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MATH

GRADE 9 (Advanced)

Revision



Term 1
2019/2020

Mock Exam A

Part I

Circle the letter corresponding to the correct answer.

1) Write a simplified expression to represent 4 times the sum of x and 5 increased by 10.

a) $4x + 30$

b) $4x + 25$

c) $20x + 10$

d) $60x$

2) Solve $2^3 - b > -6(2 - 4)$.

a) $b < -6$

b) $b < -4$

c) $b > -6$

d) $b > -4$

3) Evaluate $\frac{a^2 - b}{-c}$ for $a = -3$, $b = -1$, and $c = 2$

a) -4

b) 4

c) 5

d) -5

4) Evaluate $|-2(5a + b)| - |a - b^2|$ for $a = 1$ and $b = -2$.

a) 3

b) -3

c) 1

d) -9

5) A number is divided by three. The result is added to one. This result is multiplied by two to give 8. What is the number?

- a) 18
- b) 45
- c) 1
- d) 9

6) Solve $|x + 5| = 13$.

- a) 8
- b) -18
- c) no solution
- d) 8, -18

7) Solve $\frac{1}{2} + x = -\frac{3}{4}$

- a) $-\frac{1}{4}$
- b) $-1\frac{1}{4}$
- c) -1
- d) 1

8) Solve $2x + 4(x - 8) = \frac{3}{5}(10x + 15)$.

- a) 0
- b) all real numbers
- c) no solution
- d) 9

9) Solve the proportion $\frac{x+3}{4} = \frac{x-2}{5}$.

- a) 23
- b) -23
- c) 7
- d) -7

10) Solve $\frac{2}{3}x - \frac{1}{2} \leq \frac{1}{3}x$.

a) $x \geq \frac{3}{2}$

b) $x \leq \frac{3}{2}$

c) $x \geq 1$

d) $x \leq -1$

11) Write an equation to describe the relationship between the number of games and the points scored.

Number of games, x	3	4	5	6
Points scored, y	24	32	40	48

a) $y = 24x$

b) $y = 3x$

c) $y = 8x$

d) $y = \frac{1}{8}x$

12) The number of students at a school decreased from 840 to 735 over a 5-year period. What was the percent of decrease?

a) 27.10%

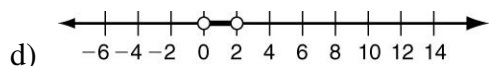
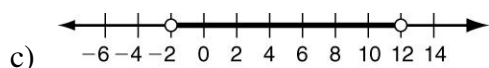
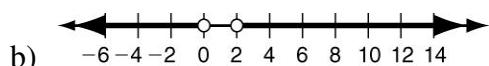
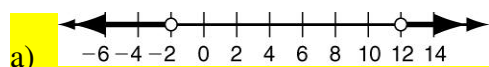
b) 12.5%

c) 21.0%

d) 14.29%

13) Which graph represents the solutions of

$x + 3 < 1$ OR $x - 6 > 6$?



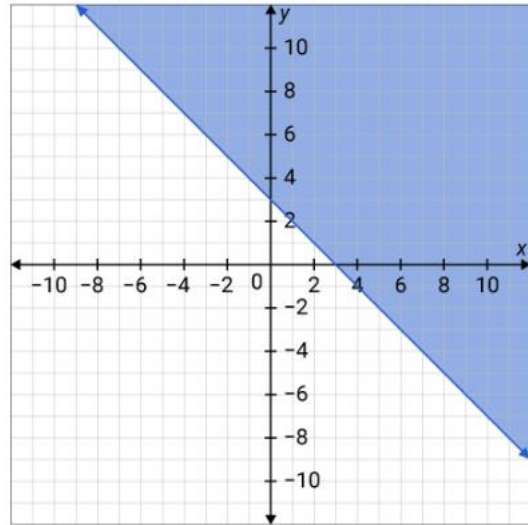
14) The solution of which linear inequality is graphed below?

