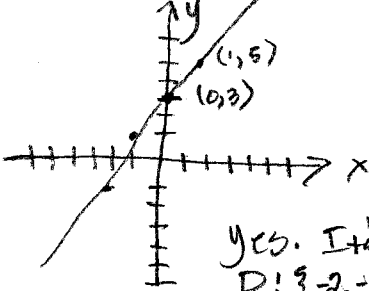


No books and no notes. Be sure to set up each problem before evaluation. Show all work in the space provided for full credit.

1. Use "vertical line test" to check whether each relation defines y as a function of x . Is that a function? Is that a linear function? Graph each function and give the domain and range.

a) $y = 2x + 3$ (6 points)

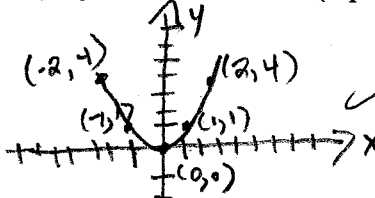


x	y
0	3
1	5
-1	1
-2	-1

yes. It's a function ✓

D: $\{-2, -1, 0, 1, 3\}$ R: $\{-1, 1, 3, 5\}$ } -2

b) $y = x^2$ (6 points)



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

yes. It's a function ✓

D: $\{-2, -1, 0, 1, 2, 3\}$ R: $\{0, 1, 4\}$ } -2

2. Let $f(x) = 3x + 1$. Find the following. (9 points)

a) $f(-4) = 3x + 1$
 $= 3(-4) + 1$
 $= -12 + 1$
 $= -11$

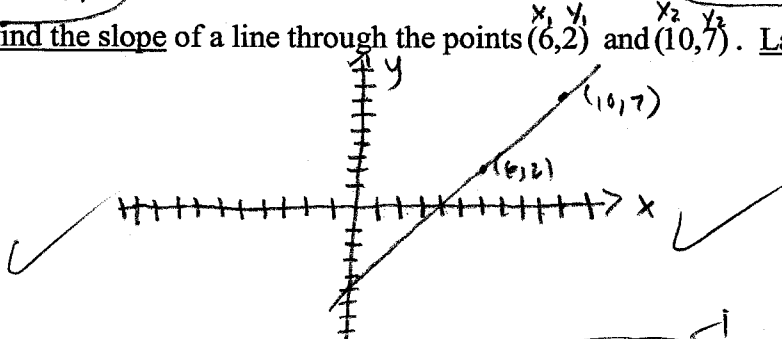
b) $f(x+5) = 3x + 1$
 $= 3(x+5) + 1$
 $= 3x + 15 + 1$
 $= 3x + 16$

3. Graph and find the slope of a line through the points $(6, 2)$ and $(10, 7)$. Label all the points. (8 points)

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

$m = \frac{7 - 2}{10 - 6}$

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



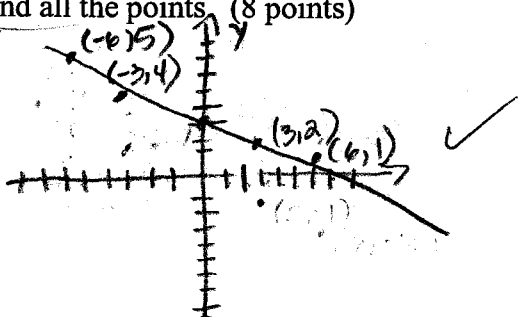
4. Write the following equation in slope-intercept form, give the slope of the line, give the y-intercept, and graph the line. Label the line and all the points. (8 points)

$3y + x = 9$ $y = mx + b$

$3y = -x + 9$

$\frac{3y}{3} = \frac{-x}{3} + \frac{9}{3}$

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



x	y
0	3
3	2
6	1
3	4
-6	5

5. Using the point-slope form to find an equation of the line that satisfies the given conditions. Write the equation in slope-intercept form. (10 points)

