

SHOW ALL WORK

1. Explain the concepts of zero slope and undefined slope and how they are different from each other.

Zero Slope - Horizontal Line - the y-values are the same so the numerator of the slope formula is zero

Undefined Slope - No Slope - Vertical Line - the x-values are the same so, the denominator of the slope formula is zero. You cannot divide by zero, so undefined.

2. Is it possible for two lines with positive slopes to be perpendicular to each other? Explain your reasoning.

No. Perpendicular slope are NEGATIVE reciprocals \rightarrow they must be opposite signs

3. Find the value of k : if the line through the points $(k-3, k+2)$ and $(2, 1)$ is parallel to the line through the points $(-1, 1)$ and $(3, 9)$.

$$m_{11} = \frac{9-1}{3-(-1)} = \frac{8}{4} = 2$$

$$2 = \frac{k+2-1}{k-3-2}$$

$$2 = \frac{k+1}{k-5}$$

$$2k-10 = k+1$$

$$k = 11$$

4. Find the value of k : if the line through the points $(2k+1, -4)$ and $(5, 3-k)$ is parallel to the line through the points $(-4, -9)$ and $(2, -3)$.

$$m_{11} = \frac{-3-(-9)}{2-(-4)} = \frac{6}{6} = 1$$

$$1 = \frac{3-k+4}{5-(2k+1)}$$

$$1 = \frac{-k+7}{-2k+4}$$

$$-2k+4 = -k+7$$

$$-k = 3$$

$$k = -3$$

5. Find the value of k : if the line through the points $(10-k, k)$ and $(k+4, 5k+1)$ is perpendicular to the line through the points $(-1.5, -0.5)$ and $(7, 6)$.

$$m = \frac{6-(-0.5)}{7-(-1.5)} = \frac{6.5}{8.5} = \frac{13}{17}$$

$$\frac{-17}{13} = \frac{5k+1-k}{k+4-(10-k)}$$

$$m_{\perp} = \frac{-17}{13}$$

$$\frac{-17}{13} = \frac{4k+1}{2k-6}$$

$$-34k+102 = 52k+13$$

$$89 = 86k$$

$$\frac{89}{86} = k$$

6. Find the value of k : if the line through the points $(4k+3, k+1)$ and $(k-6, -2k+3)$ is perpendicular to the line through the points $(2, 3)$ and $(2, 8)$.

$$m = \frac{8-3}{2-2} = \frac{5}{0} = \phi$$

$$0 = \frac{-2k+3-(k+1)}{k-6-(4k+3)}$$

$$m_{\perp} = 0$$

$$0 = -2k+3-(k+1)$$

$$0 = -3k+2$$

$$-2 = -3k$$

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

7. For one manufacturer of camping equipment, between 1990 and 2000 annual sales increased by \$7.4 million per year. In 2000, the total sales were \$85.9 million. If sales increase at the same rate, what will be the total sales in 2010?

1990	78.5
2000	85.9
2010	?

$$m = \frac{85.9-78.5}{2000-1990} = \frac{7.4}{10} = 0.74 \text{ million/year}$$

$$85.9 + 10(0.74) = \$93.3 \text{ mil in 2010}$$