a) $y \geq -x + 3$

b) $y > -x + 3$

c) $y < -x + 3$

d) $y \leq -x + 3$



15) Solve by substitution: $2x - y = 9$
 $x = 4y + 1$

a) (5, 1)

b) (1, 5)

c) (2, 7)

d) (7, 11)

16) Solve by elimination: $2x - 3y = 14$
 $3x + 2y = 8$

a) (2, -4)

b) (4, -2)

c) (-2, 4)

d) (4, -1)

17) Which set of ordered pairs satisfies a linear function?

a)

x	1	1	1	1
y	4	6	8	10

b)

x	4	5	6	7
y	5	4	3	2

c)

x	1	2	3	4
y	5	7	10	12

d)

x	2	4	6	8
y	6	4	2	-3

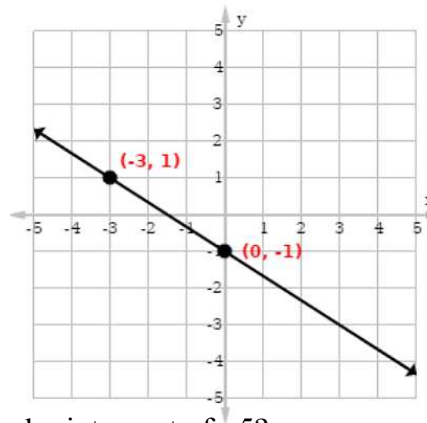
18) Find the slope of this line.

a) $-\frac{2}{3}$

b) $\frac{2}{3}$

c) $-\frac{3}{2}$

d) $\frac{3}{2}$



19) Which equation describes the line with a slope of 2 and y-intercept of -5 ?

a) $y = -5x + 2$

b) $y = 2x - 5$

c) $y = 5x - 2$

d) $y = 2x + 5$

20) y varies directly with x , and $y = -8$ when $x = 4$. Find y when $x = 15$.

a) 30

b) 7.5

c) -7.5

d) -30

21) What is the common difference of the sequence 3, 2.5, 2, 1.5, ...?

a) 0.5

b) 3

c) 2.5

d) -0.5

22) Which equation describes a line that passes through $(-3, 6)$ and is parallel to the line described by $y = 3x - 4$?

a) $y = 3x + 15$

b) $y = -\frac{1}{3}x + 5$

c) $y = -3x - 3$

d) $y = \frac{1}{3}x + 7$

23) The common difference of an arithmetic sequence is -6 . If a_{10} is 30, what is a_1 ?

a) 15

b) 30

c) 84

d) -84

24) Solve the following system for y :

$$\begin{aligned} 2x + y &= 8 \\ 2x - y &= -2 \end{aligned}$$

a) $y = 5$

b) $y = -5$

c) $y = 2$

d) $y = -2$

25) If $f(x) = 7x + 5$, find $f^{-1}(x)$.

a) $f^{-1}(x) = 5x + 7$

b) $f^{-1}(x) = -7x - 5$

c) $f^{-1}(x) = \frac{x+5}{7}$

d) $f^{-1}(x) = \frac{x-5}{7}$

Part II

26) Write an equation for the n^{th} term of the arithmetic sequence. Then graph the first five terms in the sequence. $-9, -14, -19, -24, \dots$ **The common difference is -5**

