

Geometry – Problems

1. The graphs of which line passes closer to the point $(10, 15)$: $y = 3x + 5$, or $2y + 6x = 4$?
2. Give an example of one line that is perpendicular to the graph of $3x + 2y = 4$ and one that is parallel to it.
3. Give three examples of lines that are perpendicular to the graph of $y - 4x = 2$.
4. Find two lines that are perpendicular to each other and pass through the point $(5, -1)$.
5. Give three examples of lines which pass through the point $(1, 2)$.
6. Which of the following points is closest to the point $(3, -5)$: $(0, 0)$, $(-2, -4)$, $(3, 2)$, or $(-1, 1)$?
7. Classify each point as being either:
 - inside the graph of $x^2 + y^2 = 4$;
 - on the graph of $x^2 + y^2 = 4$;
 - outside the graph of $x^2 + y^2 = 4$.
 - (a) $(0, 1)$
 - (b) $(1.1, 1.9)$
 - (c) $(-2, 0)$
 - (d) $(0, 4)$
8. How many circles pass through both of the points $(1, 1)$ and $(1, -5)$? Explain your answer.
9. How many points with integer coordinates are inside (but not on) the graph of $x^2 + y^2 = 8^2$.
10. A triangle is drawn so that one of its sides is parallel to the graph of the line $y = 4 - 3x$ and another of its sides is parallel to the graph of the line $y = \frac{1}{3}x + 1$. If those two sides both have length 6, how long is the third side?
11. Let \overline{AB} be the line segment that starts at the point $A(-2, 5)$ and ends at the point $B(4, 7)$. Find the equation of the line that intersects \overline{AB} at its midpoint and is perpendicular to it.

12. Classify each of the following sets of vertices as the vertices of a square, rectangle, rhombus, (non-rhomboid) parallelogram, or none of the above:

(a) $(5, 2), (2, 5), (-1, 2), (2, -1)$

(b) $(4, 3), (5, 1), (0, -2), (-1, 0)$

(c) $(1, 3), (2, 5), (2, -1), (3, 7)$

(d) $(1, 3), (-1, 3), (1, -4), (-1, -4)$