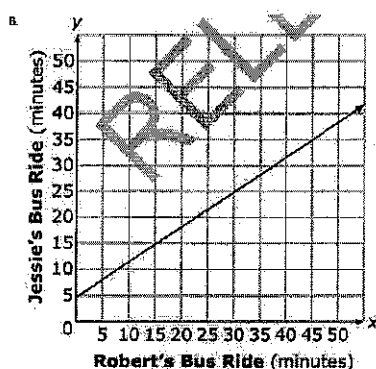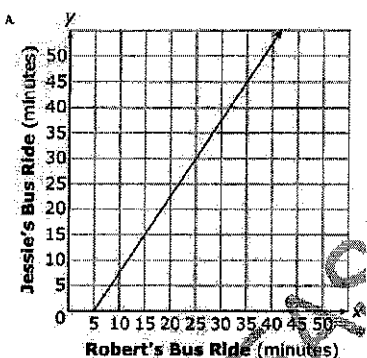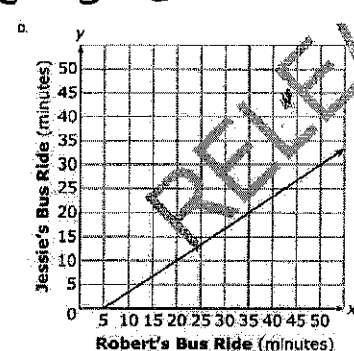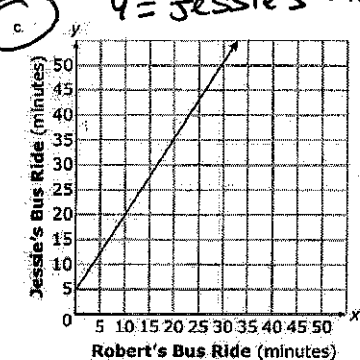## Semester Math One Midterm Exam Review

1. Jessie's bus ride to work is 5 minutes more than 3/2 the time of Robert's ride. Which graph shows the possible times of Jessie and Robert's bus rides?

X = Robert's ride
Y = Jessie's ride

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

(C circled)

2. Ryan has a total of 30 coins in his car.
- The coins are either dimes or quarters
- The total value of the coins is $8.75

Which system of equations can be used to determine the number of dimes, d, and quarters, q, that Ryan has in his car?

A. $0.10d + 0.25q = 8.75$
   $30d + 30q = 8.75$

B. $0.10d + 0.25q = 30$
   $d + q = 8.75$

C. $d + q = 8.75$
   $30d + 30q = 8.75$

D. $d + q = 30$
   $0.10d + 0.25q = 8.75$

(D circled)

3. The Student Council sells pretzels and drinks during football games.   P = pretzels   d = drinks
- 72 pretzels and 125 drinks will sell for $398.75
- 144 pretzels and 80 drinks will sell for $500.00

How much does each pretzel sell for?

-2 (72p + 125d = 398.75)
144p + 80d = 500

-144p - 250d = -797.50
144p + 80d = 500
─────────────────
-170d = -297.50
─────   ───────
-170   -170

d = $1.75

144p + 80(1.75) = 500
144p + 140 = 500
144p = 360
P = 2.50

$2.50

4. Three times Andy's age plus 4 times Sam's age equals 322. Sam's age is also five times Andy's age. How old is Sam?

S = Sam's age   A = Andy's age

3A + 4S = 322
S = 5A

3A + 4(5A) = 322
3A + 20A = 322
23A = 322
A = 14
S = 5(14)
S = 70

70 yrs old

5. Suppose that the function $f(x) = 3x + 15$ represents the cost to rent x dvds a month from an internet movie club. Madison now has $20. How many more dollars does Madison need to rent 8 dvds next month?

3(8) + 15
24 + 15
$39

$39 - $20

$19

6. The volume of a cylinder is found using the following formula:
$$V = \pi r^2 h$$

Where r is the radius of the circular base and h is the height of the cylinder.

What is the equation used to find h?

$\dfrac{V}{\pi r^2} = \dfrac{\pi r^2 h}{\pi r^2}$

$h = \dfrac{V}{\pi r^2}$

The table below shows the average amount of money saved after several weeks.

Weeks (x)	Amount saved in dollars (f(x))
2	39
3	56
4	73
5	90
6	107

What is the average rate of change in amount saved from week 3 to week 5?

$(3, 56)$ $(5, 90)$

$$\frac{90-56}{5-3} = \frac{34}{2} = 17$$

$\boxed{\$17 \text{ per week}}$

---

8. Andre compared the y-intercept of the graph of the function $f(x) = 4x + 3$ to the y-intercept of the graph of the linear function that includes the points in the table below.