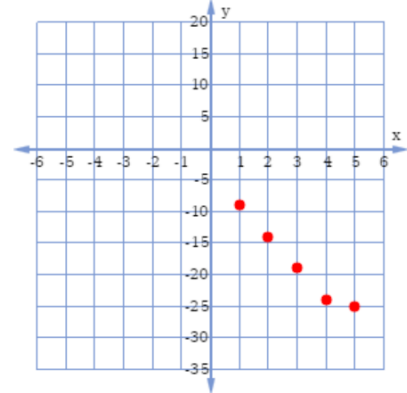
$$a_n = a_1 + (n - 1)d$$

$$a_n = -9 + (n - 1) - 5$$

$$a_n = -9 - 5n + 5$$

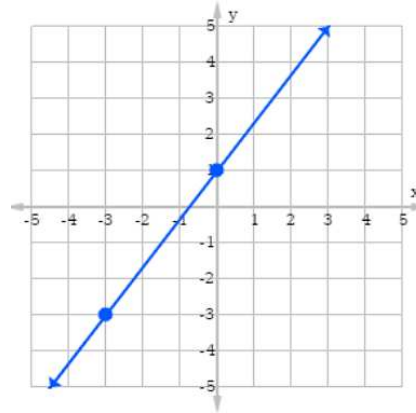
$$a_n = -5n - 4$$

n	$-5n - 4$	a_n	(n, a_n)
1	$-5(1) - 4$	-9	(1,-9)
2	$-5(2) - 4$	-14	(2,-14)
3	$-5(3) - 4$	-19	(3,-19)
4	$-5(4) - 4$	-24	(4,-24)
5	$-5(5) - 4$	-29	(5,-29)



27) Write an equation in function notation for the given relation.

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



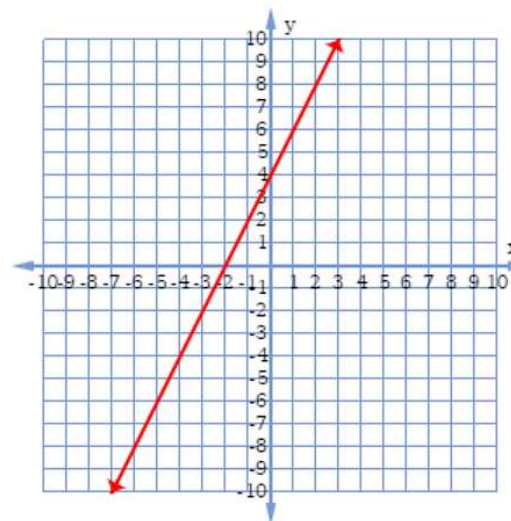
28) Solve $2x + 1 = -3$ by graphing.

$$2x + 1 = -3$$

$$2x + 4 = 0$$

$$y = 2x + 4$$

$$\text{Solution: } x = -2$$



29) Fatima creates floral arrangements at her flower shop. She sells roses for AED 25 each and lilies for AED 45 each. She wants to create a floral arrangement that has 20 flowers made up of roses and lilies. She wants the average price for one of these flowers to be AED 38. How many of each flower should Fatima put in the vase? $r = \text{roses}$ $l = \text{lilies}$

Total number of flowers: $r + l = 20 \rightarrow r = 20 - l$

Total cost of flowers: $25r + 45l = 760$

$$25(20 - l) + 45l = 760$$

$$500 - 25l + 45l = 760$$

$$500 + 20l = 760$$

$$20l = 260$$

$$l = 13$$

$$r + 13 = 20$$

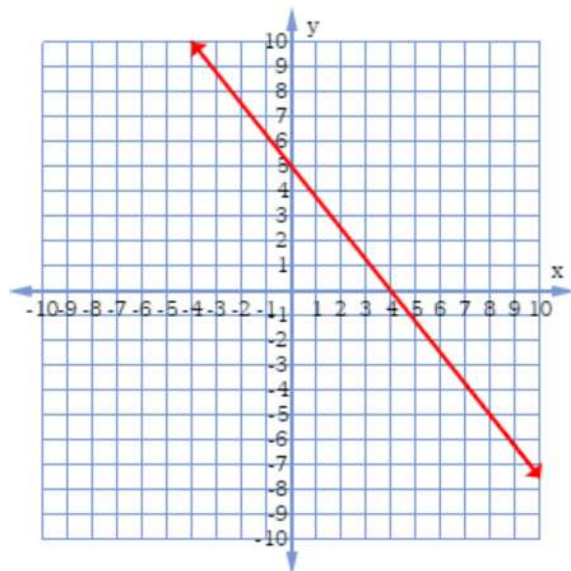
$$r = 7$$

Fatima should put 7 roses & 13 lilies in the vase.

