Exercise Set Equations of Lines

(1) Find the Point-Slope Equation of the line with slope $\frac{5}{2}$ which passes through the point $(-3, 2)$. What is the y-coordinate of the y-intercept of this line? What is the x-coordinate of the x-intercept of this line?

Solution

(2) Find the Point-Point Equation of the line which passes through the points $(-4, 2)$ and $(-1, 5)$. What is the y-coordinate of the y-intercept of this line? What is the x-coordinate of the x-intercept of this line?

Solution

(3) A line intersects the x-axis at $(6, 0)$ and intersects the y-axis at $(0, 4)$. First find its Intercept-Intercept Equation, and then find its Slope-Intercept equation. What is the distance from the origin to this line?

Solution

(4) Find the Slope-Intercept equation of the line through (4,3) which is parallel to the line through the points $(-5, -2)$ and $(-7, -6)$. Solution

(5) Find the Slope-Intercept equation of the line through (4,3) which is perpendicular to the line through the points $(-5, -2)$ and $(-7, -6)$. Solution

(6) Find the distance of the line $y = 6x + 10$ from the point (2,2). Solution

(7) Find the distance of the line $y - 3 = 5x + 8$ from the point (3,2). Solution

(8) Find the distance of the line $2y = 6x + 2$ from the point (4,2). Solution

(9) Find the distance of the line $-3y = 6x - 10$ from the point (4,2). Solution

(10) Find the distance of the line $-5y = -6x + 20$ from the point (6,2). Solution

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Solution Set .

(1) **Solution:**

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$y - 3 = \frac{5}{2}(x - (-3))$ simplifies to $y = \frac{5}{2}x + \frac{21}{2}$, so its y-intercept is

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(1) **Solution:**

$y - 3 = \frac{5}{2}(x - (-3))$ simplifies to $y = \frac{5}{2}x + \frac{21}{2}$, so its y-intercept is $\frac{21}{2}$.

To find the x-intercept, we set $y = 0$ and solve for x: $0 = \frac{5}{2}x + \frac{21}{2}$ has solution $x = \frac{-\frac{21}{2}}{\frac{5}{2}} = -\frac{21}{2}\frac{2}{5} =$

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(2) **Solution:**

$y - 2 = \dfrac{5-2}{-1-(-4)}(x - (-4)$ simplifies to $y = \dfrac{3}{3}(x+4) + 2 = x + 6$, so its y-intercept is

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(4) **Solution:**

The line through $(-5,-2)$ and $(-7,-6)$ has slope $\frac{-6-(-2)}{-7-(-5)} = \frac{-4}{-2} = 2$, so the Point-Slope Equation is $y - 3 = 2(x - 4)$ which simplifies to the Slope-Intercept Form

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(4) **Solution:**

The line through $(-5, -2)$ and $(-7, -6)$ has slope $\frac{-6-(-2)}{-7-(-5)} = \frac{-4}{-2} = 2$, so the Point-Slope Equation is $y - 3 = 2(x - 4)$ which simplifies to the Slope-Intercept Form $y = 2x - 5$

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(5) **Solution:**

The line through $(-5, -2)$ and $(-7, -6)$ has slope $\dfrac{-6-(-2)}{-7-(-5)} = \dfrac{-4}{-2} = 2$, so the desired Point-Slope Equation is $y - 3 = -\frac{1}{2}(x - 4)$ which simplifies to the Slope-Intercept Form

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(5) **Solution:**

The line through $(-5,-2)$ and $(-7,-6)$ has slope $\dfrac{-6-(-2)}{-7-(-5)} = \dfrac{-4}{-2} = 2$, so the desired Point-Slope Equation is $y - 3 = -\frac{1}{2}(x-4)$ which simplifies to the Slope-Intercept Form $y = -\frac{1}{2}x + 5$

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(6) **Solution:**

A General Form of the equation $y = 6x + 10$ is $-6x + y - 10 = 0$, so the distance from this line to the point $(2, 2)$ is

$$d = \frac{|-6(2) + 1(2) - 10|}{\sqrt{(-6)^2 + 1^2}} = \frac{|-12 + 2 - 10|}{\sqrt{36 + 1}} = \frac{|-20|}{\sqrt{37}} =$$