$f(x)$
$b = 3$

$g(x)$
$b = 5$

x	g(x)
-4	-3
-2	1
2	9
4	13

$\underset{0}{\overset{5}{}}$ +4

What is the difference when the y-intercept of f(x) is subtracted from the y-intercept of g(x)?

$5 - 3$

$\boxed{2}$

---

9. Internet Company Y charges a $15 start-up fee plus $0.25 per megabyte, x. Internet Company Z charges $0.45 per megabyte, x, with no start-up fee. Which function represents the difference in cost between Company Y and Company Z?

A. f(x) = -0.20x – 15

Ⓑ f(x)= -0.20x + 15

C. f(x)= 15x - 0.20

D. f(x)= 15x + 0.20

$$Y: \ f(x) = 0.25x + 15$$
$$-$$
$$Z: \ f(x) = 0.45x$$
$$\overline{f(x) = -0.20x + 15}$$
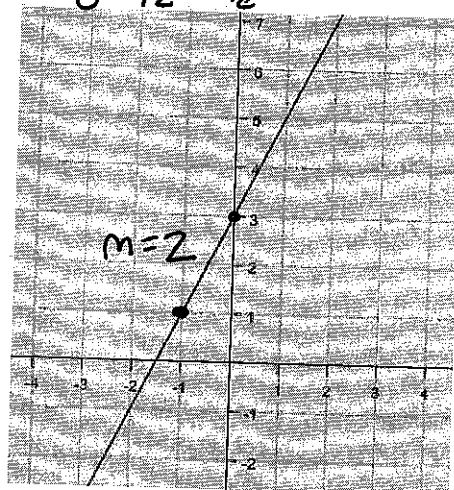
Subtract the company Z function from the company Y function

---

10. Caden compared the slope of the function graphing below to the slope of the linear function that has an x-intercept of ½ and a y-intercept of -3.

$(\frac{1}{2}, 0)$ $(0, -3)$

$$\frac{-3-0}{0-1/2} = \frac{-3}{-1/2} = 6$$ $m = 6$

$m = 2$

What is the slope of the function with the smaller slope?

2

. The table below shows the monthly paycheck an employee earns based on the number of cars sold.

Cars Sold	Monthly Paycheck
6	$2,500
12	$4,000
18	$5,500
24	$7,000

What is the meaning of the slope of the linear model for the data?

    A. The employee earns $350 for every car sold
    B. The employee earns $250 for every car sold *(circled)*
    C. The employee earns $250 each month
    D. The employee earns $350 each month

---

12. Adam and Sam began saving money the same week. The table below shows the models for the amount of money Adam and Sam had saved after x weeks.

Adam's Savings	$f(x) = 12x + 5$
Sam's Savings	$g(x) = 9x + 47$

After how many weeks will Adam and Sam have the same amount of money saved?

    A. 10 weeks
    B. 12 weeks
    C. 14 weeks *(circled)*
    D. 9 weeks

(handwritten work)
$$12x + 5 = 9x + 47$$
$$-9x \qquad -9x$$
$$3x + 5 = 47$$
$$-5 \quad -5$$
$$\frac{3x}{3} = \frac{42}{3} \qquad x = 14$$

---

13. What is the solution to the equation:

$$-7x + 4(6x - 2) + 12 = -18x + 10$$

(handwritten work)
$$-7x + 24x - 8 + 12 = -18x + 10$$
$$17x + 4 = -18x + 10$$
$$+18x \qquad +18x$$
$$35x + 4 = 10$$
$$-4 \quad -4$$
$$\frac{35x}{35} = \frac{6}{35}$$
$$x = \frac{6}{35}$$

---

14. The table below shows the cost of a sub sandwich based on the number of meat selections on it.

Number of Meats (m)	Cost (C)
1	7
2	8.25
3	9.50
4	10.75

(handwritten: +1 between rows; $1.25 brackets between cost values)

Which function represents the cost of a sub with m meat selections?

A. $C(m) = 7m$
B. $C(m) = 7 + m$
C. $C(m) = 1.25m + 7$
D. $C(m) = 7 + 1.25(m - 1)$ *(circled)*

---

15. There were originally 5 plants in a blueberry field. Each year the owner planted the same number of plants. In the 30th year, there were 245 plants in the field. Which function $f(x)$, can be used to determine the number of plants in the field in any year, x?