30) Use the x - and y - intercepts to graph $5x + 4y = 20$.

If $x = 0$, y -intercept = 5

If $y = 0$, x -intercept = 4



31) Write an algebraic expression to represent the area of the rectangle. Then evaluate it to find the area when $m = 7$ cm.

$$A = l \times w$$

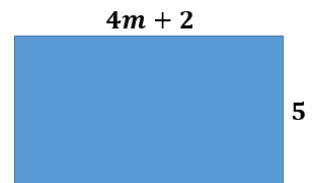
$$A = (4m + 2) \times 5$$

$$A = 20m + 10$$

When $m = 7$ cm

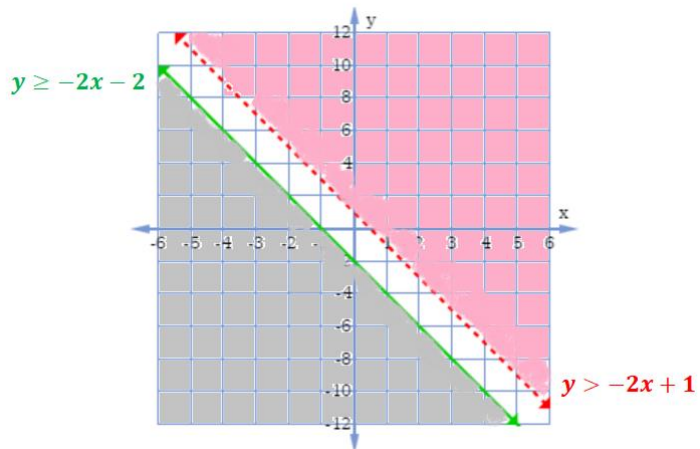
$$A = 20(7) + 10$$

$$A = 150 \text{ cm}^2$$



32) Solve $y > -2x + 1$
 $y \leq -2x - 2$ by graphing.

The two regions do not intersect at any point, so the system has NO solution.



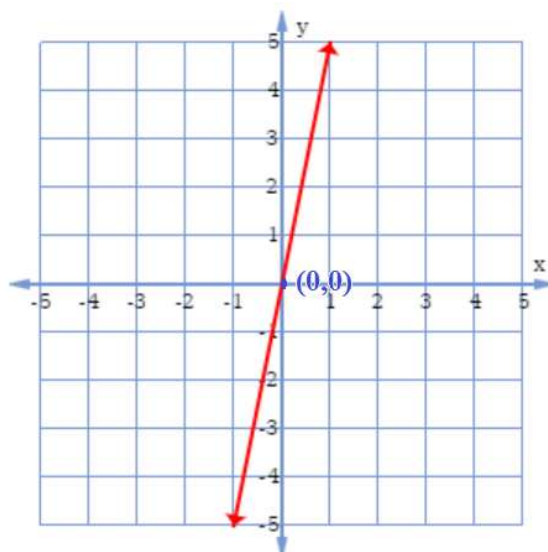
33) Determine the related function for the arithmetic sequence 5, 10, 15, ... Then determine if the function is proportional or nonproportional. Explain.

The common difference is 5.

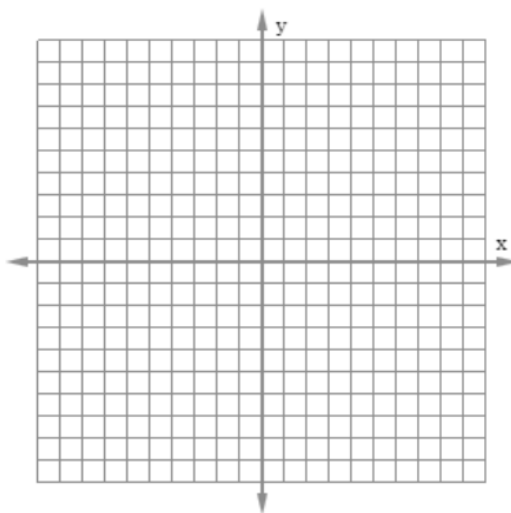
n	$5n$	a_n	(n, a_n)
0	$5(0)$	0	$(0,0)$
1	$5(1)$	5	$(1,5)$
2	$5(2)$	10	$(2,10)$
3	$5(3)$	15	$(3,15)$

