

## *Equations of Linear Relations Lesson #8: Practice Test*

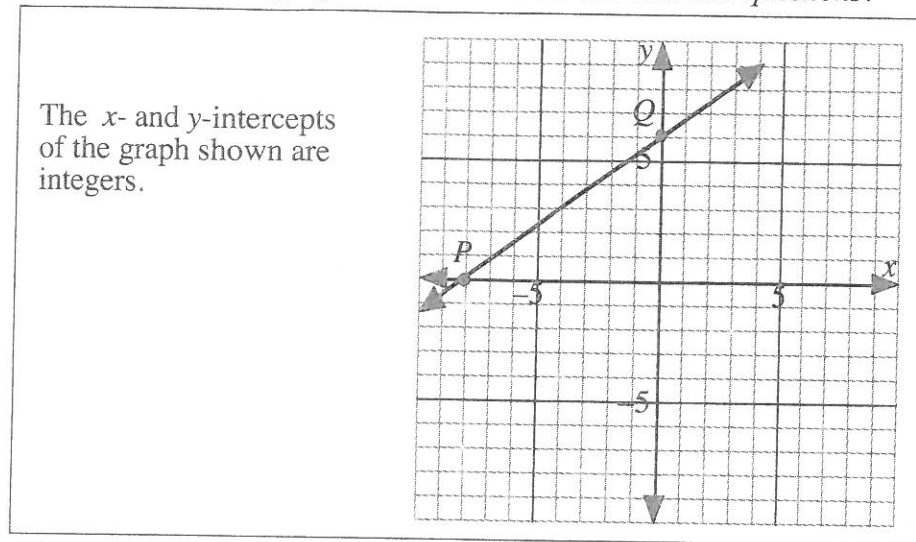
1. The slope of the line with equation  $3y = 2x - 12$  is
  - A. 2
  - B.  $\frac{2}{3}$
  - C. -4
  - D. -12
  
2. The y-intercept of the graph of the line with equation  $y = 5x - 10$  is
  - A. 2
  - B. 5
  - C. 10
  - D. -10
  
3. Which equation represents a line with a slope of 3 and a y-intercept of -4?
  - A.  $y = -4x + 3$
  - B.  $y = -\frac{1}{3}x - 4$
  - C.  $y = 3x - 4$
  - D.  $y = 3x + 4$
  
4. Which of the following is the equation of a line perpendicular to  $5y + x + 6 = 0$ ?
  - A.  $y = 5x$
  - B.  $y = x$
  - C.  $y = \frac{1}{5}x$
  - D.  $y = -\frac{1}{5}x$
  
5. Which of these ordered pairs can be found on the graph of the line  $3x - 5y - 4 = 0$ ?

i) (8, 4)      ii) (-3, 1)      iii) (0, -0.8)      iv) (-2, 2)

  - A. i) and ii) only
  - B. i) and iii) only
  - C. i), ii), and iii) only
  - D. some other combination of i), ii), iii), and iv)

6. The point of intersection of the line  $9x - 3y + 9 = 0$  and the  $y$ -axis is
- A.  $(0, 9)$
  - B.  $(0, 3)$
  - C.  $(0, -1)$
  - D.  $(0, -3)$

Use the following information to answer the next **two** questions.



7. The equation of the line  $PQ$  is

- A.  $3x + 4y + 24 = 0$
- B.  $3x + 4y + 32 = 0$
- C.  $3x - 4y + 24 = 0$
- D.  $3x - 4y + 32 = 0$

**Numerical Response**

1. Given that the line above passes through  $(7.2, k)$ , the value of  $k$ , to the nearest tenth, is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

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8. If the lines  $ax + by + c = 0$  and  $dx + ey + f = 0$  are parallel, then

- A.  $ae - bd = 0$
- B.  $ae + bd = 0$
- C.  $ad - be = 0$
- D.  $ad + be = 0$

Numerical  
Response

2. Given that the line joining the points  $(2, 3)$  and  $(8, -q)$ , where  $q \in W$ , is perpendicular to the line  $3x - 2y - 5 = 0$ , then the value of  $q$  is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

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9. The equations of four straight lines are

- 1)  $7x - y = 0$       2)  $7x + y - 6 = 0$       3)  $x - 7y + 4 = 0$       4)  $x + 7y - 2 = 0$

Which pairs of lines are perpendicular?

