

Foundations of Math I
Final Exam Study Guide

1.) Water is drained from a 10-foot cylindrical tank at a constant rate.

- The depth of the water is decreasing linearly.
- At 1:30 PM, the water depth was 4.5 feet.
- At 4:00 PM, the water depth was 3.9 feet.

If the linear pattern continues, what will the depth (in feet) of the water be at 5:00 PM?

$(1.5, 4.5) (4, 3.9)$

$$m = \frac{3.9 - 4.5}{4 - 1.5}$$

$$m = -0.24 \text{ ft/hr}$$

$3.9 - .24$
3.66 ft

2.) The length of rectangle is six inches more than its width. If the perimeter of the rectangle is 24 inches, find the width.

A. 9 inches B. 4 inches

C. 9 inches D. 3 inches

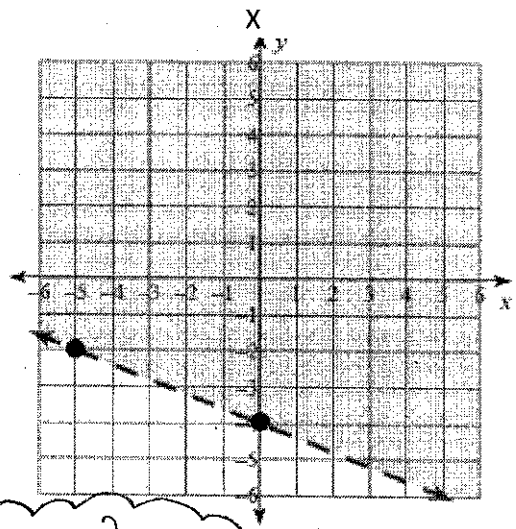
$$4W + 12 = 24$$

$$4W = 12$$

$$W = 3$$

$W + L$
 $P = 24$
 $W + L$

3.) Write the inequality that matches the graph below.



$y > -\frac{2}{5}x - 4$

4.) "Three times the difference of a number and 9 is 18 more than 8 times the number." What is **twice** the number?

$$3(n - 9) = 8n + 18$$

$$3n - 27 = 8n + 18$$

$$-5n = 45$$

$$n = -9$$

$2n = -18$

5.) This summer, Shane plans to join a swim club for \$40. He has to pay an additional \$4.00 per visit. If Shane does not want to spend more than \$120, what is the maximum number of times he can visit the pool this summer?

$$4x + 40 \leq 120$$

$$\begin{array}{r} 4x + 40 \leq 120 \\ -40 \quad -40 \\ \hline 4x \leq 80 \\ \frac{4x}{4} \leq \frac{80}{4} \\ x \leq 20 \end{array}$$

20 VISITS

6.) A company charges \$18 plus \$4 per hour to rent a boat. Destiny and Janay want to rent a boat but do not want to spend more than \$30 each. What is the maximum number of hours the girls can rent a boat?

$$4x + 18 \leq 30$$

$$4x \leq 12$$

$$x \leq 3$$

13 HOURS

~~C.~~ $5x + 3y = 3$

D. $5x - 3y = 3$

15.) Which is the equation of the line that passes through the points $(-4, 3)$ and $(2, -6)$?

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

B. $y = -\frac{3}{2}x - 3$

~~C.~~ $y = \frac{3}{2}x + 3$

~~D.~~ $y = \frac{3}{2}x - 3$

$$m = \frac{-6 - 3}{2 - (-4)} = \frac{-9}{6}$$

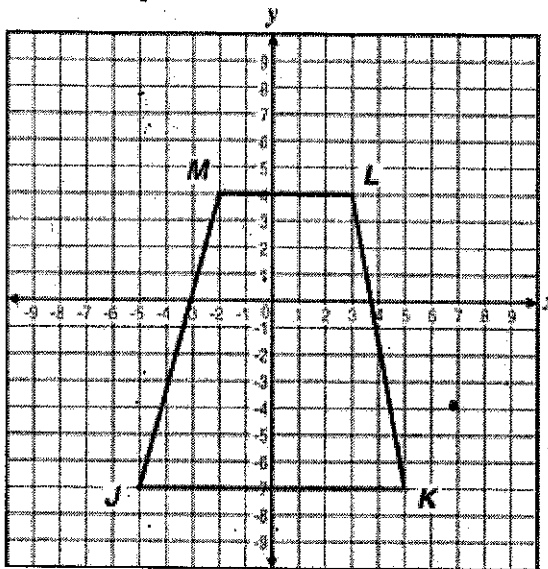
$$m = \frac{-3}{2} \quad (-4, 3)$$

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

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

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

16.) Trapezoid $JKLM$ is shown below. The coordinates of $J, K, L,$ and M are $(-5, -7), (5, -7), (3, 4)$ and $(-2, 4)$, respectively.