A. $f(x) = \frac{245}{30}x + 5$ B. $f(x) = \frac{245}{30}x - 5$

C. $f(x) = 8x + 5$ *(circled)*   D. $f(x) = x^2$

(handwritten)
$$245 - 5 = 240 \quad \text{Started with 5 already there}$$
$$240 \text{ plants over 30 yrs}$$
$$\frac{240}{30} = 8$$

---

16. The sequence below shows the total number of days Selina had used her gym membership at the end of weeks 1,2,3, and 4
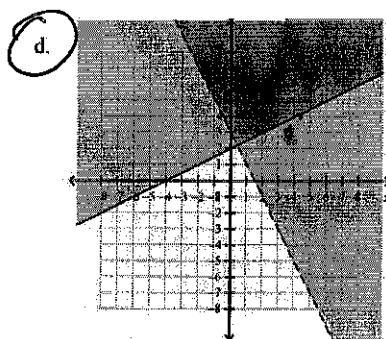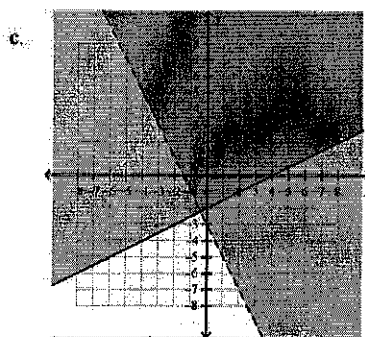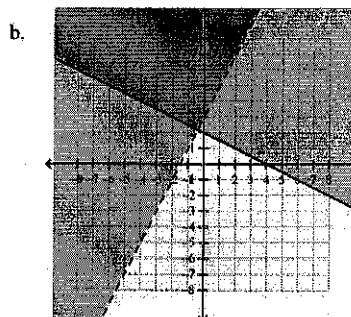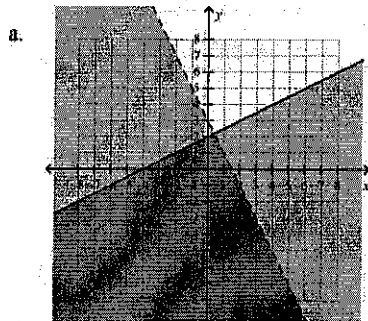
$$3, 9, 15, 21, \ldots$$

Assuming the pattern continued, which function could be used to find the total number of days Selina had used her gym membership at the end of week n?

A. $f(n) = n + 6$ B. $f(n) = 6n - 3$ *(circled)*

C. $f(n) = 6n + 4$ D. $f(n) = n^2$

. A system of inequalities is shown below.

$$\begin{cases} 12x + 6y > 18 \\ x - 2y \le -4 \end{cases}$$

$6y > -12x + 18 \rightarrow \boxed{y > -2x + 3}$

$-2y \le -x - 4 \rightarrow \boxed{y \ge \tfrac{1}{2}x + 2}$

Which graph shows the solution set to the system?

a.

b.

c.

d. (circled)

---

18. What is the solution of the inequality:

$$3 - (2x - 7) \le 34 - 6x$$

$3 - 2x + 7 \le 34 - 6x$

$10 - 2x \le 34 - 6x$
$ + 6x \quad + 6x$

$10 + 4x \le 34$
$-10 \qquad -10$

$\dfrac{4x}{4} \le \dfrac{24}{4}$

$\boxed{x \le 6}$

---

19. What is the value of x in the equation:

$$(8)\tfrac{3}{4}x + (8)\tfrac{6}{8} = (8)\tfrac{1}{2}x - \tfrac{1}{4}(8)$$

$6x + 6 = 4x - 2$
$-4x \qquad -4x$

$2x + 6 = -2$
$-6 \quad -6$

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

$\boxed{x = -4}$

---

20. What is the value of x for

$$-12(4x - 5) + 10x - 24 = 49 - 3(9x + 4)$$

$-48x + 60 + 10x - 24 = 49 - 27x - 12$

$-38x + 36 = 37 - 27x$
$+27x \qquad\qquad +27x$

$-11x + 36 = 37$
$-36 \quad -36$

$\dfrac{-11x}{-11} = \dfrac{1}{-11}$

$\boxed{x = -\dfrac{1}{11}}$

---

21. What is the domain of the graph below?
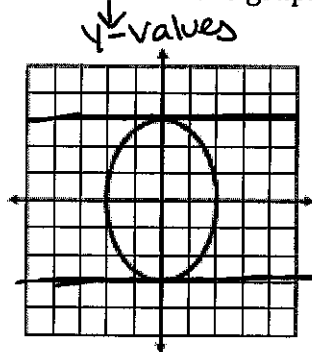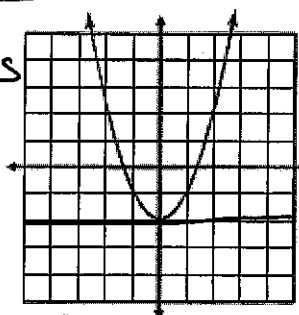
y = values

$$-3 \le y \le 3$$

22. What is the value of $f(-4)$ for the function $\dfrac{4x-10}{2}$

$$\dfrac{4(-4)-10}{2} = \dfrac{-16-10}{2} = \dfrac{-26}{2}$$

$$f(-4) = \boxed{-13}$$

23. What is the range of the graph below?

y-values

y values are -2 or bigger

$$\boxed{y \geq -2}$$

24. The length of the sides of a triangle are three consecutive even integers. What is the length of the longest side if the perimeter is 48 units?