- A. 1) and 2) only
- B. 1) and 4) only
- C. both 1) and 4) and 2) and 3)
- D. both 1) and 2) and 2) and 3)

10. The line passing through the points  $(-5, -2)$  and  $(-2, -1)$  has equation

- A.  $x + y + 3 = 0$
- B.  $x + 3y + 5 = 0$
- C.  $x - 3y + 1 = 0$
- D.  $x - 3y - 1 = 0$

Numerical  
Response

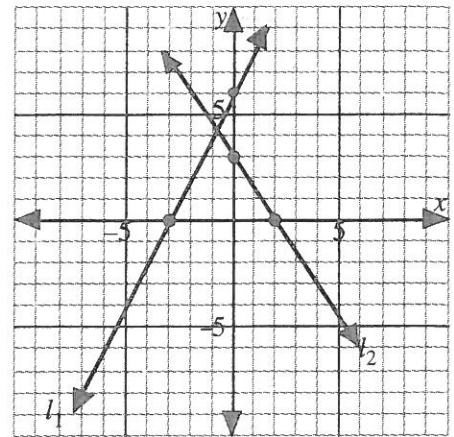
3. The lines  $3x - y + 2 = 0$  and  $5x - By + 26 = 0$ , where  $B \in W$ , intersect on the  $y$ -axis. The value of  $B$  is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

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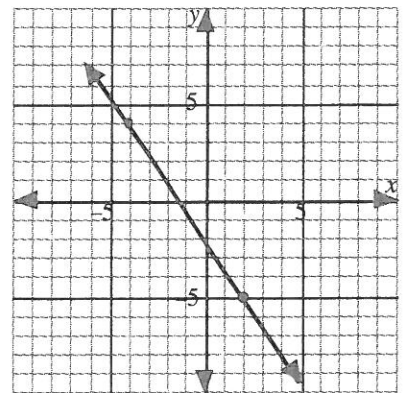
11. Which equation represents a line which is perpendicular to line  $l_1$  and has the same  $x$ -intercept as line  $l_2$ ?

- A.  $x + 2y - 2 = 0$
- B.  $x + 2y + 2 = 0$
- C.  $2x + y - 4 = 0$
- D.  $2x + y + 4 = 0$



**Numerical Response**

4. The equation of the line shown in the diagram is  $Ax + 2y + C = 0$ . The value of  $\frac{A}{C}$ , to the nearest hundredth, is \_\_\_\_\_.



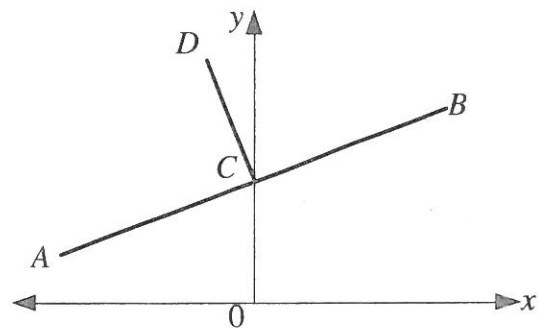
(Record your answer in the numerical response box from left to right)

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12. The equation of  $AB$  is  $x - 2y + 4 = 0$ .  
 $AB$  cuts the  $y$ -axis at  $C$ .  
 $CD$  is perpendicular to  $AB$ .

The equation of  $CD$  is

- A.  $x + 2y - 2 = 0$
- B.  $2x + y - 2 = 0$
- C.  $2x - y + 2 = 0$
- D.  $2x + y - 4 = 0$



13. Consider  $\triangle PQR$  in which side  $PQ$  has slope  $\frac{1}{3}$  and  $R$  has coordinates  $(-4, 7)$ . The equation of the altitude from  $R$  to  $PQ$  (the line drawn from  $R$  to  $PQ$ , perpendicular to  $PQ$ ), is

- A.  $x + 3y = 25$
- B.  $3x + y = 19$
- C.  $3x + y = -5$
- D.  $3x + y = -19$

14. Which of the following lines is/are perpendicular to the line  $9x + y + 2 = 0$ ?

- i)  $9y + x = 2$     ii)  $9y - x = 2$     iii)  $y = 9x + 2$     iv)  $9y = x - 2$

- A. i) and iii) only
- B. ii) only
- C. iv) only
- D. some other combination of i), ii), iii), and iv)

15. The line  $l_1$  passes through the points  $(-3, 5)$  and  $(-2, -1)$ .

Which of the following statements is true?

