PRACTICE EXAM 15: TSIA2 CRC MATH SIMULATION

QUANTITATIVE REASONING (Questions 1–5)

1. A savings account earning 5% simple interest annually holds $800. How much interest does it earn in 2 years?

A. $80

B. $70

C. $90

D. $100

2. A grocer sells apples at 4 for $3.20. What is the price of 15 apples?

A. $10.00

B. $11.00

C. $12.00

D. $13.00

3. A runner covers 12 miles in 1.5 hours. Her average speed is:

A. 6 mph

B. 7 mph

C. 7.5 mph

D. 8 mph

4. Which is equivalent to 3/5?

A. 35%

B. 60%

C. 50%

D. 65%

5. A recipe yielding 12 servings uses 2 cups of sugar. How much sugar is needed for 18 servings?

A. 3 cups

B. 3.5 cups

C. 4 cups

D. 2.5 cups

ALGEBRAIC REASONING (Questions 6–10)

6. Solve for x: $5x - 2 = 3x + 10$.

A. 4

B. 5

C. 6

D. 8

7. Factor: $x^2 - 2x - 8$.

A. $(x - 2)(x + 4)$

B. $(x - 4)(x + 2)$

C. $(x + 4)(x + 2)$

D. $(x - 8)(x + 1)$

8. The function $f(x) = 3x + 7$ gives $f(-2) = ?$

A. -13

B. -1

C. 7

D. 1

9. Solve: $2(x + 3) > 14$.

A. $x > 4$

B. $x < 4$

C. $x > 7$

D. $x < 7$

10. If $y = 2x - 1$, what is y when $x = 4$?

A. 4

B. 6

C. 7

D. 8

GEOMETRIC AND SPATIAL REASONING (Questions 11–15)

11. A rectangle has a length of 12 m and an area of 84 m^2. What is its width?

A. 6 m

B. 7 m

C. 8 m

D. 9 m

12. A cone has a radius of 6 and a height of 8. Its volume is:

A. 48π

B. 64π

C. 80π

D. 96π

13. A 45-45-90 triangle has legs of 5. The hypotenuse is:

A. $5\sqrt{2}$

B. 10

C. $5\sqrt{3}$

D. $10\sqrt{2}$

14. How many meters are in 2,500 centimeters?

A. 2.5 meters

B. 250 meters

C. 25 meters

D. 0.25 meters

15. A sphere has a radius of 3 cm. Its volume is:

A. 9π cm³

B. 36π cm³

C. 27π cm³

D. 12π cm³

PROBABILISTIC AND STATISTICAL REASONING (Questions 16–20)

16. A class has the following scores: 70, 75, 80, 80, 85, 90, 95. What is the median?

A. 75

B. 85

C. 90

D. 80

17. A bag has 4 white and 6 black marbles. The probability of drawing white is:

A. 2/5

B. 3/5

C. 4/6

D. 1/4

18. The mean of {15, 20, 25, 30, 35} is:

A. 20

B. 22

C. 25

D. 30

19. Rolling two dice, the probability of rolling a sum of 7 is:

A. 1/9

B. 1/6

C. 1/12

D. 1/4

20. A fair coin is flipped three times. The probability of getting at least one head is:

A. 1/2

B. 3/4

C. 5/8

D. 7/8

PRACTICE EXAM 15: ANSWER KEY AND EXPLANATIONS

Quantitative Reasoning

1. A — $80. Simple interest uses the formula I = Prt, so I = 800 × 0.05 × 2 = $80. Simple interest calculates interest only on the original principal, without compounding across years.
2. C — $12.00. The unit price is $3.20 ÷ 4 = $0.80 per apple. Multiplying by 15 gives 15 × $0.80 = $12.00. Unit rate problems find the per-item cost first, then apply it to the new quantity.
3. D — 8 mph. Dividing total distance by total time gives 12 ÷ 1.5 = 8 miles per hour. Average speed is always calculated as distance divided by elapsed time.
4. B — 60%. Dividing 3 by 5 gives 0.6, which converts to 60% by moving the decimal two places to the right. Fraction-to-percent conversions always pass through the decimal form first.
5. A — 3 cups. Setting up the proportion 2/12 = x/18 and cross-multiplying gives 12x = 36, so x = 3 cups. Proportion problems scale recipes proportionally through cross-multiplication.

Algebraic Reasoning

6. C — 6. Subtracting 3x from both sides gives 2x − 2 = 10, then adding 2 gives 2x = 12, so x = 6. Linear equations with variables on both sides are solved through inverse operations.
7. B — (x − 4)(x + 2). Two numbers that multiply to −8 and add to −2 are −4 and 2. The factored form (x − 4)(x + 2) expands back to $x^2 - 2x - 8$. Opposite signs are required because the constant term is negative.
8. D — 1. Substituting x = −2 into f(x) = 3x + 7 gives 3(−2) + 7 = −6 + 7 = 1. Function evaluation replaces the variable with the input value.
9. A — x > 4. Distributing gives 2x + 6 > 14, then subtracting 6 gives 2x > 8, so x > 4. The inequality does not flip because division is by a positive number.
10. C — 7. Substituting x = 4 into y = 2x − 1 gives y = 8 − 1 = 7. Linear function evaluation simply plugs the input into the equation.

Geometric and Spatial Reasoning

11. B — 7 m. The area formula A = lw gives 84 = 12w, and dividing by 12 gives w = 7 m. Rectangle problems solve for the unknown dimension using the area formula rearranged.

12. D — 96π. The cone volume formula is $V = (1/3)\pi r^2 h$, so $V = (1/3)\pi(36)(8) = (1/3)(288\pi) = 96\pi$. The 1/3 factor reflects that a cone fits three times into a cylinder of the same base and height.

13. A — $5\sqrt{2}$. In a 45-45-90 triangle, the hypotenuse equals a leg times $\sqrt{2}$. With legs of 5, the hypotenuse is $5\sqrt{2}$. The side ratio $1 : 1 : \sqrt{2}$ applies to every isosceles right triangle.

14. C — 25 meters. One meter equals 100 centimeters, so 2,500 cm ÷ 100 = 25 meters. Metric conversions between meters and centimeters use the 100-to-1 factor.

15. B — 36π cm³. The sphere volume formula is $V = (4/3)\pi r^3$, so $V = (4/3)\pi(3^3) = (4/3)\pi(27) = 36\pi$ cm³. Sphere volume uses the cube of the radius scaled by 4/3.

Probabilistic and Statistical Reasoning

16. D — 80. For an odd number of values arranged in order, the median is the single middle value. With seven values, the fourth is in the middle position, which is 80.

17. A — 2/5. The bag contains 4 + 6 = 10 marbles, and 4 are white. The probability is 4/10 = 2/5 in simplest form.

18. C — 25. Adding the five values gives 15 + 20 + 25 + 30 + 35 = 125, and dividing by 5 gives 25. The mean is always the sum divided by the count.

19. B — 1/6. A sum of 7 can occur with (1,6), (2,5), (3,4), (4,3), (5,2), and (6,1) — six favorable outcomes out of 36 total. The probability is 6/36 = 1/6, making 7 the most likely sum when rolling two dice.

20. D — 7/8. Using the complement, P(at least one head) = 1 − P(no heads) = $1 - (1/2)^3 = 1 - 1/8 =$ 7/8. The complement rule is often faster than calculating each case directly.