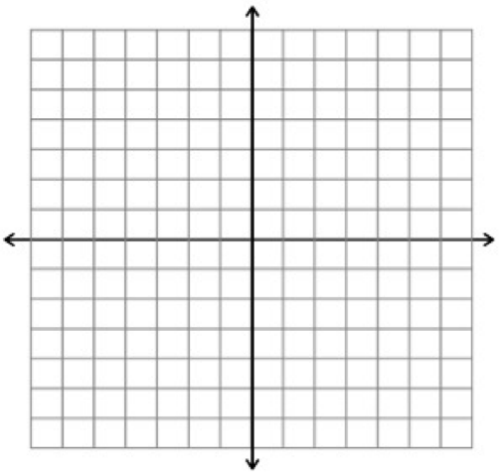
6.4 Parallel and Perpendicular Lines Worksheet

MPM1D

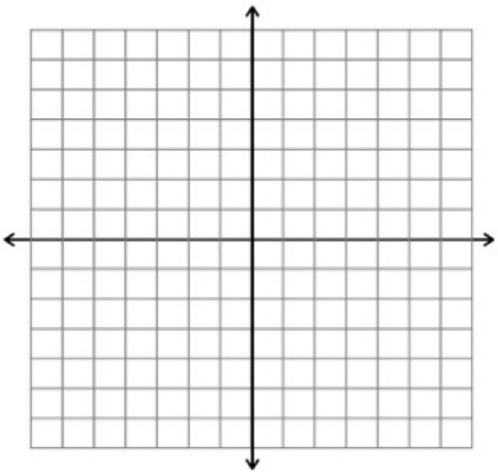
Jensen

1. Graph each pair of lines on the same coordinate grid. Find their slopes and conclude whether the lines are parallel, perpendicular, or neither.

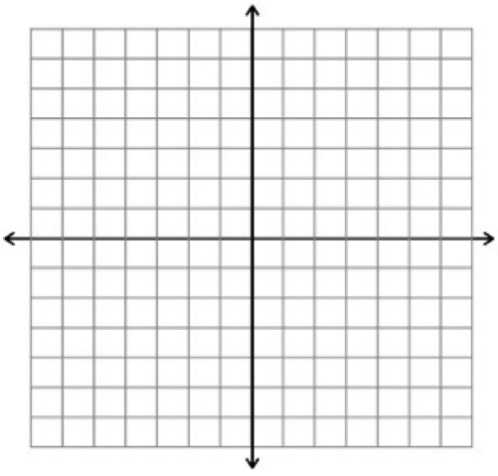
a) $y = \frac{1}{4}x - 2$ $\quad y = \frac{1}{4}x + 3$



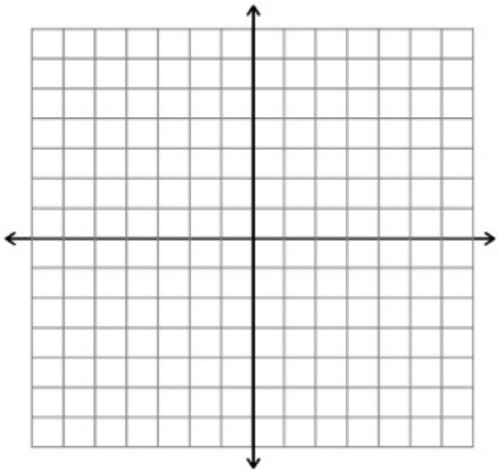
b) $y = 2x + 5$ $\quad 4x - 2y + 6 = 0$



c) $x + y = 4$ $\quad y = x - 3$



d) $y = \frac{1}{2}x - 4$ $\quad x - 2y + 1 = 0$



3. The slopes of two lines are given. Conclude whether the lines are parallel, perpendicular, or neither. Justify your answers

a) $m = \frac{2}{3}, m = \frac{4}{6}$

b) $m = \frac{3}{4}, m = -\frac{4}{3}$

c) $m = 2, m = -2$

d) $m = 1, m = -1$

e) $m = \frac{1}{5}, m = 0.2$

f) $m = 2\frac{1}{4}, m = -\frac{4}{9}$

4. What is the slope of a line that is parallel to each line?

a) $y = \frac{3}{5}x - 2$

b) $y = -x + 7$

c) $2x - y + 3 = 0$

d) $4x + 3y = 12$

e) $y = 2$

f) $x = -5$

5. For each line in question 4, give the slope of a perpendicular line.

a)

b)

c)

d)

e)

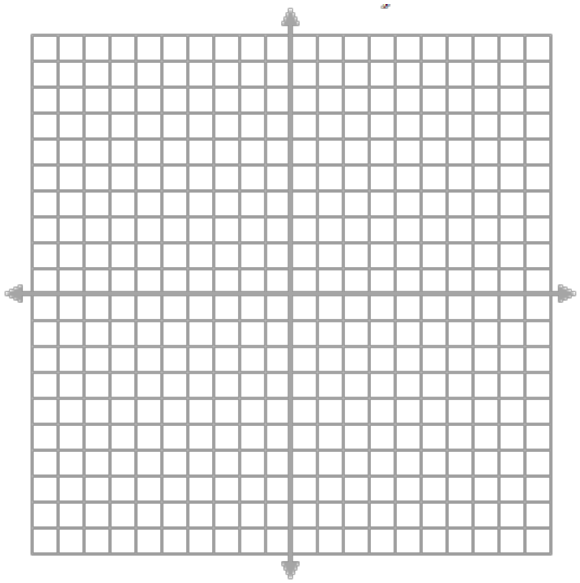
f)

6. Write the equations of two lines that are parallel to the line $3x - 6y - 5 = 0$

7. Write the equations of two lines that are perpendicular to the line $4x + y - 2 = 0$

8. A triangle has vertices A(1, 2), B(3, 8), and C(6, 7).

a) Plot these points and draw the triangle.



b) Does this appear to be a right triangle? Explain.

c) Find the slopes of the line segments that form this triangle.

d) Explain how the slopes can be used to conclude whether or not this is a right triangle. Is it?

9. Determine whether or not the following sets of points form right triangles. Justify your answers with mathematical reasoning.

a) A(1, 1), B(-2, 5), C(3, -2)

b) P(2, 4), Q(-2, 2), R(5, -2)

Answers:

1) a) parallel b) Parallel c) Perpendicular d) Parallel
3) a) parallel b) perpendicular d) perpendicular e) parallel
4) a) $m = \frac{3}{5}$ b) $m = -1$ d) $m = \frac{-4}{3}$ e) $m = 0$

5) a) $m = \frac{-5}{3}$ b) $m = 1$ d) $m = \frac{3}{4}$ e) undefined

6) Any two lines with a slope of $\frac{1}{2}$. Examples: $y = \frac{1}{2}x + 99$ and $y = \frac{1}{2}x + 87$

7) Any two lines with a slope of $\frac{1}{4}$. Examples: $y = \frac{1}{4}x + 71$ and $y = \frac{1}{4}x + 87$

8) b) It appears vertex B might be a 90 degree angle c) $m_{AB} = 3, m_{BC} = \frac{-1}{3}, m_{AC} = 1$
d) $m_{AB} \times m_{BC} = -1$, therefore AB and BC are perpendicular

9) a) Not a right triangle b) PQ and PR form a right angle