

Module 5 Questions: #1, 2, 3, 5, 6, 7, NR1, 10, NR4, NR5

**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 $3x - 5y - 4 = 0$?

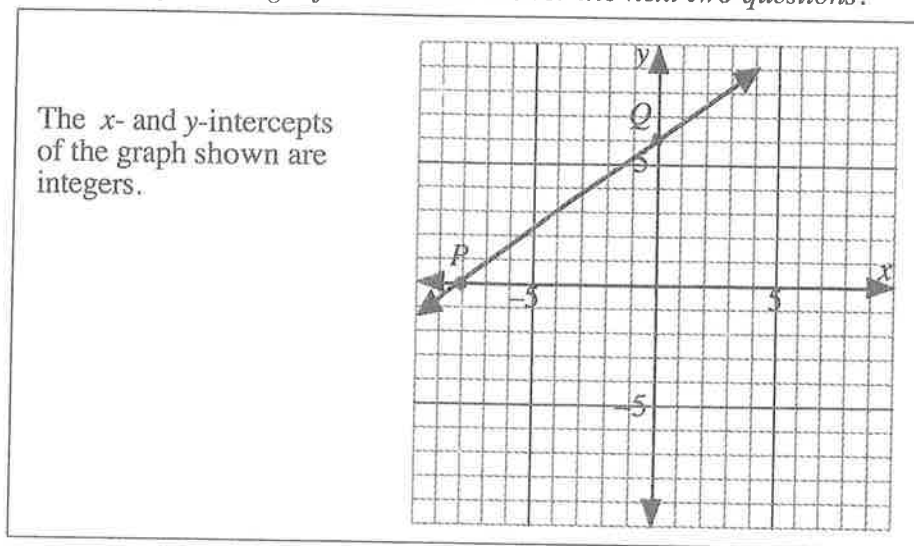
i) (8, 4)ii) (-3, 1)iii) (0, -0.8)iv) (-2, 2)

 - 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

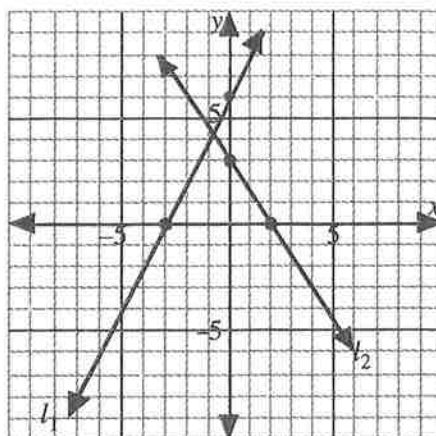
3. The lines $3x - y + 2 = 0$ and $5x - By + 26 = 0$, where $B \in W$, intersect on the y-axis. The value of B is _____.

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

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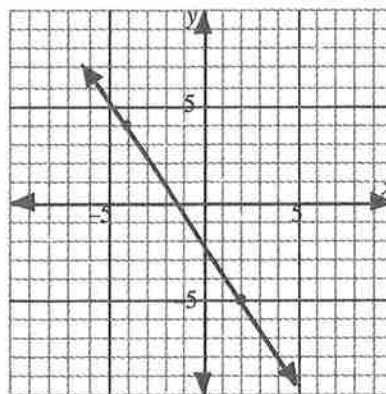
11. Which equation represents a line which is perpendicular to line l_1 and has the same x -intercept as line l_2 ?

- 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 _____.



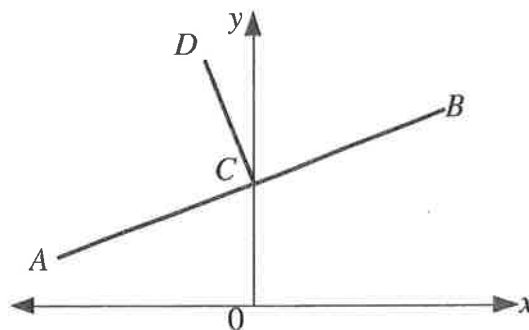
(Record your answer in the numerical response box from left to right)

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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**

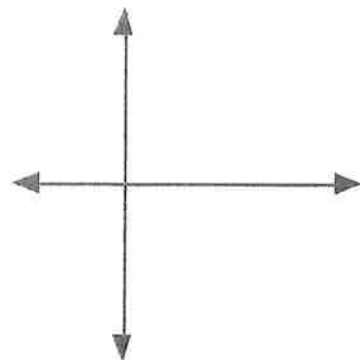
5. The temperature at sea level is 12.1°C . At the top of a mountain, 6 400 m above sea level, the temperature is -29.5°C . To the nearest tenth, the rate of temperature decrease, in $^\circ\text{C}$ per km, is _____.

