

Name: _____ Class: _____ Date: _____

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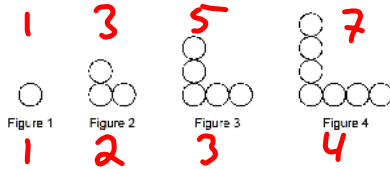
Math 9: Linear Relations Test

Short Answer

$$y = mx + b$$

↑ slope ↑ y-intercept

1. Determine an equation that relates the number of circles, C , to the figure number, n .



n	C
1	1
2	3
3	5
4	7

↓ +2 = m

$$C = 2n + b$$

$$C = 2n - 1$$

2. The pattern in this table continues. Write an equation that relates the term value to the term number.

Term Number, t	1	2	3	4	5
Term Value, w	5	8	11	14	17

↓ +3 ↓ +3 ↓ +3 ↓ +3

$$w = mt + b$$

$$w = 3t + 2$$

3. Shirley has \$540 in her bank account. She withdraws \$35 each week to cover her expenses.
 a) Write an equation that relates the amount of money in her account, A dollars, after n weeks.
 b) Determine the amount of money in Shirley's account after 8 weeks.

$$A = mn + b$$

$$A = -35n + 540$$

n	A
0	540
1	505
2	470
3	435

4. a) Create a table of values for the linear relation $y = \frac{1}{2}x - 1$. Use $-4, -2, 0, 2, 4$ for values of x .

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

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

$$= -2 - 1 = -3$$

5. Dorina is having a party. She estimates that she will need 5 sandwiches for each guest, and 12 extra sandwiches for unexpected guests.

a) Write an equation that relates the total number of sandwiches, T , to the number of guests, p .
 b) How many sandwiches will Dorina need for 16 guests?

$$T = 5p + 12$$

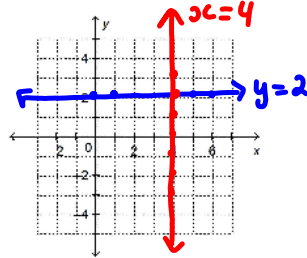
$$T = 5(16) + 12$$

$$= 80 + 12$$

$$T = 92$$

6. Graph the following lines on the same grid. Label the lines.

- i) $y = 2$ $y = 2$
- ii) $x = 4$ $x = 4$



p	T
0	12
1	17
2	22
3	27
4	32

↓ +5 ↓ +5 ↓ +5 ↓ +5

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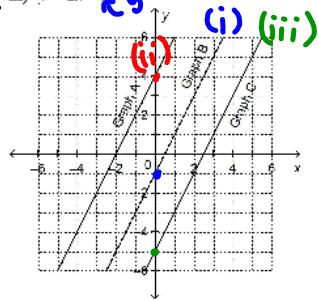
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7. Match each equation with a graph on the grid below.

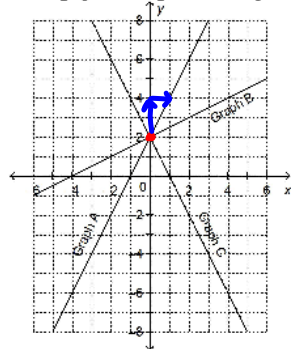
B i) $y = 2x - 1$

A ii) $y = 2x + 4$

C iii) $y = 2x - 5$



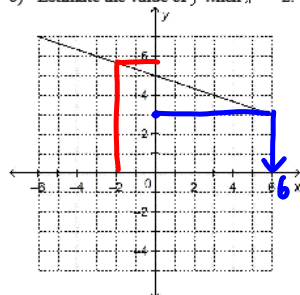
8. Which graph on this grid has the equation $y = 2x + 2$?



$\frac{\text{rise}}{\text{run}} = \frac{2}{1}$
Graph A

9. This graph represents a linear relation.

- a) Determine the value of x when $y = 3$.
- b) Estimate the value of y when $x = -2$.

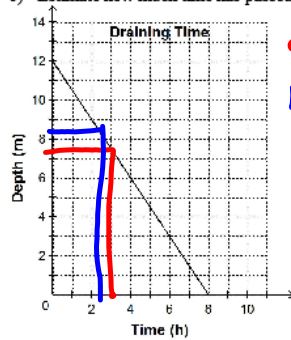


$y = 3, x = 6$
 $x = -2, y = 5.5$

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10. This graph shows the depth of water in a tank, in metres, as the water drains out.
- Estimate the depth of water after 3 h.
 - Estimate how much time has passed if there is 8.5 m of water in the tank.