- i)  $l_1$  passes through  $(4, -37)$ .    ii)  $l_1$  has an  $x$ -intercept of  $-\frac{13}{6}$ .  
iii)  $l_1$  is perpendicular to  $y = \frac{1}{6}x + 2$ .

- A. i) and ii) only
- B. i) and iii) only
- C. ii) and iii) only
- D. i), ii), and iii)

**Numerical  
Response**

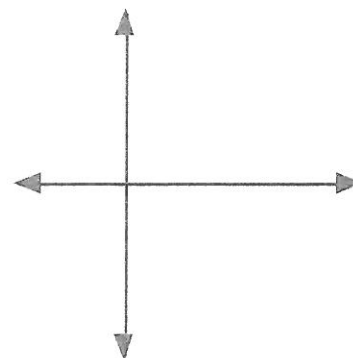
5. The temperature at sea level is  $12.1^\circ\text{C}$ . At the top of a mountain, 6 400 m above sea level, the temperature is  $-29.5^\circ\text{C}$ . To the nearest tenth, the rate of temperature decrease, in  $^\circ\text{C}$  per km, is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

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**Written Response - 5 marks**

1. Consider the points  $P(-7, -2)$ ,  $Q(2, 1)$ ,  $R(-2, -7)$ , and  $S(8, 3)$ .
- Show that the equation of the line,  $L_1$ , through  $S$  and perpendicular to  $PQ$  is  $y = -3x + 27$ .
  - Determine the equation of the line,  $L_2$ , through  $R$  and parallel to  $PQ$ . Give the answer in slope y-intercept form.
  - Draw both lines on the grid, and state a suitable window which shows x- and y-intercepts for each graph.



**Answer Key**

|       |                                                                  |       |       |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
|-------|------------------------------------------------------------------|-------|-------|-------|---|-------|-----------------------------------------------------------------|---|---|---|--|-------|----------------------------------------------------------------|---|---|--|--|
| 1. B  | 2. D                                                             | 3. C  | 4. A  | 5. B  |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| 6. B  | 7. C                                                             | 8. A  | 9. C  | 10. D |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| 11. A | 12. B                                                            | 13. C | 14. D | 15. D |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| NR 1. | <table><tr><td>1</td><td>1</td><td>.</td><td>4</td></tr></table> | 1     | 1     | .     | 4 | NR 2. | <table><tr><td>1</td><td></td><td></td><td></td></tr></table>   | 1 |   |   |  | NR 3. | <table><tr><td>1</td><td>3</td><td></td><td></td></tr></table> | 1 | 3 |  |  |
| 1     | 1                                                                | .     | 4     |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| 1     |                                                                  |       |       |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| 1     | 3                                                                |       |       |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| NR 4. | <table><tr><td>0</td><td>.</td><td>7</td><td>5</td></tr></table> | 0     | .     | 7     | 5 | NR 5. | <table><tr><td>6</td><td>.</td><td>5</td><td></td></tr></table> | 6 | . | 5 |  |       |                                                                |   |   |  |  |
| 0     | .                                                                | 7     | 5     |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |
| 6     | .                                                                | 5     |       |       |   |       |                                                                 |   |   |   |  |       |                                                                |   |   |  |  |

**Written Response**

- $y = -3x + 27$
- $y = \frac{1}{3}x - \frac{19}{3}$
- $x: [-5, 25, 5]$  and  $y: [-10, 35, 5]$

## Equations of Linear Relations Lesson #8: Practice Test

1. The slope of the line with equation  $3y = 2x - 12$  is

A. 2

☒ B.  $\frac{2}{3}$

C. -4

D. -12

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

2. The y-intercept of the graph of the line with equation  $y = 5x - 10$  is

A. 2

B. 5

C. 10

☒ D. -10

$$y\text{-int} = -10$$

3. Which equation represents a line with a slope of 3 and a y-intercept of -4?

A.  $y = -4x + 3$

B.  $y = -\frac{1}{3}x - 4$

☒ C.  $y = 3x - 4$

D.  $y = 3x + 4$

$$y = 3x - 4$$

4. Which of the following is the equation of a line perpendicular to  $5y + x + 6 = 0$ ?

☒ A.  $y = 5x$

B.  $y = x$

C.  $y = \frac{1}{5}x$

D.  $y = -\frac{1}{5}x$

$$5y = -x - 6$$

$$y = -\frac{1}{5}x - \frac{6}{5}$$

$$\text{slope} = -\frac{1}{5}$$

$$\text{perpendicular slope} = 5$$

5. Which of these ordered pairs can be found on the graph of the line  $3x - 5y - 4 = 0$ ?

i) (8, 4)

ii) (-3, 1)

iii) (0, -0.8)

iv) (-2, 2)

