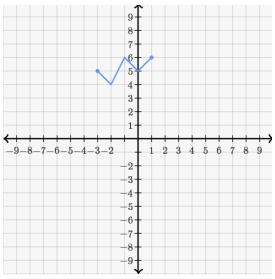
Chapter 3 Homework:

3.1 - #3-29 odd	ordered pairs, distance, midpoint } Tuesday
3.2 - #3-16 all, 21-43 odd, 49-87 odd	functions, domain, range
3.3 - #3-9 odd, 15-33 odd	graph by plotting points, x- and y-intercepts
3.4 - #3-19 odd, 29-41 odd	finding slope, graph using slope and y-intercept } Friday
3.5 - #3-49 odd	finding equations of lines

abscissa is the x- or 1st coordinate
ordinate is the y- or 2nd coordinate

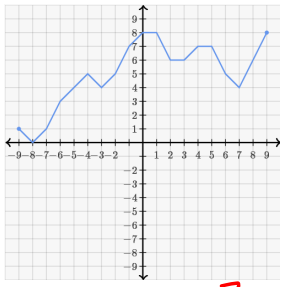


State the domain and range of the function graphed in blue.



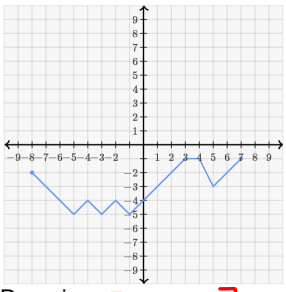
Domain: $[-3, 1]$

Range: $[4, 6]$



Domain: $[-9, 9]$

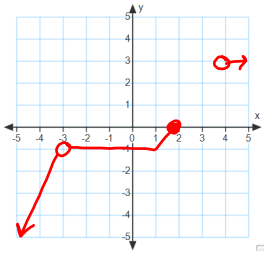
Range: $[0, 8]$



Domain: $[-8, 7]$

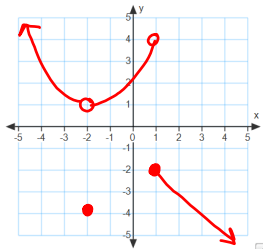
Range: $[-5, -1]$

State the domain and range of the function.



Domain: $(-\infty, -3) \cup (-3, 2] \cup (4, \infty)$

Range: $(-\infty, 0] \cup \{3\}$



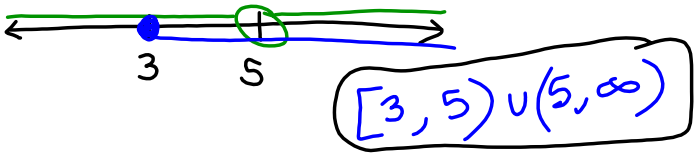
Domain: $(-\infty, \infty)$

Range: $(-\infty, -2] \cup (1, \infty)$

$$f(x) = \frac{\sqrt{x-3}}{x-5}$$ What is the domain of f?

$x-5 \neq 0$ and $x-3 \geq 0$

$x \neq 5$ $\cap$ $x \geq 3$



$[3,5) \cup (5,\infty)$

$$f(x) = \frac{x-5}{\sqrt{x-3}}$$ What is the domain?

$x-3 \geq 0$ and $x-3 \neq 0$

$x-3 > 0$

$x > 3$

$(3,\infty)$

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

$5-x \geq 0$ and $x+2 \neq 0$ and $x-6 \neq 0$

$5 \geq x$ $\quad -x \geq -5$, $x \leq 5$ $\qquad x \neq -2$ $\qquad x \neq 6$

$x \leq 5$

$(-\infty, -2) \cup (-2, 5]$

$$f(x) = \frac{\sqrt{9-x}}{x\sqrt{x+3}}$$

$9-x \geq 0$ and $x+3 > 0$ and $x \neq 0$

$-x \geq -9$

$x \leq 9$ $\qquad x > -3$

$(-3, 0) \cup (0, 9]$

Review:

A **linear function** is a function of the form $f(x) = mx + b$ or $y = mx + b$, where $m =$ **slope** $= \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$ and the point $(0, b)$ is the **y-intercept**, or the point where the graph of the function intersects the y-axis. The y-intercept of any function is found by plugging 0 in for x (evaluating $f(0)$).

$y = mx + b$ is called the **slope-intercept form** of the equation of a line.

$Ax + By = C$ is the **standard form** of the equation of a line.

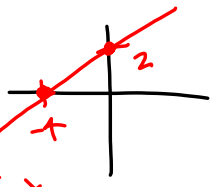
A **horizontal line** has an equation of the form $y = b$, where b is the y-coordinate of every point on the line. A horizontal line has a slope of 0.