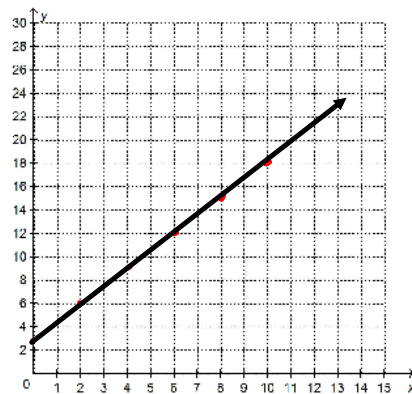
a) depth = 7.5 m
b) time = 2.5 h

Problem

11. a) Create a table of values for the relation $y = 1.5x + 3$, then graph the relation. Use 0, 2, 4, 6, 8, 10 as values of x .

$y = 1.5x + 3$

x	0	2	4	6	8	10
y	3	6	9	12	15	18



- b) Is the relation linear? How do you know? **Yes, line.**
c) What is the value of y when $x = 33$?

$$y = 1.5x + 3$$

$$= 1.5(33) + 3$$

$$y = 52.5$$

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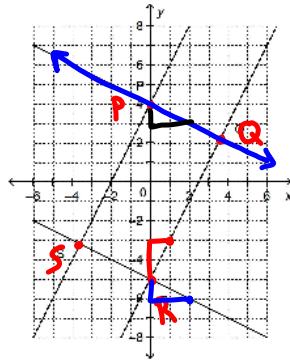
12. The lines on the grid below intersect to form rectangle PQRS.

The equations of the lines are:

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

What is the equation of the line on which each side of the rectangle lies?

- a) PQ b) QR c) RS d) PS



PS: $y = 2x + 4$
 QR: $y = 2x - 5$
 PQ: $y = -\frac{1}{2}x + 4$
 RS: $y = -\frac{1}{2}x - 5$

13. A local chocolate maker sells three different sizes of chocolate bars.

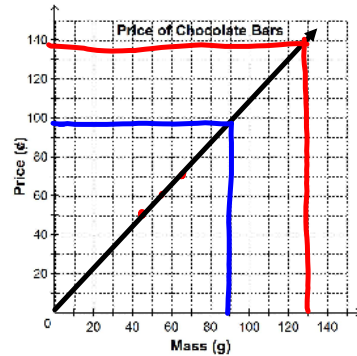
The price of each chocolate bar is listed below.

The chocolate maker plans to make two new sizes of chocolate bars.

She wants the prices and sizes to be related to the chocolate bars she sells already.

Size (g)	45	55	65
Price (£)	50	60	70

- a) Graph the data.



- b) What should the chocolate maker charge for a 130-g chocolate bar?
 c) What should be the size of a chocolate bar that costs 95£?

b) 135g
 c) 90g

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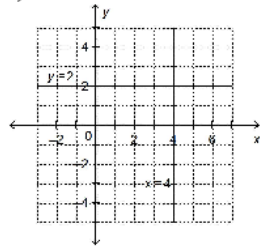
**Math 9: Linear Relations Test
Answer Section**

SHORT ANSWER

1. $C = 2n - 1$
2. $w = 3t - 2$
3. a) $A = 540 - 35n$
b) \$260
4. a)

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

5. a) $y = 5x - 12$
b) 92 sandwiches



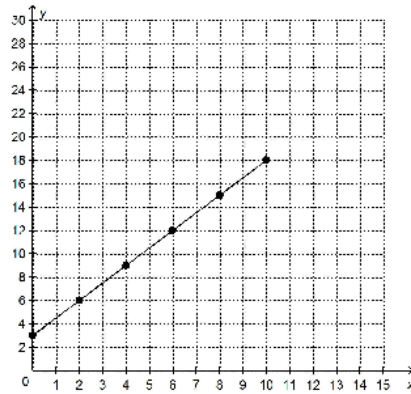
- 6.
7. Graph A: $y = 2x - 4$
Graph B: $y = 2x - 1$
Graph C: $y = 2x + 5$
8. Graph A
9. a) $x = 6$
b) $y = 5\frac{2}{3}$
10. a) 7.5 m
b) 2.33 h

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PROBLEM

11. a)

x	0	2	4	6	8	10
y	3	6	9	12	15	18



- b) The relation is linear because the points on the graph lie on a straight line.
- c) When $x = 33$, $y = 52.5$.

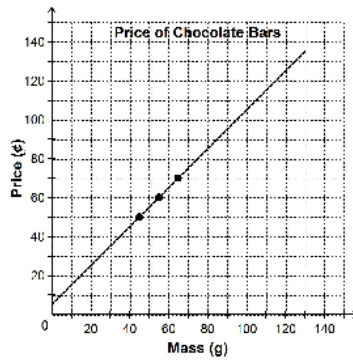
12. a) PQ: $y = \frac{1}{2}x - 4$

b) QR: $y = 2x - 5$

c) RS: $y = \frac{1}{2}x - 5$

d) PS: $y = 2x - 4$

13. a)



- b) The chocolate maker should charge \$1.35 for a 130-g chocolate bar.
- c) The size of a chocolate bar that costs 95¢ should be 90 g.