Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 7: Comprehensive Math Review)

February 23, 2025

Answer Key

Section A: Multiple Choice Solutions

1. Solving:
$$2x^2 - 5x + 3 = 0$$
Factoring:
$$(2x - 3)(x - 1) = 0$$
$$x = \frac{3}{2}, 1$$
Answer: (c) $x = \frac{3}{2}, 1$

2. Evaluating logarithm:
$$\log_2 16 = 4$$
Answer: (c) 4

3. Arithmetic sequence:
$$S_n = \frac{n}{2}(2a + (n-1)d)$$
$$S_{10} = \frac{10}{2}(2(5) + (10-1)(3)) = 5(10 + 27) = 5(37) = 185$$
Answer: (d) 150

4. Solving $\tan x = 1$:
$$x = 45^\circ, 225^\circ$$
Answer: (a) $45^\circ, 225^\circ$

5. Distance formula:

$$d = \sqrt{(4-1)^2 + (6-2)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

Answer: (a) 5

Section B: Problem-Solving Solutions

1. Solving system of equations:

$$x = y + 4$$

Substituting:

$$3(y+4) + 2y = 12$$

$$3y + 12 + 2y = 12$$

$$5y = 0, \quad y = 0, \quad x = 4$$

2. Limit:

$$\frac{x^2-4}{x-2} = \frac{(x-2)(x+2)}{x-2} = x+2$$

Evaluating at $x = 2$:

$$2 + 2 = 4$$

3. Derivative:

$$f'(x) = 3x^2 - 8x + 2$$

4. Line equation:

$$y - 5 = -3(x-2)$$

5. Integration:

$$\int (3x^2 - 5x + 2)\, dx$$

$$x^3 - \frac{5}{2}x^2 + 2x + C$$