$$\begin{aligned} a_n &= a_1 + (n - 1)d \\ &= 5 + (n - 1)5 \\ &= 5 + 5n - 5 \\ &= 5n \end{aligned}$$

The function is proportional since $y = 5n$ and it passes through $(0,0)$



34) Graph $f(x) = |x| - 3$.



35) The graph of $f(x)$ is a line passing through $(1, 4)$ and $(2, 8)$. What is the equation for its inverse function $f^{-1}(x)$?

$(4, 1)$ & $(8, 2)$ slope: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 1}{8 - 4} = \frac{1}{4}$

$$y = mx + b$$

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

$$1 = 1 + b$$

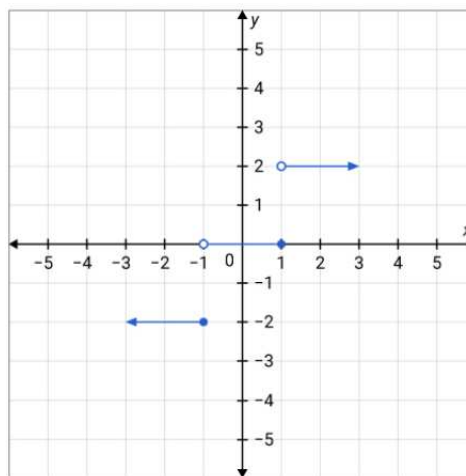
$$b = 0$$

$$f^{-1}(x) = \frac{1}{4}x$$

36) Find the domain and the range of the function with the given graph.

Domain: All real numbers

Range: $y = 2, 0, -2$



Mock Exam B

Part I

Circle the letter corresponding to the correct answer.

1) Choose the correct verbal expression for the algebraic expression $3(a^2 - 9) + 5$.

- a) three times a squared minus nine plus five
- b) three times the quantity of a squared minus nine, plus five
- c) a squared minus nine times three, plus five
- d) 9 less than a squared minus nine plus five

2) Simplify $3(5a + b) - 4(a - 2b)$.

- a) $11a - 5b$
- b) $19a + 3b$
- c) $11a + 11b$
- d) $4a - 5b$

3) Evaluate $a(3 + b^2 - 2c)$ for $a = 3$, $b = -2$, and $c = 5$

- a) -33
- b) -9
- c) 27
- d) -27

4) Translate the following sentence into an equation.

The product of six and a number x is two less than the quotient of three and x .

- a) $6 + x = \frac{3}{x} - 2$
- b) $6x = \frac{3}{x} - 2$
- c) $6x = 2 - \frac{3}{x}$
- d) $6 + x = 2 - \frac{3}{x}$

5) Solve $|x+8| = -13$.

a) 5

b) -21

c) no solution

d) 5, -21

6) Solve $4(3m + 2) = -3(m - 7)$.

a) $\frac{13}{15}$

b) $-1\frac{4}{15}$

c) $1\frac{14}{15}$

d) -13

7) Solve the proportion $\frac{7}{3x} = \frac{1}{12}$.

a) 4

b) 28

c) 56

d) 16

8) Solve the compound inequality

$$-7 \leq m + 2 < 8.$$

a) $10 \leq m < 16$

b) $6 \leq m < 39$

c) $-5 \leq m < 10$

d) $-9 \leq m < 6$

9) Solve $\frac{x}{21} - \frac{1}{3} = \frac{1}{21}$

- a) -8
- b) 6
- c) -6
- d) 8

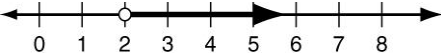
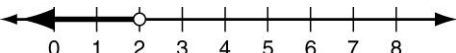

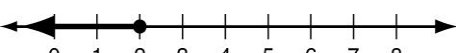
10) The formula for the volume of a cone is $V = \frac{1}{3} \pi r^2 h$, where V represents the volume, r represents the radius of the base, and h represents the height. Solve for h .

