

Name _____

Date: _____

Math 9/10 Honours: Section 3.4 Slopes of Parallel and Perpendicular Lines

1. Given the slopes for each line, indicate whether they are perpendicular, parallel or neither:

a) $m_1 = \frac{2}{3}, m_2 = -\frac{3}{2}$

b) $m_1 = -\frac{3}{5}, m_2 = -\frac{6}{10}$

c) $m_1 = 2, m_2 = -\frac{1}{2}$

d) $m_1 = \frac{4}{7}, m_2 = -\frac{4}{7}$

e) $m_1 = \frac{12}{14}, m_2 = -\frac{7}{6}$

f) $m_1 = 0, m_2 = 9999$

g) $m_1 = 0.125, m_2 = -8$

h) $m_1 = -0.\overline{18}, m_2 = 5.5$

2. Given that the two slopes are perpendicular, find the value of "k"

a) $m_1 = \frac{4}{6}, m_2 = -\frac{1}{k}$

b) $m_1 = -\frac{1.5}{4}, m_2 = -k + 1$

c) $m_1 = \frac{7}{3}, m_2 = -\frac{3}{2k}$

d) $m_1 = -\frac{2}{4.5}, m_2 = k - 1$

e) $m_1 = 0.\overline{09}, m_2 = k(10 - k)$

f) $m_1 = -0.\overline{1}, m_2 = 4k^2$

g) $m_1 = \frac{-3k}{2}, m_2 = \frac{k-1}{7k-6}$

h) $m_1 = -0.\overline{18}, m_2 = 3k^2 - 2k$

3. Indicate whether the following lines segments are either "parallel", "perpendicular" or "neither"

a) M(-5,1) and N(1,-5)
O(1,4) and P(6,-1)

b) R(-1,4) and S(3,-2)
T(4,2) and U(-2,-2)

c) A(-1,3) and B(4,-1)
D(4,5) and C(-2,-3)

d) W(-2,3) and V(8,3)
B(4,8) and D(4,-4)

e) D(3,5) and E(0,-2)
G(5,3) and F(3,-2)

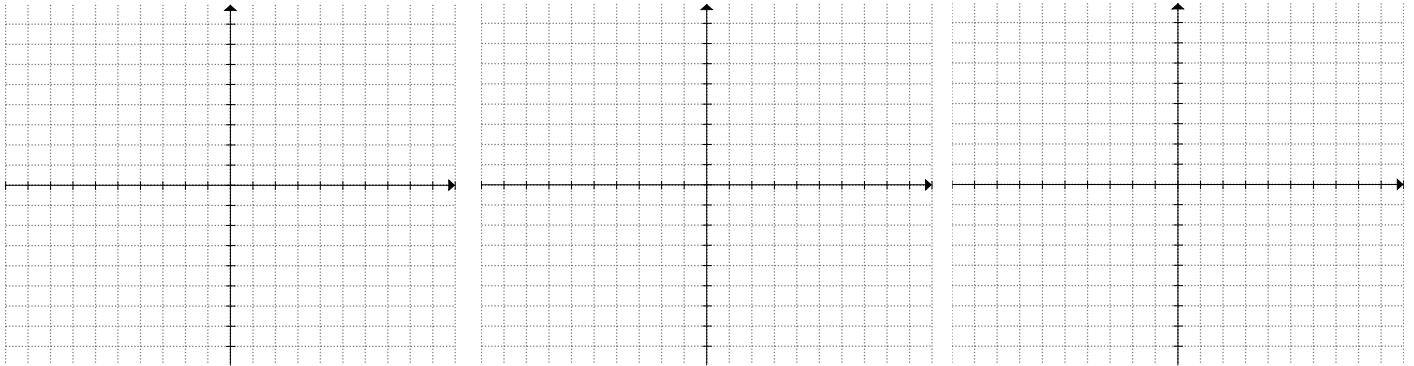
f) W(5,4) and V(-9,4)
Y(6,-10) and Z(6,-3)

4. Given each pair of coordinates, find the equation of the perpendicular bisector and draw it on the graph provided.

a) $A(-3,4)B(3,5)$

b) $C(-5,-4)D(3,-6)$

c) $E(9,11)F(1,1)$



5. The line $y = ax + c$ is parallel to the line $y = 2x$ and passes through the point $(1,5)$. What is the value of “c”?

