PRACTICE EXAM 19: ALEKS PPL SIMULATION

1. Which of the following numbers is the smallest?

A. 1/3

B. 0.34

C. 3/8

D. 0.3

2. Simplify: $3(x - 2) + 4(2 - x)$.

A. $-x + 2$

B. $7x - 14$

C. $x + 2$

D. $-x - 2$

3. Solve: $2|x| = 10$.

A. $x = 5$

B. $x = -5$

C. $x = 5$ or $x = -5$

D. $x = 25$

4. A square has an area of 49 cm^2. What is the length of its side?

A. 14 cm

B. 7 cm

C. 24.5 cm

D. 4.9 cm

5. If $\log(x) = \log(5) + \log(4)$, what is x?

A. 9

B. 1/5

C. 4/5

D. 20

6. Simplify: $(x^2 - 16)/(x - 4)$, assuming $x \neq 4$.

A. $x - 4$

B. $x^2 - 4$

C. $x + 4$

D. $(x + 4)/(x - 4)$

7. What is the slope of a line that is perpendicular to $y = (1/3)x - 4$?

A. -3

B. 3

C. 1/3

D. $-1/3$

8. A car traveling at 60 mph makes a 4-hour trip. How many miles does it travel?

A. 15 miles

B. 240 miles

C. 120 miles

D. 360 miles

9. Simplify: $(a + b)^2 - (a - b)^2$.

A. 2ab

B. 0

C. 4ab

D. $2a^2 + 2b^2$

10. A sphere has a radius of 5 cm. What is its volume? (Use π.)

A. 100π cm^3

B. $125\pi/3$ cm^3

C. 250π cm^3

D. $500\pi/3$ cm^3

11. If $f(x) = x^2 - 1$ and $g(x) = 2x + 3$, what is $(f + g)(2)$?

A. 10

B. 6

C. 12

D. 15

12. Find the area of a triangle with base 14 and height 9.

A. 23

B. 126

C. 84

D. 63

13. What is 15% of 60?

A. 6

B. 9

C. 10

D. 15

14. Solve: $\sqrt{(x)} + 3 = 7$.

A. $x = 4$

B. $x = 2$

C. $x = 16$

D. $x = 100$

15. The range of $f(x) = x^2$ is:

A. $y \geq 0$

B. $y > 0$

C. all real numbers

D. $y \leq 0$

16. Which line is horizontal?

A. $x = 5$

B. $y = 3x$

C. $y = 3x + 1$

D. $y = -2$

17. Simplify: $(2x^{-3})(3x^{5})$.

A. $5x^2$

B. $6x^2$

C. 6x^(−2)

D. $6x^8$

18. The circumference of a circle is 10π cm. What is the radius?

A. 10 cm

B. 20 cm

C. 2.5 cm

D. 5 cm

19. Factor: $x^2 - 5x + 6$.

A. $(x - 2)(x - 3)$

B. $(x - 1)(x - 6)$

C. $(x - 6)(x + 1)$

D. $(x + 2)(x + 3)$

20. Solve: $3x + 2 = 11$.

A. $x = 1$

B. $x = 2$

C. $x = 3$

D. $x = 4$

21. What is the value of $\sin(0°)$?

A. 1

B. −1

C. 0

D. $\sqrt{2}/2$

22. A coin is flipped three times. What is the probability of getting all heads?

A. 1/8

B. 1/4

C. 1/2

D. 3/8

23. Simplify: $(2x + 3)(x - 4)$.

A. $2x^2 + 5x - 12$

B. $2x^2 - 11x + 12$

C. $2x^2 - 5x + 12$

D. $2x^2 - 5x - 12$

24. A parallelogram has base 12 cm and height 8 cm. What is its area?

A. 20 cm^2

B. 96 cm^2

C. 80 cm^2

D. 120 cm^2

25. What is the solution to $(x - 2)/(x + 1) = 0$?

A. $x = -1$

B. $x = 1$

C. $x = 2$

D. No solution

26. Simplify: $\cos(90° - \theta)$.

A. $\sin \theta$

B. $\cos \theta$

C. $-\sin \theta$

D. $-\cos \theta$

27. A square pyramid has a base edge of 4 cm and a height of 6 cm. What is its volume?

A. 24 cm^3

B. 64 cm^3

C. 48 cm^3

D. 32 cm^3

28. What is the y-intercept of $y = 4x - 7$?

A. 4

B. −7

C. 7

D. −4

29. Simplify: $\sqrt{(121)} - \sqrt{(64)}$.

A. 3

B. 5

C. 7

D. 10

30. Solve: $2^{(x - 1)} = 16$.

A. $x = 4$

B. $x = 5$

C. $x = 6$

D. $x = 3$

PRACTICE EXAM 19: ANSWER KEY AND EXPLANATIONS

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1. D — Convert each to decimal: $1/3 \approx 0.333$, $0.34 = 0.34$, $3/8 = 0.375$, $0.3 = 0.30$. The smallest is 0.3. Always convert fractions to decimals (or all to the same form) before comparing.

2. A — Distribute: $3x - 6 + 8 - 4x$. Combine like terms: $(3x - 4x) + (-6 + 8) = -x + 2$. Always distribute completely through each parenthesis before combining like terms.