(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.

1	1	.	4
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NR 2.

1			
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NR 3.

1	3		
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NR 4.

0	.	7	5
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NR 5.

6	.	5	
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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

i) $3(8) - 5(4) - 4 = 0$ ✓ ii) $3(-3) - 5(1) - 4 = -18 \times$

B. i) and iii) only

iii) $3(0) - 5(-0.8) - 4 = 0$ ✓

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

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. $(0, -3)$

$$x = 0$$

$$-3y + 9 = 0$$

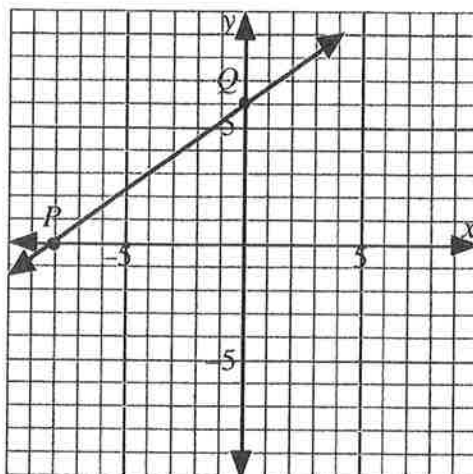
$$9 = 3y$$

$$y = 3$$

$$(0, 3)$$

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)

1	1	.	4
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$$3(7.2) - 4k + 24 = 0$$

$$21.6 + 24 = 4k$$

$$45.6 = 4k$$

$$k = 11.4$$

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

- ☒ A. $ae - bd = 0$ $by = -ax - c$ $ey = -dx - f$
☐ B. $ae + bd = 0$ $y = -\frac{a}{b}x - \frac{c}{b}$ $y = -\frac{d}{e}x - \frac{f}{e}$
☐ C. $ad - be = 0$ $-\frac{a}{b} = -\frac{d}{e}$ $-ae = -bd$
☐ D. $ad + be = 0$ $0 = ae - bd$ $ae - bd = 0$

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)

1			
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$$\begin{aligned}
 3x - 5 &= 2y \\
 y &= \frac{3}{2}x - \frac{5}{2} \\
 m &= \frac{3}{2} \\
 m_{\perp} &= -\frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 \frac{-q-3}{8-2} &= -\frac{2}{3} \\
 3(-q-3) &= -2(6) \\
 -3q-9 &= -12 \\
 -3q &= -3 \\
 q &= 1
 \end{aligned}$$

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)

$$\begin{aligned}
 1) \quad 7x &= y & y &= 7x & m &= 7 \\
 2) \quad y &= -7x + 6 & & & m &= -7 \\
 3) \quad x + 4 &= 7y & y &= \frac{1}{7}x + \frac{4}{7} & m &= \frac{1}{7} \\
 4) \quad 7y &= -x - 2 & y &= -\frac{1}{7}x - \frac{2}{7} & m &= -\frac{1}{7}
 \end{aligned}$$

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

- ☐ A. $x + y + 3 = 0$ $m = \frac{-1+2}{-2+5} = \frac{1}{3}$ $3y + 3 = x + 2$
☐ B. $x + 3y + 5 = 0$
☐ C. $x - 3y + 1 = 0$ $y + 1 = \frac{1}{3}(x + 2)$ $0 = x - 3y - 1$
☒ D. $x - 3y - 1 = 0$ $3(y + 1) = x + 2$ $x - 3y - 1 = 0$

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)

1	3		
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$$\begin{aligned}
 3x + 2 &= y \\
 y &= 3x + 2 \\
 y_{int} &= 2
 \end{aligned}$$

$$\begin{aligned}
 (0, 2) \text{ lies on } 5x - By + 26 &= 0 \\
 5(0) - B(2) + 26 &= 0 \\
 26 &= 2B & B &= 13
 \end{aligned}$$