What is the equation of the line \overline{JM} ? $(-5, -7)(-2, 4)$

$$y - 4 = \frac{11}{3}(x + 2)$$

$$y - 4 = \frac{11}{3}x + \frac{22}{3}$$

$y = \frac{11}{3}x + \frac{34}{3}$

17.) Isaac rented a movie but forgot to return it on time. The table below shows the total amount of money that Isaac owed after different numbers of days.

Number of Days (x)	Total Owed (y)
2	\$4.50
5	\$9.00
6	\$10.50
8	\$13.50

Which function models the amount of money Isaac owed after x days?

A. $y = 1.50x + 1.75$

B. $y = 1.50x + 3$

C. $y = 1.50x$

D. $y = 1.50x + 1.50$

19.) John is saving to buy a television that costs \$1250. John currently has \$200 saved. He plans to save an additional \$50 each week. Write a linear equation to model John's savings.

$$y = 50x + 200$$

18.) A sequence is shown below:

$$-7, -9, -11, -13$$

Write an explicit formula can be used to determine the n th term of the sequence.

$$d = -2$$

$$a_n = -2(n-1) - 7$$

$$= -2n + 2 - 7$$

$a_n = -2n - 5$

20.) The function $g(x) = 20x + 100$ models the balance of Liz's savings account after x months. What is the meaning of the y -intercept of the function?

A. the initial amount Liz starts with each year in the account

B. the initial amount in Liz's bank account

C. the additional amount Liz saves per month

D. the additional amount Liz saves per year

21.) The function below shows the cost of a hamburger with different numbers of toppings (t). $f(t) = 1.90 + 1.40t$. What is the y-intercept, and what does it mean?

It costs \$1.90 for a hamburger with no toppings.

22.) Which of the following expressions represents the sequence 12, 13.50, 15, 16.50 written explicitly for $n = 1, 2, 3, \dots$?

A. $f(n) = 12 + 1.5(n - 1)$ B. $f(n) = 1.5n + 12$
~~C. $f(n) = 12 + n$~~ ~~D. $f(n) = 12n$~~

23.) Solve the inequality:

$$\begin{array}{r} 3x - 6 \leq -2x + 4 \\ +2x \quad +2x \\ \hline 5x - 6 \leq 4 \\ 5x \leq 10 \\ x \leq 2 \end{array}$$

24.) At SeptemberFest, the first dance of the year, the Students' Council charged \$3 for couples and \$2 for singles. If 365 tickets were sold and the total receipts were \$925, which pair of equations would determine the number of each ticket sold?

A. $x - y = 365$ B. $x + y = 925$
 $3x + 2y = 925$ C. $3x + 2y = 365$
 $x + y = 925$ D. $3x + 2y = 925$
 $x + y = 365$

25.) The total cost, in dollars, of membership in a basketball league is given by the function $m(x) = 25x + 50$, where m is the number of months a person is a member. In dollars, how much is the cost of membership for two years?

$25(24) + 50 = 600 + 50 = 650$
 24 months.
 \$650

26.) Which of the following is equivalent to the equation $4x + 7y = z$?

A. $x = 4z - 28y$ B. $x = \frac{(z - 7y)}{4}$
 C. $y = 7z + 28x$ D. $y = \frac{(z + 4x)}{7}$

27.) A manufacturer makes two kinds of computers, laptops and desktops. The company has equipment to manufacture any number of laptops up to 600 per month or any number of desktops up to 800 per month. However, the company can manufacture at most 1,000 computers of both kinds per month in all. It takes 35 hours to manufacture either type of computer and the manufacturer has available 25,000 hours per month. Which system of inequalities models this scenario?

A. $x \leq 600$
 $y \leq 800$
 $x + y \leq 1000$
 $35x + 35y \geq 25000$

B. $x \leq 600$
 $y \leq 800$
 $x + y \leq 1000$
 $35x + 35y \leq 25000$

~~C. $x \leq 600$
 $y \leq 800$
 $x + y \geq 1000$
 $35x + 35y \geq 25000$~~

~~D. $x \geq 600$
 $y \geq 800$
 $x + y \geq 1000$
 $35x + 35y \geq 25000$~~

28.) Find the y-coordinate of the systems of equations:

$$\begin{array}{r} 4x + 2y = 10 \\ 4(x - y) = 13 \end{array}$$

$$\begin{array}{r} 4x + 2y = 10 \\ 4x - 4y = 52 \\ \hline 6y = -42 \\ y = -7 \end{array}$$

29.) What value of x satisfies the equation $5(x - 3) - 2(x + 1) = 4$?

$$\begin{array}{r} 5x - 15 - 2x - 2 = 4 \\ 3x - 17 = 4 \\ 3x = 21 \\ x = 7 \end{array}$$

30.) MATCHING - Three systems of equations are in the table below. Draw a line to identify the choice that describes the number of solutions of each system.