- a) $h = \frac{V}{3\pi r^2}$
- b) $h = \frac{3V}{\pi r^2}$
- c) $h = \frac{3\pi V}{r^2}$
- d) $h = \frac{3Vr^2}{\pi}$

11) If 1 meter = 3.28 feet, use dimensional analysis to find 3.5 kilometers in miles. Round to the nearest hundredths. (*Hint*: 1 mi = 5280 ft)

- a) 1.51 mi
- b) 2.17 mi
- c) 5.63 mi
- d) 11.48 mi

12) Which graph represents $x \geq 2$?

- a) 
- b) 
- c) 
- d) 

13) The original price of a bicycle is AED 450. What is the total cost of the bicycle after 5% tax?

- a) AED 455
- b) AED 445
- c) AED 427.50
- d) AED 472.50

14) Which represents the solution of $|x| - 8 > 10$?

- a) $x > 18$ OR $x < -18$
- b) $x < 18$ OR $x \geq -18$
- c) $x > -18$ AND $x > 18$
- d) $x > 18$ AND $x < -18$

15) Which ordered pair belongs to the inverse of the relation shown in the table?

- a) (1, 8)
- b) (4, 7)
- c) (-6, 9)
- d) (3, 1)

x	1	4	7	9
y	8	3	-5	-6

16) Which represents the solution of $6(x - 4) > 2(9 + 3x)$?

- a) no solutions
- b) $x < 18$
- c) all real numbers
- d) $x > -24$

17) Classify $y = -2x - 2$
 $4x + 2y = 12$

- a) consistent and independent
- b) consistent and dependent
- c) inconsistent
- d) inconsistent and dependent

18) Solve by substitution: $y = 2x + 1$
 $4x + 5y = 12$

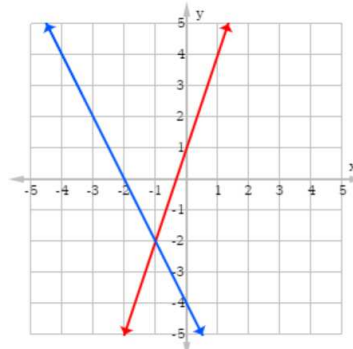
- a) (0.5, 2)
- b) (2, 0.5)
- c) (3, 7)
- d) (7, 3)

19) Solve by elimination: $2x - 5y = -4$
 $x + 5y = 13$

- a) (8, 4)
- b) (3, 2)
- c) $(\frac{5}{2}, \frac{9}{5})$
- d) $(4, \frac{9}{5})$

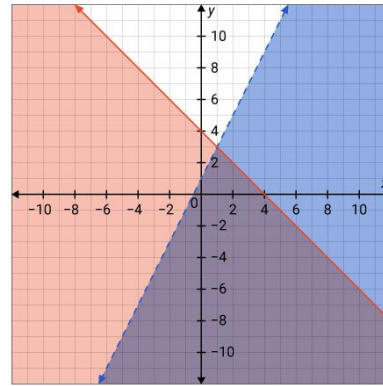
20) What is the solution of the system of linear equations with the given graph?