3. C — Divide both sides by 2: $|x| = 5$. Absolute value equations always split into two cases: $x = 5$ or $x = -5$. Never drop the negative case when solving $|x| = k$ with $k > 0$.

4. B — Side length = $\sqrt{(\text{area})} = \sqrt{49} = 7$ cm. The side of a square is always the positive square root of the area. Reject the negative root in geometric contexts.

5. D — Apply the product law of logarithms: $\log(5) + \log(4) = \log(20)$. So $\log(x) = \log(20)$, giving $x = 20$. Equal logarithms with the same base imply equal arguments.

6. C — Factor numerator as a difference of squares: $x^2 - 16 = (x - 4)(x + 4)$. Cancel $(x - 4)$: result is $x + 4$. Always factor both numerator and denominator before canceling common factors.

7. A — Perpendicular slopes are negative reciprocals. The slope of $y = (1/3)x - 4$ is $1/3$; negative reciprocal is -3. Flip the fraction AND change the sign — both steps are required.

8. B — Distance = rate × time = $60 \times 4 = 240$ miles. Always multiply speed by time when both are constant. Units must be consistent (mph times hours yields miles).

9. C — Apply the pattern $(a + b)^2 - (a - b)^2 = 4ab$. The squared terms a^2 and b^2 cancel when the difference is computed, leaving only the $4ab$ cross term. Memorizing this identity speeds up frequent manipulations.

10. D — Volume of sphere = $(4/3)\pi r^3 = (4/3)\pi(125) = 500\pi/3$ cm³. Always cube the radius before multiplying. Keeping π symbolic prevents decimal rounding errors.

11. A — $(f + g)(2) = f(2) + g(2) = (4 - 1) + (4 + 3) = 3 + 7 = 10$. Evaluating function sums at a point is the sum of the function values at that point.

12. D — Area of triangle = $(1/2)(\text{base})(\text{height}) = (1/2)(14)(9) = 63$. Always use the perpendicular height, not a slant side, when computing triangle area.

13. B — 15% of 60 = $0.15 \times 60 = 9$. Convert the percent to decimal form, then multiply. "Of" in percent problems always signals multiplication.

14. C — Isolate the radical: $\sqrt{x} = 4$. Square both sides: $x = 16$. Always isolate the radical before squaring to avoid introducing extra terms.

15. A — The range of $f(x) = x^2$ is all non-negative real numbers because squaring any real number produces a non-negative result. The parabola's minimum is at $y = 0$, with no upper bound.

16. D — A horizontal line has constant y-value and equation $y = c$. Only $y = -2$ matches this structure. Vertical lines have form $x = c$ with undefined slope; lines with slope have x-dependence.

17. B — Multiply coefficients: $(2)(3) = 6$. Add exponents with the same base: $x^{(-3 + 5)} = x^2$. Combined: $6x^2$. Always apply the product rule to each base separately.

18. D — Circumference = $2\pi r$, so $2\pi r = 10\pi$ and $r = 5$ cm. Divide by 2π to isolate the radius. The π cancels cleanly.

19. A — Two numbers multiplying to 6 and adding to −5 are −2 and −3. Factored: $(x - 2)(x - 3)$. For trinomials with leading coefficient 1, find two numbers matching the constant (product) and middle coefficient (sum).

20. C — Subtract 2: $3x = 9$. Divide by 3: $x = 3$. Always isolate variables by performing inverse operations in reverse order.

21. C — $\sin(0°) = 0$ because the terminal side of a zero-degree angle lies along the positive x-axis, where $y = 0$. Sine is always the y-coordinate on the unit circle.

22. A — Three independent coin flips: P(all heads) = (1/2)(1/2)(1/2) = 1/8. For independent events, probabilities multiply. All heads is one of eight equally likely outcomes.

23. D — FOIL: First: $2x^2$. Outer: $-8x$. Inner: $3x$. Last: -12. Combine: $2x^2 - 5x - 12$. Always combine the outer and inner terms as the final middle coefficient.

24. B — Area of a parallelogram = base × perpendicular height = 12 × 8 = 96 cm^2. The height must be measured perpendicular to the base, not along a slant side.

25. C — A rational expression equals zero only when the numerator equals zero (and the denominator is nonzero). Numerator: $x - 2 = 0$ gives $x = 2$. Check: denominator $3 \neq 0$. Valid solution.

26. A — By the cofunction identity, $\cos(90° - \theta) = \sin \theta$. Complementary angles have reciprocal sine and cosine relationships, reflecting the 90° complementary structure of right triangles.

27. D — Volume of pyramid = (1/3)(base area)(height). Base area = $4^2 = 16$. Volume = (1/3)(16)(6) = 32 cm^3. Pyramids always use the one-third factor — this distinguishes pointed solids from prisms.

28. B — In $y = mx + b$ form, b is the y-intercept. For $y = 4x - 7$, $b = -7$. The y-intercept is the constant term when the equation is in slope-intercept form.

29. A — $\sqrt{121} = 11$ and $\sqrt{64} = 8$. Difference: $11 - 8 = 3$. Always evaluate each radical as a perfect square independently before combining.

30. B — Rewrite 16 as 2^4: $2^{(x - 1)} = 2^4$, so $x - 1 = 4$ and $x = 5$. Matching bases allows direct equating of exponents.