$\begin{aligned} 2x + 8y &= 6 \\ -5x - 20y &= -15 \end{aligned}$	One Solution
$\begin{aligned} -3x + 3y &= 4 \\ -x + y &= 3 \end{aligned}$	Infinitely Many Solutions
$\begin{aligned} 3x - 2y &= 2 \\ 5x - 5y &= 10 \end{aligned}$	No Solution

(-2, -4)

31.) Two stores have movies to rent.

- The first store charges a \$12.00 per month membership fee plus \$2.50 per movie rented.
- The second store has no membership fee but charges \$4.50 per movie rented.

What is the minimum number of movies a person would need to rent in a month for the first store to be a better deal?

7 MOVIES

32.) Ann and Betty together have \$60. Ann has \$9 more than twice Betty's amount. How much money does Ann have?

$$\begin{aligned} X + Y &= 60 \\ X &= 2Y + 9 \\ Y &= 30 + Y \\ X &= 2(17) + 9 \\ X &= \$43 \end{aligned}$$

33.) The function $a(n) = 7n - 3$ represents the value of the n th term in a sequence. What is the sum of the second and the sixth term in the sequence?

11 39
50

34.) The width of a rectangle is $\frac{3}{4}$ its length. If the perimeter is 252 cm. Find the dimensions of the rectangle.

$$\begin{aligned} 2(L) + 2\left(\frac{3}{4}L\right) &= 252 \\ 2L + 1.5L &= 252 \\ 3.5L &= 252 \\ L &= 72 \text{ cm} \\ W &= 54 \text{ cm} \end{aligned}$$

35.) Allyson has taken four tests and made 82, 77, 75, and 84. Allyson really wants to make a B in the class, which means she needs an overall average of 80. What does Allyson need to make on the final to get a B in the class?

$$\frac{82 + 77 + 75 + 84 + X}{5} = 80$$

$$318 + X = 400$$

X = 82

36.) Two functions are shown shbelow.

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

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

What is the value of x where the graphs of $f(x)$ and $g(x)$ intersect?

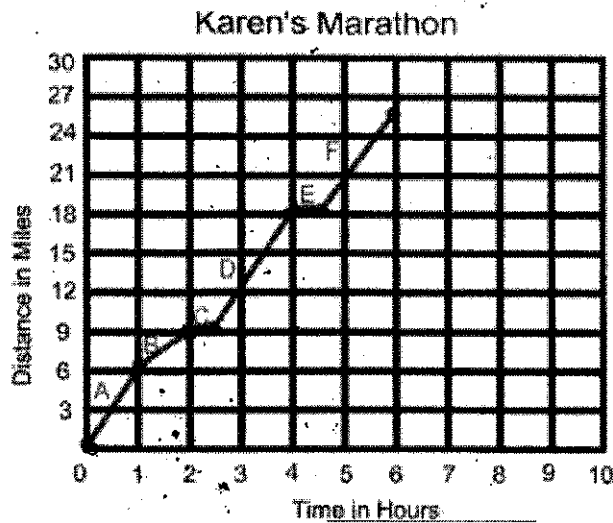
X = 1/2

37.) A function is shown below:

What is the value of $h(20)$?

$$\begin{aligned} h(x) &= 14.35 - 0.7x \\ h(20) &= 14.35 - 0.7(20) \\ h(20) &= .35 \end{aligned}$$

38.) The following graph represents Karen's marathon.



$(0,0) (2,9) = 4.5$
 $(1,6) (3,12) = 3$
 $(3,12) (4,18) = 6$

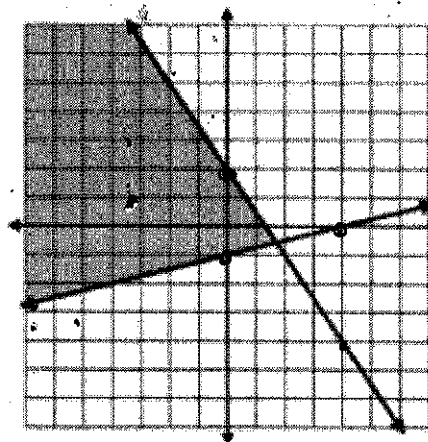
During which interval did Karen have the greatest rate of change?

A. 0 - 2 hours

B. 1 - 3 hours

C. 3 - 4 hours

39.) Which system of inequalities is represented by the graph below?



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

a) $y \leq \frac{2}{3}x + 2$

b) $y \geq \frac{2}{3}x + 2$

$y \geq 4x + 1$

$y \leq 2x + 1$

c) $y \leq \frac{2}{3}x - 2$

d) $y \leq -\frac{3}{2}x + 2$

$y \geq 4x + 5$

$y \geq \frac{1}{4}x - 1$

40.) Circle the first incorrect step in solving the equation below.

$3 - 2(x + 4) = -17$

$3 - 2x - 8 = -17$

$5 - 2x = -17$

$2x = -22$

$x = 11$

$-5 - 2x = -17$
 $-2x = -12$
 $x = 6$