A. i) and ii) only

☒ B. i) and iii) only

C. i), ii), and iii) only

D. some other combination of i), ii), iii), and iv)

i)  $3(8) - 5(4) - 4 = 0$  ✓

ii)  $3(-3) - 5(1) - 4 = -18 \times$

iii)  $3(0) - 5(-0.8) - 4 = 0$  ✓

iv)  $3(-2) - 5(2) - 4 = -20 \times$

6. The point of intersection of the line  $9x - 3y + 9 = 0$  and the y-axis is

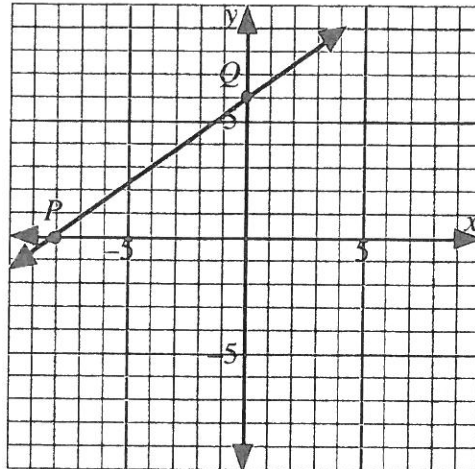
- A. (0, 9)  
 B. (0, 3)  
 C. (0, -1)  
 D. (0, -3)

$$\begin{aligned} x &= 0 & -3y + 9 &= 0 \\ & & 9 &= 3y \\ & & y &= 3 \end{aligned}$$

(0, 3)

Use the following information to answer the next two questions.

The x- and y-intercepts of the graph shown are integers.



7. The equation of the line PQ is

- A.  $3x + 4y + 24 = 0$   
 B.  $3x + 4y + 32 = 0$   
 C.  $3x - 4y + 24 = 0$   
 D.  $3x - 4y + 32 = 0$

P(-8, 0)

Q(0, 6)

$$m_{PQ} = \frac{6-0}{0-(-8)} = \frac{6}{8} = \frac{3}{4}$$

$$y = mx + b$$

$$y = \frac{3}{4}x + 6$$

$$4y = 3x + 24$$

$$0 = 3x - 4y + 24$$

$$3x - 4y + 24 = 0$$

Numerical Response

1. Given that the line above passes through  $(7.2, k)$ , the value of  $k$ , to the nearest tenth, is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

11.4

$$3(7.2) - 4k + 24 = 0$$

$$21.6 + 24 = 4k$$

$$45.6 = 4k$$

$$k = 11.4$$



11. Which equation represents a line which is perpendicular to line  $l_1$  and has the same x-intercept as line  $l_2$ ?

- A.  $x + 2y - 2 = 0$   
 B.  $x + 2y + 2 = 0$   
 C.  $2x + y - 4 = 0$   
 D.  $2x + y + 4 = 0$

$$m_{l_1} = \frac{\text{rise}}{\text{run}} = \frac{6}{3} = 2 \quad m_{\perp} = -\frac{1}{2}$$

$$x_{\text{int of } l_2} = 2$$

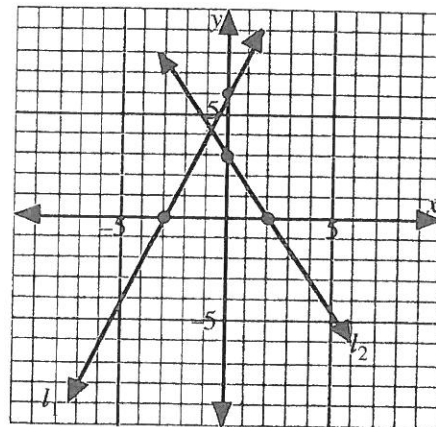
$$m = -\frac{1}{2} \quad \text{point}(2, 0)$$

$$y - 0 = -\frac{1}{2}(x - 2)$$

$$2y = -(x - 2)$$

$$2y = -x + 2$$

$$x + 2y - 2 = 0$$



Numerical Response

4. The equation of the line shown in the diagram is  $Ax + 2y + C = 0$ . The value of  $\frac{A}{C}$ , to the nearest hundredth, is \_\_\_\_\_.