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$$d = \frac{|-6(2) + 1(2) - 10|}{\sqrt{(-6)^2 + 1^2}} = \frac{|-12 + 2 - 10|}{\sqrt{36 + 1}} = \frac{|-20|}{\sqrt{37}} = \frac{20}{\sqrt{37}}$$

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(7) **Solution:**

A General Form of the equation $y - 3 = 5x + 8$ is $-5x + y - 11 = 0$, so the distance from this line to the point (3,2) is

$$d = \frac{|-5(3) + 1(2) - 11|}{\sqrt{(-5)^2 + 1^2}} = \frac{|-15 + 2 - 11|}{\sqrt{25 + 1}} = \frac{|-24|}{\sqrt{26}} =$$

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(7) **Solution:**

A General Form of the equation $y - 3 = 5x + 8$ is $-5x + y - 11 = 0$, so the distance from this line to the point (3,2) is

$$d = \frac{|-5(3) + 1(2) - 11|}{\sqrt{(-5)^2 + 1^2}} = \frac{|-15 + 2 - 11|}{\sqrt{25 + 1}} = \frac{|-24|}{\sqrt{26}} = \frac{24}{\sqrt{26}}$$

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(8) Solution:

A General Form of the equation $2y = 6x + 2$ is $-6x + 2y - 2 = 0$, so the distance from this line to the point (4,2) is

$$d = \frac{|-6(4) + 2(2) - 2|}{\sqrt{(-6)^2 + 2^2}} = \frac{|-24 + 4 - 2|}{\sqrt{36 + 4}} = \frac{|-22|}{\sqrt{40}} = \frac{22}{2\sqrt{10}} =$$

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(8) Solution:

A General Form of the equation $2y = 6x + 2$ is $-6x + 2y - 2 = 0$, so the distance from this line to the point (4,2) is

$$d = \frac{|-6(4) + 2(2) - 2|}{\sqrt{(-6)^2 + 2^2}} = \frac{|-24 + 4 - 2|}{\sqrt{36 + 4}} = \frac{|-22|}{\sqrt{40}} = \frac{22}{2\sqrt{10}} = \frac{11}{\sqrt{10}}$$

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(9) **Solution:**

A General Form of the equation $-3y = 6x - 10$ is $-6x - 3y + 10 = 0$, so the distance from this line to the point (4,2) is

$$d = \frac{|-6(4) - 3(2) + 10|}{\sqrt{(-6)^2 + (-3)^2}} = \frac{|-24 - 6 + 10|}{\sqrt{36 + 9}} = \frac{|-20|}{\sqrt{45}} =$$

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(9) **Solution:**

A General Form of the equation $-3y = 6x - 10$ is $-6x - 3y + 10 = 0$, so the distance from this line to the point (4,2) is

$$d = \frac{|-6(4) - 3(2) + 10|}{\sqrt{(-6)^2 + (-3)^2}} = \frac{|-24 - 6 + 10|}{\sqrt{36 + 9}} = \frac{|-20|}{\sqrt{45}} = \frac{20}{3\sqrt{5}}$$

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(10) **Solution:**

A General Form of the equation $-5y = -6x + 20$ is $6x - 5y - 20 = 0$, so the distance from this line to the point (6,2)

$$d = \frac{|6(6) - 5(2) - 20|}{\sqrt{6^2 + (-5)^2}} = \frac{|36 - 10 - 20|}{\sqrt{36 + 25}} = \frac{|6|}{\sqrt{61}} =$$

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(10) Solution:

A General Form of the equation $-5y = -6x + 20$ is $6x - 5y - 20 = 0$, so the distance from this line to the point (6,2)

$$d = \frac{|6(6) - 5(2) - 20|}{\sqrt{6^2 + (-5)^2}} = \frac{|36 - 10 - 20|}{\sqrt{36 + 25}} = \frac{|6|}{\sqrt{61}} = \frac{6}{\sqrt{61}}$$