

# Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 1: Algebra)

February 23, 2025

## Answer Key

### Section A: Multiple Choice Solutions

1.  $3x - 7 = 2x + 5$

$$3x - 2x = 5 + 7 \Rightarrow x = 12$$

**Answer: (c)**  $x = 12$

2. Solving  $x^2 - 5x + 6 = 0$ :

$$(x - 2)(x - 3) = 0 \Rightarrow x = 2, 3$$

**Answer: (a)**  $x = 2, 3$

3. The exponential function is:

$$f(x) = 2^x$$

**Answer: (b)**  $2^x$

4. Evaluating  $f(3) = 4(3) - 7 = 5$ . **Answer: (b)** 5

5. Solving  $2x + 3 < 7$ :

$$2x < 4 \Rightarrow x < 2$$

**Answer: (a)**  $x < 2$

### Section B: Problem-Solving Solutions

1. Solving the system:

$$x = y + 4$$

Substitute into the first equation:

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

$$5y = 4 \Rightarrow y = \frac{4}{5}, \quad x = \frac{24}{5}$$

2. The maximum height of  $h(t) = -5t^2 + 20t + 15$  occurs at:

$$t = \frac{-b}{2a} = \frac{-20}{2(-5)} = 2 \text{ seconds}$$

3. The function  $f(x) = \frac{1}{x-3}$  has a domain:

$$x \neq 3 \Rightarrow (-\infty, 3) \cup (3, \infty)$$

4. Finding the vertex of  $g(x) = x^2 - 4x + 7$ :

$$x = \frac{-(-4)}{2(1)} = 2, \quad g(2) = 3$$

**Vertex:** (2, 3)

5. The maximum of  $R(x) = 50x - x^2$  occurs at:

$$x = \frac{-b}{2a} = \frac{50}{2} = 25$$