Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 4: Analytic Geometry)

February 23, 2025

Answer Key

Section A: Multiple Choice Solutions

1. Distance formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-1-3)^2 + (1-4)^2} = \sqrt{16+9} = \sqrt{25} = 5$$

Answer: (c) $\sqrt{25}$

2. Midpoint formula:

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$M = \left(\frac{2+8}{2}, \frac{3+7}{2}\right) = (5, 5)$$

Answer: (b) $(5, 5)$

3. Slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{1-6}{2-4} = \frac{-5}{-2} = \frac{5}{2}$$

Answer: (a) $\frac{5}{2}$

4. Equation of a line using point-slope form:

$$y - y_1 = m(x - x_1)$$

$$y - 3 = 4(x - 2)$$

Answer: (b) $y - 3 = 4(x - 2)$

5. The equation:

$$\frac{x^2}{16} + \frac{y^2}{4} = 1$$

represents an ellipse. **Answer: (c) Ellipse**

Section B: Problem-Solving Solutions

1. Equation of the line passing through $(5, 2)$ and $(9, 8)$:

$$m = \frac{8 - 2}{9 - 5} = \frac{6}{4} = \frac{3}{2}$$

Using $y - y_1 = m(x - x_1)$:

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

2. Convert $3x - 4y = 12$ to slope-intercept form:

$$y = \frac{3}{4}x - 3$$

Slope: $\frac{3}{4}$, y-intercept: -3.

3. Equation of a circle with center $(3, 4)$ and radius 5:

$$(x - 3)^2 + (y - 4)^2 = 25$$

4. Foci of the ellipse:

$$c^2 = a^2 - b^2 = 25 - 9 = 16 \Rightarrow c = 4$$

Foci: $(\pm 4, 0)$.

5. Equation of a parabola with vertex $(0, 0)$ and focus $(0, 3)$:

$$y = \frac{1}{4p}x^2 = \frac{1}{12}x^2$$