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6.3 Graphing Linear Equations | McGraw-Hill Education

Question 1: What is the slope of the line passing through the points (2, 5) and (4, 9)?

Answer: The slope of a line passing through two points (x1, y1) and (x2, y2) is given by the formula:

$$\text{slope} = (y_2 - y_1) / (x_2 - x_1)$$

Substituting the given values, we get:

$$\text{slope} = (9 - 5) / (4 - 2) = 4 / 2 = 2$$

Therefore, the slope of the line is 2.

Question 2: Graph the line with the equation $y = -2x + 5$.

Answer: To graph a linear equation, we can use the slope-intercept form:

$$y = mx + b$$

where m is the slope and b is the y-intercept.

In this case, the slope is -2 and the y-intercept is 5. To graph the line, we can plot two points on the line and draw a straight line connecting them.

For example, when $x = 0$, $y = 5$. So, one point on the line is (0, 5).

When $x = 1$, $y = -2(1) + 5 = 3$. So, another point on the line is $(1, 3)$.

Plotting these two points and connecting them with a straight line gives the graph of the equation $y = -2x + 5$.

Question 3: Find the equation of the line parallel to $y = 2x - 3$ and passing through the point $(1, 4)$.

Answer: Lines that are parallel have the same slope. The slope of the given line is 2. So, the line we want to find must also have a slope of 2.

Since the line passes through the point $(1, 4)$, we can substitute these values into the point-slope form of a linear equation:

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

where (x_1, y_1) is the given point and m is the slope.

Substituting the values, we get:

$$y - 4 = 2(x - 1)$$

Simplifying the equation, we get:

$$y = 2x - 2$$

Therefore, the equation of the line parallel to $y = 2x - 3$ and passing through the point $(1, 4)$ is $y = 2x - 2$.

Question 4: Find the equation of the line perpendicular to $y = -3x + 2$ and passing through the point $(-2, 5)$.

Answer: Lines that are perpendicular have slopes that are negative reciprocals of each other. The slope of the given line is -3. So, the line we want to find must have a slope of $1/3$.

Using the point-slope form again, we get:

$$y - 5 = 1/3(x + 2)$$

Simplifying the equation, we get:

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

Therefore, the equation of the line perpendicular to $y = -3x + 2$ and passing through the point $(-2, 5)$ is $y = \frac{1}{3}x + \frac{7}{3}$.

Question 5: Graph the system of inequalities:

$$y > 2x + 1$$

$$y < -x + 3$$

Answer: To graph a system of inequalities, we first graph each inequality individually.

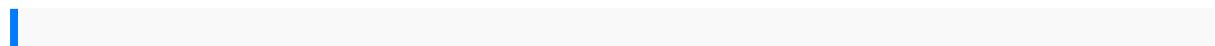
For $y > 2x + 1$:

- Graph the line $y = 2x + 1$ as a solid line.
- Shade the region above the line, since y is greater than $2x + 1$ in that region.

For $y < -x + 3$:

- Graph the line $y = -x + 3$ as a solid line.
- Shade the region below the line, since y is less than $-x + 3$ in that region.

The solution to the system of inequalities is the region that is shaded by both inequalities. This is the region above the line $y = 2x + 1$ and below the line $y = -x + 3$.



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