Through $(-2, 7)$; slope $-\frac{3}{2}$

$y - y_1 = m(x - x_1)$ ✓

$y - 7 = -\frac{3}{2}(x + 2)$ ✓

$y - 7 = -\frac{3}{2}x + 3$

$2(y - 7) = 2(-\frac{3}{2}x + 3)$

$2y - 7 = 3x + 6$

$2y - 7 = 3x + 6$

$2y = 3x + 13$

$y = \frac{3}{2}x + \frac{13}{2}$

6. Solve the following linear equation: (8 points)

$$\frac{x-1}{2} - \frac{2x-6}{4} = x+3$$

$$2 \cdot \frac{x-1}{2} - \frac{1}{1} \cdot \frac{2x-6}{4} = 4(x+3)$$

$$2x - 2 - 2x + 6 = 4x + 3 \quad | \quad x = \frac{1}{4}$$

$$4 = 4x + 3$$

$$1 = 4x$$

7. Francis took 180 minutes to drive to his annual family reunion, 210 miles away.

What was his speed (rate) in miles per hour? (6 points)

$$d = rt$$

$$d = 210 \text{ mi}$$

$$r = ?$$

$$t = 180 \text{ min} = 3 \text{ hrs}$$

$$210 = r \cdot 3$$

$$\frac{210}{3} = r$$

$$r = 70 \text{ mph}$$

$$180 \text{ min} = \frac{3}{60} \text{ hr} = \frac{1}{20} \text{ hr}$$

8. The width of a rectangle lot is 100 feet more than the length. Find the width and the length of the rectangle lot if the perimeter of the lot is 1200 feet. (10 points)

$$P = 2L + 2W$$

$$P = 1200 \text{ ft}$$

$$W = L + 100 \text{ ft}$$

$$L = ?$$

$$1200 = 2L + 2(L + 100)$$

$$1200 = 2L + 2L + 200$$

$$1200 = 4L + 200$$

$$1000 = 4L$$

$$250 = L$$

$$W = 250 + 100$$

$$W = 350$$

9. Solve the following linear inequality, graph and give the solution sets (including the interval notation): (6 points)

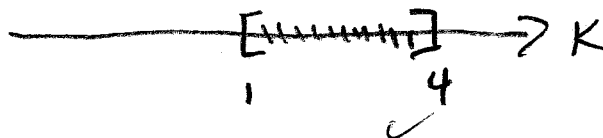
$$-3 \leq -3k + 9 \leq 6$$

$$-9 \leq -9 \leq -9$$

$$-12 \leq -3k \leq -3$$

$$-\frac{12}{-3} \geq \frac{-3k}{-3} \geq \frac{-3}{-3}$$

$$4 \geq k \geq 1$$



$$\text{Sol set: } \{k \mid 1 \leq k \leq 4\}$$

$$[1, 4]$$

10. For the following compound inequalities, state whether intersection or union should be used. Then graph and give the solution sets (including the interval notation): (7 points)

Union \checkmark

$-3x+1 \leq 7$ and $2+x \leq 5$

$-3x \leq 6$ \checkmark $x \leq 3$ \checkmark

$-\frac{3}{-3} \leq \frac{6}{-3}$

$x \geq -2$ \checkmark

Sol set: $\{x \mid -2 \leq x \leq 3\}$

$[-2, 3]$ \checkmark

11. Complete the sets of numbers for the following: (6 points)

a) Natural Numbers = $\{1, 2, 3, 4, \dots\}$ \checkmark

b) Whole Numbers = $\{0, 1, 2, 3, \dots\}$ \checkmark

c) Integers = $\{\dots, -2, -1, 0, 1, 2, 3, \dots\}$ \checkmark

12. Evaluate the following: (12 points)

a) $|10| + |-8| + 3 = 10 + 8 + 3 = 21$ \checkmark

b) $|7 - 9 + 1| = |-1| = 1$ \checkmark

c) $|6.5 - 8 + 1| = |-0.5| = 0.5$ \checkmark

d) $4^5 \cdot 4^2 = 16^7 = 100,663,296$ \checkmark -2

e) $\frac{x^8}{x^3} = x^{8-3} = x^5$ \checkmark

f) $(x^{-2})^3 = (\frac{1}{x^2})^3 = \frac{1}{x^6}$ \checkmark -2

$[-4$