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. $2x + y + 4 = 0$

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

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

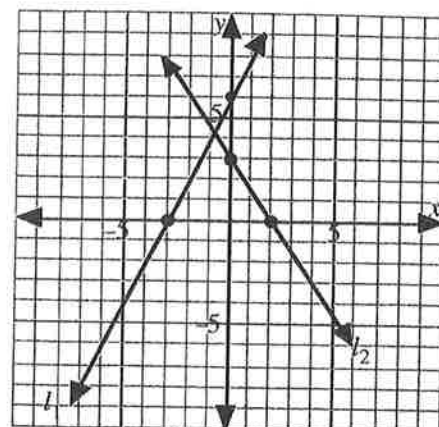
$$m = -\frac{1}{2} \quad \text{point}(2, 0)$$

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

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

$$2y = -x + 2$$

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



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 _____.

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

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

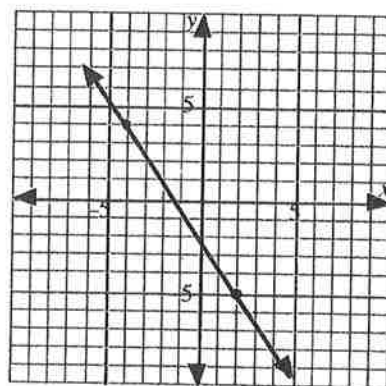
$$2(y + 5) = -3(x - 2)$$

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

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

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

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



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

$$x + 4 = 2y$$

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

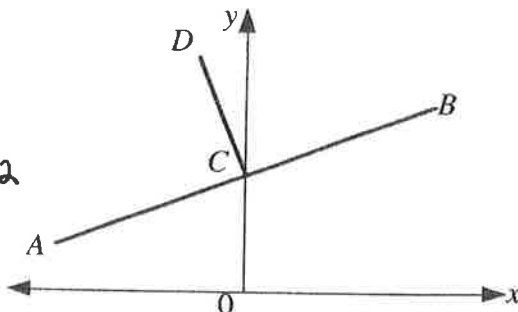
$$m_{AB} = \frac{1}{2} \quad m_{CD} = -2$$

$$C(0, 2)$$

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

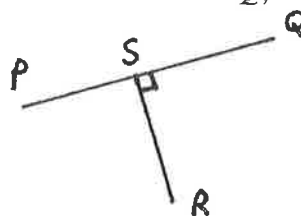
$$y - 2 = -2x$$

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



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. $3x + y = -19$
- $m_{SR} = -3$
 $y - 7 = -3(x + 4)$
 $y - 7 = -3x - 12$
 $3x + y + 5 = 0$
 $3x + y = -5$



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 $m = -\frac{1}{9}$ $m = \frac{1}{9}$ $m = \frac{1}{9}$
 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 $y = \frac{1}{6}x + 2$. $m = \frac{-1-5}{-2+3} = -6$ $y + 1 = -6(x + 2)$
 A. i) and ii) only $y + 1 = -6x - 12$
 B. i) and iii) only $y = -6x - 13$
 C. ii) and iii) only i) $LS = -37$ $RS = -6(4) - 13 = -37$ ✓
 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°C . At the top of a mountain, 6 400 m above sea level, the temperature is -29.5°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)

6	.	5
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$$\frac{12.1 + 29.5}{6400 - 0} = 0.0065^\circ\text{C per m}$$

$$= 6.5^\circ\text{C per km}$$

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.

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

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

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

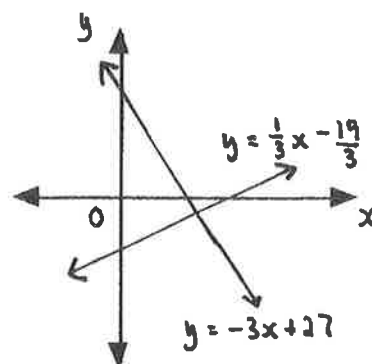
$$y + 7 = \frac{1}{3}(x + 2)$$

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

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

- 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
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NR 2.

1			
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NR 3.

1	3		
---	---	--	--

NR 4.

0		7	5
---	--	---	---

NR 5.

6		5	
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Written Response

- $y = -3x + 27$

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

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