- a) (-1, -2)
- b) (-2, 0)
- c) (0, -4)
- d) (0, 1)



21) Which ordered pair is a solution of the system? (The purple area is the overlapping area)

- a) $(-8, 4)$
- b) $(0, 0)$
- c) $(8, 0)$
- d) $(0, 8)$

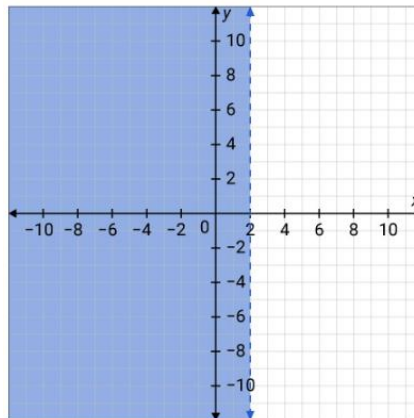


22) Find the value of p so that the line through $(-1, 2)$ and $(2, p)$ has a slope of $\frac{2}{3}$.

- a) -4
- b) 4
- c) -2
- d) 2

23) The solution of which linear inequality is graphed below?

- a) $x \geq 2$
- b) $x > 2$
- c) $x < 2$
- d) $x \leq 2$



24) What is the equation of the line passing through $(3, -4)$ with a slope of 0?

- a) $x = 3$
- b) $y = 3$
- c) $x = -4$
- d) $y = -4$

25) Which equation is NOT a direct variation?

- a) $y = 10x$
- b) $-3y = x$
- c) $2x + y = 10$
- d) $-5x + 7y = 0$

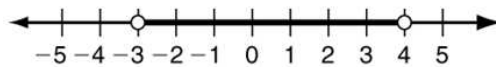
26) Which equation describes a line that passes through $(-3, 6)$ and is perpendicular to the line described by $y = 3x - 4$?

- a) $y = 3x + 15$
- b) $y = -\frac{1}{3}x + 5$
- c) $y = -3x - 3$
- d) $y = \frac{1}{3}x + 7$

27) Find the next three terms in this sequence: 120, 70, 20, -30, ...

- a) -70, -120, -170
- b) -80, -130, -180
- c) -60, -120, -170
- d) -80, -130, -170

28) Which compound inequality is shown by the graph below?



- a) $x > -3$ AND $x > 4$
- b) $x > -3$ AND $x < 4$
- c) $x > -3$ OR $x > 4$
- d) $x > -3$ OR $x < 4$

29) What is the best estimate for the x -intercept of the graph of the linear function represented in the table?

- a) between 3 and 5
- b) between 5 and 7
- c) between 7 and 9
- d) between 9 and 11

x	y
3	-3
5	-1
7	1
9	3
11	5

30) If $f(x) = 5x - 7$, find $f^{-1}(x)$.

- e) $f^{-1}(x) = 5x + 7$
- f) $f^{-1}(x) = -5x - 7$
- g) $f^{-1}(x) = \frac{x+7}{5}$
- h) $f^{-1}(x) = \frac{x-7}{5}$

Part II

Show all the details when answering these questions.

31) Tell whether $(-1, 8)$ is a solution of $y > 5 + 2x$.

$$y > 5 + 2x$$

$$y > 5 + 2(-1)$$

$$y > 3$$

Yes, $(-1, 8)$ is a solution of $y > 5 + 2x$ since $8 > 3$

32) A person walked 2.5 kilometers in 30 minutes and then jogged 1.5 more kilometers in 10 minutes. What was the average speed in kilometers per minute?

$$\begin{aligned} \text{Average speed} &= \frac{\text{Total distance}}{\text{Total time}} \\ &= \frac{2.5+1.5}{30+10} \\ &= \frac{4}{40} \\ &= 0.1 \text{ km/min} \end{aligned}$$

33) A teacher is choosing between two field trips. The first costs AED 1,200. The second costs AED 480 plus AED 40 per student. For what number of students is the first trip less expensive?