$$m = \frac{\text{rise}}{\text{run}} = \frac{9}{-6} = -\frac{3}{2} \quad \text{point}(2, -5)$$

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

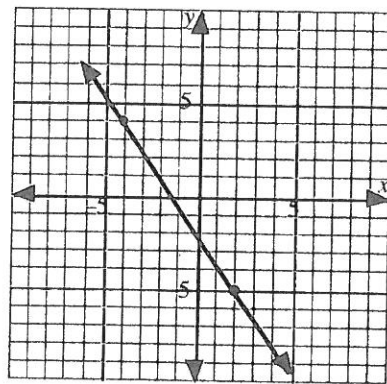
$$2(y + 5) = -3(x - 2)$$

$$2y + 10 = -3x + 6$$

$$3x + 2y + 4 = 0$$

$$A = 3 \quad C = 4$$

$$\frac{A}{C} = \frac{3}{4} = 0.75$$



(Record your answer in the numerical response box from left to right)

0.75

12. The equation of  $AB$  is  $x - 2y + 4 = 0$ .

$AB$  cuts the y-axis at  $C$ .

$CD$  is perpendicular to  $AB$ .

The equation of  $CD$  is

A.  $x + 2y - 2 = 0$

B.  $2x + y - 2 = 0$

C.  $2x - y + 2 = 0$

D.  $2x + y - 4 = 0$

$$x + 4 = 2y$$

$$y = \frac{1}{2}x + 2$$

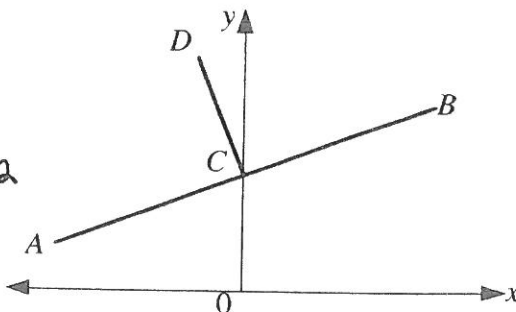
$$m_{AB} = \frac{1}{2} \quad m_{CD} = -2$$

$$C(0, 2)$$

$$y - 2 = -2(x - 0)$$

$$y - 2 = -2x$$

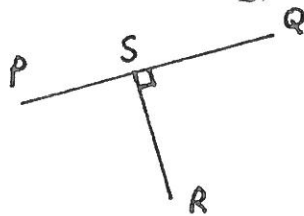
$$2x + y - 2 = 0$$



13. Consider  $\triangle PQR$  in which side  $PQ$  has slope  $\frac{1}{3}$  and  $R$  has coordinates  $(-4, 7)$ . The equation of the altitude from  $R$  to  $PQ$  (the line drawn from  $R$  to  $PQ$ , perpendicular to  $PQ$ ), is

- A.  $x + 3y = 25$   
 B.  $3x + y = 19$   
 C.  $3x + y = -5$   
 D.  $3x + y = -19$

$$\begin{aligned} m_{PQ} &= \frac{1}{3} \\ y - 7 &= -3(x + 4) \\ y - 7 &= -3x - 12 \\ 3x + y + 5 &= 0 \\ 3x + y &= -5 \end{aligned}$$



14. Which of the following lines is/are perpendicular to the line  $9x + y + 2 = 0$ ?  $y = -9x - 2$   
 $m = -9$

- i)  $9y + x = 2$     ii)  $9y - x = 2$     iii)  $y = 9x + 2$     iv)  $9y = x - 2$

- A. i) and iii) only    i)  $9y = -x + 2$     ii)  $9y = x + 2$     iii)  $m = 9$     iv)  $y = \frac{1}{9}x - \frac{2}{9}$   
 B. ii) only     $y = -\frac{1}{9}x + \frac{2}{9}$      $y = \frac{1}{9}x + \frac{2}{9}$   
 C. iv) only     $m = -\frac{1}{9}$      $m = \frac{1}{9}$   
 D. some other combination of i), ii), iii), and iv)    ii) and iv) are perpendicular

15. The line  $l_1$  passes through the points  $(-3, 5)$  and  $(-2, -1)$ .

Which of the following statements is true?