6. Two perpendicular lines with x-intercepts -2 and 8 intersect at $(0,b)$. Determine all values of “b”

7. Two perpendicular lines intersect at the point $(9,2)$. If the x-intercept of one line is double the x-intercept of the other, then a possible sum of the x-intercepts is:

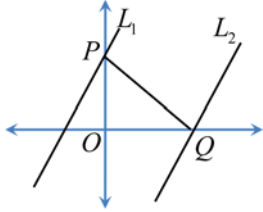
a) $\frac{17}{2}$	b) 10	c) $\frac{51}{2}$	d) $\frac{45}{2}$	e) 5
-------------------	--------------	-------------------	-------------------	-------------

8. How many right angled triangles can be formed by using any three of the six points: $(0,0)$, $(0,1)$, $(0,2)$, $(1,0)$, $(2,0)$, $(1,1)$.

9. Two perpendicular lines L_1 and L_2 intersect at the point $Q(p,2p)$. If $(p-6, p)$ is on L_1 and $(p+4,-p)$ is on L_2 . Which of the following statement will be true?

- a) Q may be any point on the line $y=2x$
- b) there are exactly 3 positions for Q
- c) There is exactly one position for Q
- d) There are exactly 2 positions for Q
- e) The number of possible positions for Q is infinite but more than three

10. The line L_1 has equation $y = mx + k$. Line L_1 crosses the y-axis at "P" and line L_2 crosses the x-axis at Q. If PQ is perpendicular to both lines, then what is the y-intercept of line L_2



11. The equation of two sides of a rectangle are $x - 2y + 8 = 0$ and $2x + y + 6 = 0$. The vertex, which does not lie on either of these lines is A(6,2). Find the equations of the two sides passing through "A".

12. $A_1x + B_1y + C_1 = 0$ and $A_2x + B_2y + C_2 = 0$ are two different lines. What relations exist among the values of $A_1, B_1, C_1, A_2, B_2,$ and C_2 if the lines are:

a) Parallel (but do not overlap)

b) perpendicular

13. The distance from point A to the line segment BC is 10cm. Two lines "L" and "M", parallel to BC, divide the triangle ABC into three parts of equal area. The distance between lines "L" and "M" is:

(A) $10\left(1 - \frac{\sqrt{3}}{3}\right)$

(B) $10\frac{\sqrt{3}}{3}$

(C) $10\frac{\sqrt{6}}{3}$

(D) $10\frac{\sqrt{3}}{3}(\sqrt{2}-1)$

(E) $10\left(1 - \frac{\sqrt{6}}{3}\right)$

14. Suppose the line "L" is parallel to the line $y = \frac{3}{4}x + 6$ and four units away from it. Which of the following is a possible equation of line "L":

(a) $y = \frac{3}{4}x$

(b) $y = \frac{3}{4}x + 1$

(c) $y = \frac{3}{4}x + 2$

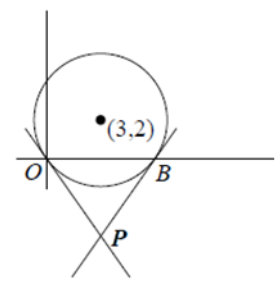
(d) $y = \frac{3}{4}x + 3$

(e) $y = \frac{3}{4}x + \frac{9}{2}$

15. Three straight lines $L_1, L_2,$ and L_3 have slopes $\frac{1}{2}, \frac{1}{3},$ and $\frac{1}{4}$ respectively. All three lines have the same y-intercept. The sum of the x-intercepts of the lines is 36. Determine the y-intercept.

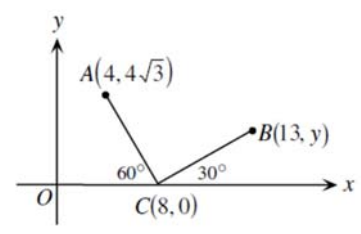
16. If "a", "b", "c" are real numbers, what is the only value of "a" for which the graphs of $y = ax + b$ and $x = ay + c$ are perpendicular to each other?

17. A circle with center at (3,2) intersects the x-axis at the origin, O, and at the point "B". The tangents to the circle at "O" and "B" intersect at point "P". The y-coordinates of "P" is:
 a) -3.5 b) -4 c) -4.5 d) -5 e) None of these



18. In the diagram, the value of "y" is:

- a) $\frac{13}{2\sqrt{3}}$ b) $\frac{5}{\sqrt{3}}$ c) 2 d) 12 e) $\frac{\sqrt{3}}{5}$



19. A line has equation $y = kx$, where $k \neq 0$ and $k \neq -1$. The line is reflected in the line with equation $x + y = 1$. Determine the slope and the y-intercept of the resulting line, in terms of "k"?

20. A square with sides lengths of 13 have vertices with integer coordinates. If one of the vertices have coordinates (3,5), then what are all the possible coordinates of the opposite corner?