x = number of students

$$48x + 480 > 1200$$

$$48x > 720$$

$$x > 15$$

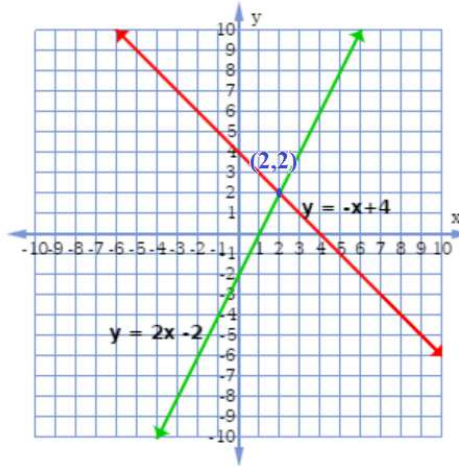
34) A chemist has a 2% acid solution and an 8% acid solution. He wants to mix the solutions to get 200 mL of a 5% acid solution. How many milliliters of each solutions does he need?

$$\begin{aligned} 0.02x + (0.08)(200 - x) &= (0.05)(200) \\ 0.02x + 16 - 0.08x &= 10 \\ -0.06x &= -6 \\ x &= 100 \end{aligned}$$

The chemist needs 100ml of the 2% acid solution and 100ml of the 8% acid solution to get 200ml of a 5% solution.

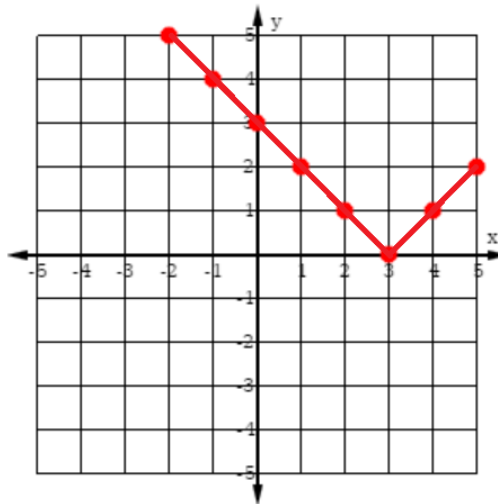
35) Solve $y = -x + 4$
 $y = 2x - 2$ by graphing.

Solution: (2,2)



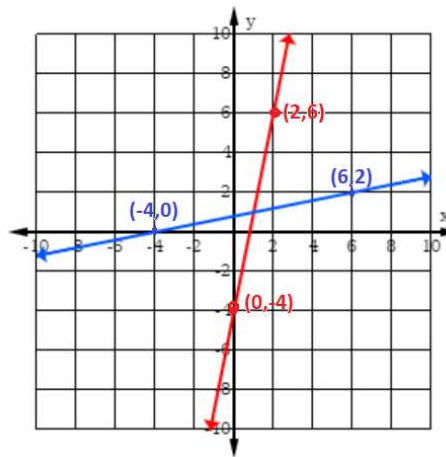
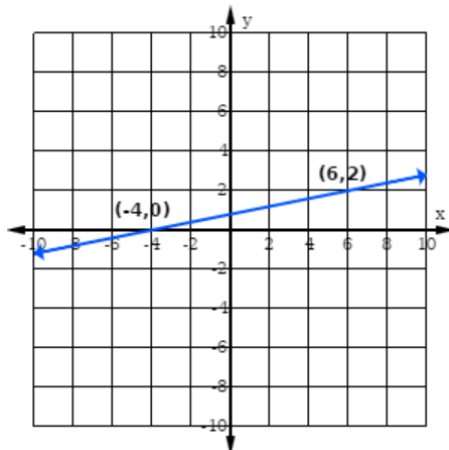
36) Graph $f(x) = |x - 3|$.

$f(x) = x - 3 $	
-2	5
-1	4
0	3
1	2
2	1
3	0
4	1
5	2



37) Graph the inverse of the function shown below.

The inverse function is:



38) Write the equation of the piecewise function with the given graph.

$$f(x) = \begin{cases} 3x + 3 & \text{if } x > -1 \\ -1 & \text{if } x \leq -1 \end{cases}$$

