

Linear Equations Homework (Parallel & Perpendicular Lines)

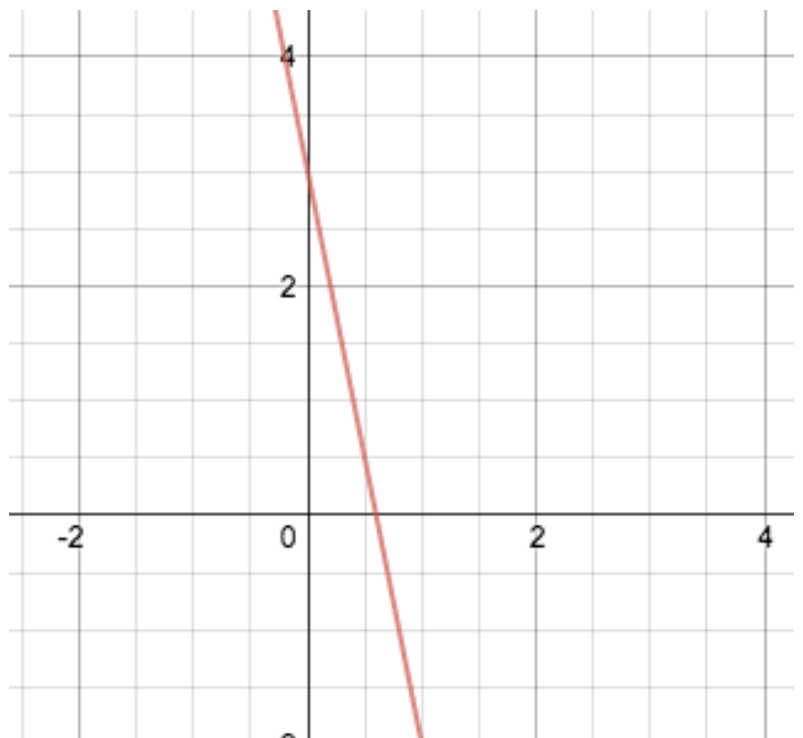
Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable.

Write the equation for each line.

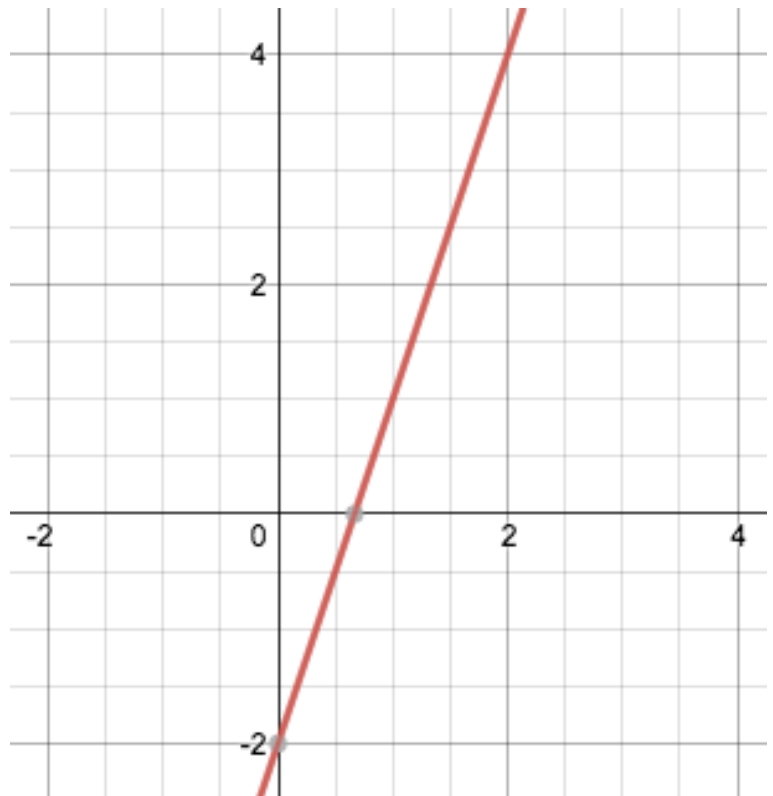
1. Write the equation for the line parallel to the line given by the equation $4y - 28x = 20$ that passes through the point $(-20, 100)$.
2. Write the equation for the line perpendicular to the line given by the equation $3x - 9y = 27$ that passes through the point $(12, -15)$.
3. Write the equation for the line perpendicular to the line given by the equation $\frac{1}{2}y = \frac{1}{4}x + 9$ that passes through the point $(-1, 0)$.
4. Write the equation for the line perpendicular to the line given by the equation $-8y + 4 = 4x$ that passes through the point $(-7, -12)$.
5. Write the equation for the line perpendicular to the line given by the equation $7 + 12y = 15x$ that passes through the point $(5, 4)$.
6. Write the equation for the line parallel to the line given by the equation $x - 2y = 10$ that passes through the point $(-24, 5)$.