X
$X+2$
$X+4$

$$3x+6 = 48$$
$$\dfrac{-6 \quad\quad -6}{3X = 42}$$
$$X = 14$$
$$X+2 = 16$$
$$X+4 = 18$$

$$\boxed{\text{Longest: } 18}$$

25. The function $f(x) = -4x + 87$ models the temperature in a house x minutes after the air conditioning is turned on. What is the meaning of the y-intercept of the function?

A. The final temperature in the house

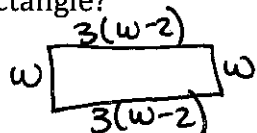B. The rate at which the temperature is changing

C. The initial temperature in the house

D. The amount of time it will take for the temperature to go down

26. A rectangle has a perimeter of 108 units. The length of the rectangle is 3 times 2 less than the width. What is the width of the rectangle?

$w = $ width
$3(w-2) = $ length

$$w + w + 3(w-2) + 3(w-2) = 108$$
$$\underline{w} + \underline{w} + 3\underline{w}\,\cancel{-6} + 3\underline{w}\,\cancel{-6}$$
$$8w - 12 = 108$$
$$\dfrac{+12 \quad +12}{8w = 120}$$
$$w = 15$$

$$\boxed{15 \text{ units}}$$

27. The expression $3m + 4t + 2f$ gives the number of points a student can earn on a test when m multiple choice questions, t true false questions and f fill in the blank questions are answered correctly. Which statement is NOT true?

A. The coefficient 3 indicates that each correct multiple choice question earns 3 points

B. The term 4t represents the total number of points earned from the true false questions worth 4 points per question.

C. The term 2f represents the total number of points earned from 2 fill in the blank questions.

₃. R is the midpoint of segment PS. Q is the midpoint of segment RS.
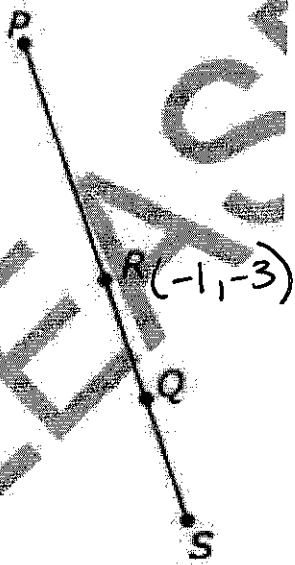
Midpoint R

$$\left(\frac{7+(-9)}{2}, \frac{(-4)+(-2)}{2}\right)$$

$$(-1, -3)$$

Midpoint Q
Use R and S Points
$(-1, -3)$ $(-9, -2)$

$$\left(\frac{(-1)+(-9)}{2}, \frac{(-3)+(-2)}{2}\right)$$

$$\left(-5, \frac{-5}{2}\right)$$

P is located at (7, -4) and S is located at (-9, -2). What are the coordinates of Q?
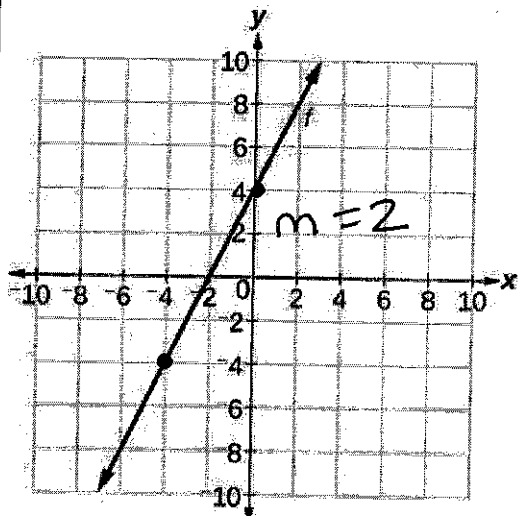
$$\left(-5, -\frac{5}{2}\right)$$

---

29. The formula for calculating velocity is $v = \frac{d}{t}$ where d represents distance and t represents the time. Solve the formula for t.

$$(t)\ V = \frac{d}{t}(t)$$

$$\frac{Vt}{V} = \frac{d}{V}$$

$$t = \frac{d}{V}$$

---

30. What is the equation that represents a line that is perpendicular to the graphed line and passes through (-5, 4)?

$m = 2$

$m = -\frac{1}{2}$

$(-5, 4)$

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

$$y - 4 = -\frac{1}{2}x - \frac{5}{2}$$
$$ +4 \qquad\qquad +4$$

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