- i)  $l_1$  passes through  $(4, -37)$ .    ii)  $l_1$  has an  $x$ -intercept of  $-\frac{13}{6}$ .  
 iii)  $l_1$  is perpendicular to  $y = \frac{1}{6}x + 2$ .  
 A. i) and ii) only  
 B. i) and iii) only    i)  $LS = -37$      $RS = -6(4) - 13 = -37$  ✓  
 C. ii) and iii) only     $m = \frac{-1-5}{-2+3} = -6$      $y+1 = -6(x+2)$   
 D. i), ii), and iii)    ii)  $0 = -6x - 13$      $6x = -13$      $x = -\frac{13}{6}$  ✓  
 iii)  $m_{l_1} = -6$  ✓

Numerical Response

5. The temperature at sea level is  $12.1^\circ\text{C}$ . At the top of a mountain, 6 400 m above sea level, the temperature is  $-29.5^\circ\text{C}$ . To the nearest tenth, the rate of temperature decrease, in  $^\circ\text{C}$  per km, is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right)

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| 6 | . | 5 |  |
|---|---|---|--|

$$\begin{aligned} \frac{12.1 - (-29.5)}{6400 - 0} &= 0.0065^\circ\text{C per m} \\ &= 6.5^\circ\text{C per km} \end{aligned}$$

**Written Response - 5 marks**

1. Consider the points  $P(-7, -2)$ ,  $Q(2, 1)$ ,  $R(-2, -7)$ , and  $S(8, 3)$ .

- Show that the equation of the line,  $L_1$ , through  $S$  and perpendicular to  $PQ$  is  $y = -3x + 27$ .

$$m_{PQ} = \frac{1+2}{2+7} = \frac{3}{9} = \frac{1}{3}$$

$$m_{\perp} = -3$$

$$S(8, 3)$$

$$y - 3 = -3(x - 8)$$

$$y - 3 = -3x + 24$$

$$y = -3x + 27$$

- Determine the equation of the line,  $L_2$ , through  $R$  and parallel to  $PQ$ . Give the answer in slope y-intercept form.

$$m_{PQ} = \frac{1+2}{2+7} = \frac{3}{9} = \frac{1}{3}$$

$$m_{\text{parallel}} = \frac{1}{3}$$

$$R(-2, -7)$$

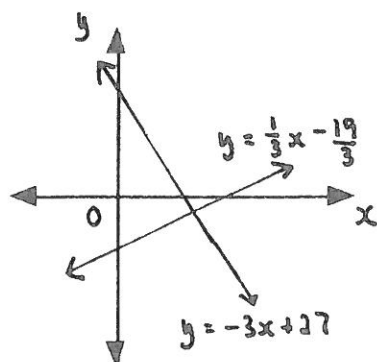
$$y + 7 = \frac{1}{3}(x + 2)$$

$$y = \frac{1}{3}x + \frac{2}{3} - 7$$

$$y = \frac{1}{3}x - \frac{19}{3}$$

- Draw both lines on the grid, and state a suitable window which shows x- and y-intercepts for each graph.

$$x: [-5, 25, 5] \quad y: [-10, 35, 5]$$



**Answer Key**

1. B

2. D

3. C

4. A

5. B

6. B

7. C

8. A

9. C

10. D

11. A

12. B

13. C

14. D

15. D

NR 1.

|   |   |   |   |
|---|---|---|---|
| 1 | 1 | . | 4 |
|---|---|---|---|

NR 2.

|   |  |  |  |
|---|--|--|--|
| 1 |  |  |  |
|---|--|--|--|

NR 3.

|   |   |  |  |
|---|---|--|--|
| 1 | 3 |  |  |
|---|---|--|--|

NR 4.

|   |   |   |   |
|---|---|---|---|
| 0 | . | 7 | 5 |
|---|---|---|---|

NR 5.

|   |  |   |  |
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| 6 |  | 5 |  |
|---|--|---|--|

**Written Response**

- $y = -3x + 27$

- $y = \frac{1}{3}x - \frac{19}{3}$

- $x: [-5, 25, 5]$  and  $y: [-10, 35, 5]$