Determine the values of x and y in each situation in problems 7, 8, and 9.

7. Line P is perpendicular to the pictured line and passes through the points $(-10, 2)$ and $(y-16, y)$. Line M is parallel to the pictured line and passes through the points $(4.5, 3)$ and $(x, x+3)$.



8. Line W is parallel to the pictured line and passes through the points $(1,3)$ and $(x,2x)$. Line Z is perpendicular to the pictured line and passes through the points $(6,6)$ and $(y+4,y)$.



9. Line R is given by the equation $\frac{1}{2}x + 8y = 10$. Line Q is parallel to line R and passes through the points $(x, \frac{1}{2}x + .5)$ and $(8,3.5)$. Line S is perpendicular to line R and passes through the points $(.5, 4)$ and $(1, y)$.



Throwback!

10. In a given data set, $\mu=8.3$ and $\sigma=1.2$. Determine the z-score for a value of 10.0. Describe what the z-score means in terms of the value's relationship to the mean and standard deviation.

11. In data set A, $\mu=29$ and $\sigma=3$. In data set B, $\mu=33$ and $\sigma= 1.5$. Which set of data is more dispersed? Support your answer.

12. The z-score that correlates to a student's score on a test is 3.5. Describe what this means in term's of the student's score compared to the mean.

Selected Solutions

1. Desired slope: 7 (parallel)

$$y - 100 = 7(x + 20)$$

$$y - 100 = 7x + 140$$

$$y = 7x + 240$$

3. Desired slope: -2 (perpendicular)

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

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

$$y = -2x - 2$$

5. Desired slope: -4/5 (perpendicular)

$$y - 4 = -4/5(x - 5)$$

$$y - 4 = -4/5x + 4$$

$$y = -4/5x + 8$$

7. x: Desired slope: $(3 - -2)/(1 - 0) = -5/1 = -5$ (parallel)

$$\frac{-5}{1} = \frac{x + 3 - 3}{x - 4.5}$$

$$-5x + 22.5 = x$$

$$22.5 - 6x$$

$$x = 3.75$$

y: Desired slope: 1/5 (perpendicular)

$$\frac{1}{5} = \frac{y + 2}{y - 16 + 10}$$

$$y - 6 = 5y - -10$$

$$-4y = -4$$

$$y = 1$$

9. x: Desired slope: $-1/16$ (parallel)

$$-\frac{1}{16} = \frac{.5x + .5 - 3.5}{x - 8}$$

$$-x + 8 = 8x - 48$$

$$-9x = -56$$

$$x = \frac{56}{9}$$

or

$$x = 6\bar{2}$$

y: Desired slope: 16 (perpendicular)

$$\frac{16}{1} = \frac{y - 4}{1 - .5}$$

$$y - 4 = 8$$

$$y = 12$$

10. $z = (10 - 8.3)/1.2 = \text{approximately } 1.4167$

This means that the score is almost one and a half standard deviations above the mean.

12. This means that the student's score is 3 and a half standard deviations above the mean. The student's score is an outlier, and demonstrates that the student answered more questions correctly than his/her classmates.