1. Determine the slope and $y$-intercept for $12x - 5y = 9$.
Label answers.

2. Find the $x$-intercept(s) and $y$-intercept(s) for $9x^2 - 5y = 7$.
Write answers as ordered pairs. Label answers.

3. Consider $x^2 + y^2 - 20x + 22y + 63 = 0$
(a) Show that this equation represents a circle.
(b) Identify the center of this circle.
(c) Identify the radius of this circle.

4. Find the equation of the circle that has endpoints of the diameter at $(7, 8)$ and $(-1, -12)$.

5. Find the distance between $(4, -7)$ and $(-9, 2)$. Be sure to simplify your answer.

6. Find the midpoint of the line segment connecting $(-3, \frac{1}{2})$ and $(9, -\frac{2}{3})$.

7. Find the equation of the line passing through $(-4, 7)$ and $(-2, -5)$.

8. Find the equation of the line passing through $\left(\frac{2}{5}, -3\right)$ that is perpendicular to $8x + 3y = 6$.

9. Find the equation of the line passing through $\left(-2, -\frac{3}{4}\right)$ that is parallel to the line passing through $(-2, 3)$ and $(-5, 5)$.

10. Sketch the graph of the line with slope $m = -\frac{5}{2}$ and passes through the point $(-2, 1)$.

11. Calculate the slope of the given line.

12. Find the equation of the line given in #11.

13. Find the equation of the line that passes through $\left(-\frac{13}{5}, \frac{17}{12}\right)$ that satisfies the given condition:
   (a) parallel to the $y$-axis.
   (b) perpendicular to the line $x = 7$.

14. Determine whether the triangle with vertices $A = (-5, 3)$, $B = (6, -4)$ and $C = (-1, -15)$ forms a right triangle. Show all work. State why or why not.
ANSWERS

1. \( m = \frac{12}{5}, \quad \left( 0, -\frac{9}{5} \right) \)

2. \( \left( \pm \frac{\sqrt{7}}{3}, 0 \right), \quad \left( 0, -\frac{7}{5} \right) \)

3. (a) \((x - 10)^2 + (y + 11)^2 = 158\)
   
   (b) \((10, -11)\)
   
   (c) \(r = \sqrt{158}\)

4. \((x - 3)^2 + (y + 2)^2 = 116\)

5. \(d = 5\sqrt{10}\)

6. \(\left( 3, -\frac{1}{12} \right)\)

7. \(y = -6x - 17\)

8. \(y = \frac{3}{8}x - \frac{63}{20}\)

9. \(y = -\frac{2}{3}x - \frac{25}{12}\)

10. plot \((-2, 1)\) and then use rise of \(-5\) to move down 5 units and a run of 2 to move 2 units to the right.

11. \(m = \frac{1}{5}\)

12. \(y = \frac{1}{5}x - \frac{16}{5}\)

13. (a) \(x = -\frac{13}{5}\)

   (b) \(y = \frac{17}{12}\)

14. \(d(A, B) = \sqrt{170}, \quad d(A, C) = \sqrt{340}, \quad d(B, C) = \sqrt{170}\). Then

\[
\left( \sqrt{170} \right)^2 + \left( \sqrt{170} \right)^2 = \left( \sqrt{340} \right)^2 \quad \Rightarrow \quad 170 + 170 = 340
\]

Hence, the triangle satisfies the Pythagorean Theorem and hence is a right triangle.

OR \(m_{AB} = -\frac{7}{11}\) and \(m_{BC} = \frac{11}{7}\). Since \(AB\) and \(BC\) have negative reciprocal slopes, the two line segments are perpendicular. Hence, \(\triangle ABC\) is a right triangle.