Math 10

Lesson 4–5 Answers

Lesson Questions

Question 1

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{-10}{5}$$

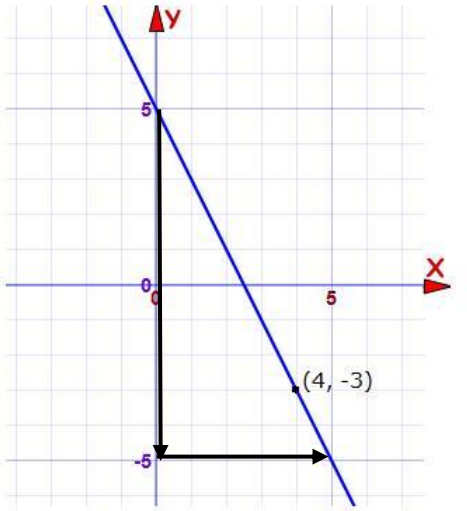
$$m = -2$$

$y - y_1 = m(x - x_1)$

Substitute $m = -2$ and $(4, -3)$ for (x_1, y_1)

$y - (-3) = -2(x - 4)$

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

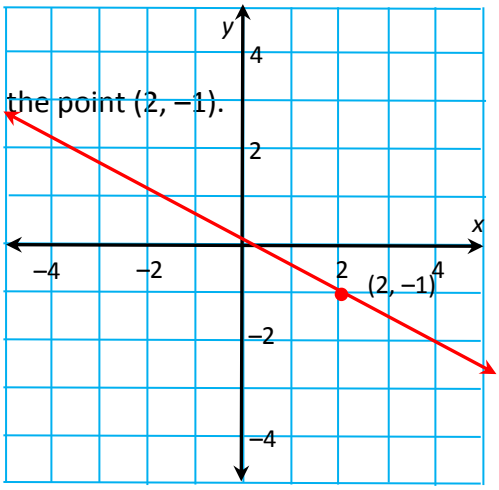


Question 2

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

The graph has a slope of $-\frac{1}{2}$ and goes through the point (2, –1).

b) Graph the equation.



Question 3

Write an equation in standard form for the following linear equations:

a) passes through S(2, –3) and has a slope of 3.

$y - y_1 = m(x - x_1)$

Substitute $m = 3$ and $(2, -3)$ for (x_1, y_1)

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

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

$y + 3 = 3x - 6$

$y - 3x + 3 = -6$

$\boxed{y - 3x = -9}$

b) passes through M(–4, 3) and N(2, 7)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{7-3}{2-(-4)}$$

$$m = \frac{4}{6}$$

$$m = \frac{2}{3}$$

$$y - y_1 = m(x - x_1)$$

$$\text{Substitute } m = \frac{2}{3} \text{ and } (2,7) \text{ for } (x_1, y_1)$$

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

$$3(y - 7) = 2(x - 2)$$

$$3y - 21 = 2x - 4$$

$$\boxed{3y - 2x = 17}$$

Question 4

x-intercept of 4 → (4, 0)
y-intercept of –2 → (0, –2)

First calculate the slope:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{0-(-2)}{4-0}$$

$$m = \frac{2}{4}$$

$$m = \frac{1}{2}$$

Then use the slope-point formula:

$$y - y_1 = m(x - x_1)$$

$$\text{Substitute } m = \frac{1}{2} \text{ and } (4,0) \text{ for } (x_1, y_1)$$

$$y - 0 = \frac{1}{2}(x - 4)$$

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

$$2y = x - 4$$

$$\boxed{2y - x = -4}$$

Assignment

1. a) $y-2=-5(x+4)$ $\quad y+5x=-18$

   b) $y+8=7(x-6)$ $\quad y-7x=-50$

   c) $y+5=-\frac{3}{4}(x-7)$ $\quad 4y+3x=-18$

   d) $y + 8 = 0$, or $y = -8$

2. Equations may be written in different forms.

   a) i) $y - 4 = -\frac{4}{3}(x + 2)$ $\quad$ ii) $y - 3 = \frac{2}{5}(x - 3)$

   iii) $y + 2 = \frac{1}{3}(x + 4)$ $\quad$ iv) $y + 2 = -\frac{5}{2}(x - 1)$

   b) i) $4x+3y=4$; x-intercept: 1; y-intercept: $\frac{4}{3}$

   ii) $-2x+5y=9$; x-intercept: $-\frac{9}{2}$; y-intercept: $\frac{9}{5}$

   iii) $-x+3y=-2$; x-intercept: 2; y-intercept: $-\frac{2}{3}$

   iv) $5x+2y=1$; x-intercept: $\frac{1}{5}$; y-intercept: $\frac{1}{2}$

3. a) $y - 2 = 2(x + 1)$

   b) $y - 2 = \frac{1}{3}(x - 1)$

   c) $y - 1 = -\frac{2}{3}(x - 2)$

4. Coordinates may vary. For example:

   a) Slope: –4; (1, 5)

   b) Slope: 3; (8, –7)

   c) Slope: 1; (–15, –11)

   d) Slope: 5; (2, 0)

   e) Slope: $\frac{4}{7}$; (–3, –6)

   f) Slope: $-\frac{8}{5}$; (–16, 21)

5. Slope-point forms of equations may vary. For example:

   a) $y - 1 = 2(x - 1)$, or $y - 5 = 2(x + 2)$; $-2x+y=-1$ or $2x-y=1$

   b) $y + 2 = -(x - 5)$, or $y - 7 = -(x + 4)$; $x+y=3$

   c) $y - 8 = 3(x - 2)$, or $y + 7 = 3(x + 3)$; $-3x+y=2$

   d) $y + 5 = -2(x + 5)$, or $y + 1 = -2(x + 7)$; $2x+y=-15$

6. Different variables may be used.

a) Let s be the speed of sound and t be the air temperature:

$s - 337 = 0.6(t - 10)$; $s - 0.6t = 331$

b) 331 m/s

7.

a) 1.26 g/mL; For every 1 mL of liquid that is poured into the cylinder, the mass of the cylinder and the liquid increases by 1.26 g.

b) Variables and form of the equation may vary. For example: Let v millilitres represent the volume of the liquid, and M grams represent the mass of the cylinder and liquid;

$M - 51.5 = 1.26(v - 20)$

c) 64.1 g

d) 26.3 g

8.

a) Variables and form of the equation may vary. For example: Let p represent the number of students enrolled in francophone schools, and t represent the time, in years, since 2001;

$p - 3740 = 198(t - 2)$; $p - 198t = 3344$

b) Approximately 3866 students

9. a) –2

b) $y - 11 = -2(x + 3)$

c) $y + 3 = -2(x - 4)$

d)

$y - 11 = -2(x + 3)$	$y + 3 = -2(x - 4)$
$y - 11 = -2x - 6$	$y + 3 = -2x + 8$
$y + 2x - 11 = -6$	$y + 2x + 3 = 8$
$y + 2x = 5$	$y + 2x = 5$

10. a) i) $y + 3 = -\frac{4}{3}(x + 5)$; $4x + 3y = -29$

ii) $y + 3 = \frac{3}{4}(x + 5)$; $-3x + 4y = 3$

11. $y = \frac{1}{5}(x - 5)$; $x - 5y = 5$