A **vertical line** has an equation of the form $x = a$, where a is the x-coordinate of every point on the line. A vertical line has no slope.

The **x-intercept**(s) of any function are the point(s) $(x, 0)$, found by substituting 0 in place of y in the equation (setting $f(x) = 0$) and solving for x.

3.3

23. $x - 2y = -4$



x-int: plug 0 in for y & solve for x

$x - 2(0) = -4$

$x = -4$

$(-4, 0)$

y-int: plug 0 in for x & solve for y

$0 - 2y = -4$

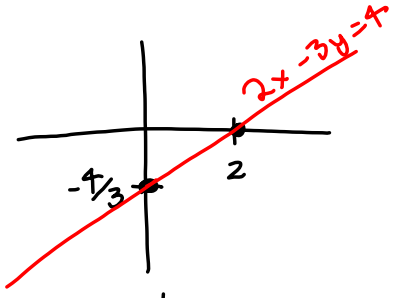
$y = 2$

$(0, 2)$

32. $2x-3y=4$

x-intercept: $(2,0)$

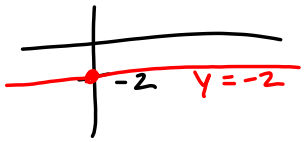
y-intercept: $(0,-4/3)$



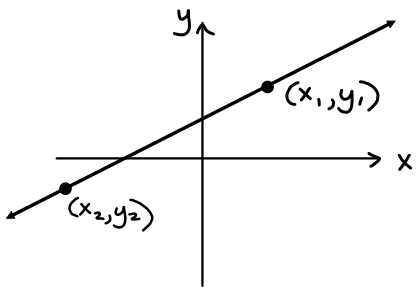
18. $y=-2$

x-intercepts: none

y-intercept: $(0,-2)$



Slope



$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

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

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

Find the slope of the line containing $(3,-4)$ and $(-7,-1)$.

$$m=\frac{\Delta y}{\Delta x}=\frac{-4-(-1)}{3-(-7)}=\frac{-4+1}{3+7}=\boxed{\frac{-3}{10}}$$

Standard Form: $Ax+By=C$

A, B, C are real numbered constants

Slope-Intercept Form: $y=mx+b$

m, b are real numbered constants

m is the slope

b is the y-intercept value (the point $(0,b)$ where the line crosses the y-axis)

Point-Slope Form: $y-y_1=m(x-x_1)$

x_1 and y_1 are real numbers such that (x_1, y_1) is a point on the line

m is the slope

Find the equation of a line that passes through the points (-3, 5) and (4, 1).

$m = \frac{5-1}{-3-4} = \frac{4}{-7}$

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

$y - 1 = -\frac{4}{7}(x - 4)$

$y - 1 = -\frac{4}{7}x + \frac{16}{7}$

$y = -\frac{4}{7}x + \frac{16}{7} + \frac{7}{7}$

$\boxed{y = -\frac{4}{7}x + \frac{23}{7}}$

$y = mx + b$

$1 = \frac{4}{-7}(4) + b$

$\frac{7}{7} = -\frac{16}{7} + b$

Parallel & Perpendicular Lines:

Two lines with slopes m_1 and m_2 are **parallel** if and only if $m_1 = m_2$ (and have different y-intercepts)

*All vertical lines are parallel.

$\ell_1 \parallel \ell_2$

Two lines with slopes m_1 and m_2 are **perpendicular** if and only if $m_1 = -\frac{1}{m_2}$ or $m_2 = \frac{-1}{m_1}$ or $m_1 m_2 = -1$

*Vertical lines are perpendicular to horizontal lines

$\ell_1 \perp \ell_2$

Find the slope-intercept (y=mx+b) equation of the line:

1. slope 2 ; passing through (3,7)

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

$y-7=2x-6$

$y=2x+1$

in standard form

$2x-y=-1$

2. passes through (-5, 2) & (6, -1)

$m=\frac{-1-2}{6-(-5)}=\frac{-3}{11}$

$y-(-1)=\frac{-3}{11}(x-6)$

$y+1=-\frac{3}{11}x+\frac{18}{11}$

$y=-\frac{3}{11}x+\frac{18}{11}-\frac{11}{11}$

$y=-\frac{3}{11}x+\frac{7}{11}$

3. Given the line y=4x+3, find the equation of a line parallel to this that passes through (4, 1).

$m=4$; $(x_1,y_1)=(4,1)$

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

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

$y-1=4x-16$

$y=4x-16+1$

$y=4x-15$

4. Given the line y=-3x+7, find the equation of a line perpendicular to it that passes through (5,-8).