PRACTICE EXAM 32: ALEKS PPL SIMULATION

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1. A recipe calls for 3/4 cup of sugar per batch. How much sugar is needed for 5 batches?

A. 3 cups

B. 3 1/2 cups

C. 3 3/4 cups

D. 4 cups

2. Simplify: $(5x - 2)(x + 3)$.

A. $5x^2 + 13x - 6$

B. $5x^2 - 13x - 6$

C. $5x^2 + 13x + 6$

D. $5x^2 - 13x + 6$

3. A rectangular poster has area 48 in^2 and length 8 in. What is its perimeter?

A. 12 in

B. 16 in

C. 20 in

D. 28 in

4. Solve: $7 - 3x = -2$.

A. $x = -1$

B. $x = 3$

C. $x = 5$

D. $x = 9$

5. What is the area of a square with perimeter 40?

A. 40

B. 25

C. 100

D. 160

6. Simplify: $\sqrt{(72)}$.

A. $6\sqrt{2}$

B. $8\sqrt{2}$

C. $6\sqrt{3}$

D. $3\sqrt{8}$

7. A line has slope 2 and passes through (1, 5). What is its equation?

A. $y = 2x + 5$

B. $y = 2x + 7$

C. $y = 2x + 4$

D. $y = 2x + 3$

8. Solve: $(x + 4)(x - 3) = 0$.

A. $x = -4$ or $x = -3$

B. $x = -4$ or $x = 3$

C. $x = 4$ or $x = -3$

D. $x = 4$ or $x = 3$

9. What is 1/4 expressed as a percent?

A. 4%

B. 14%

C. 25%

D. 40%

10. If $f(x) = 2x - 1$ and $g(x) = x + 4$, what is $(f + g)(3)$?

A. 12

B. 10

C. 8

D. 14

11. A cylinder has radius 4 and height 10. What is its volume? (Use π.)

A. 40π

B. 160π

C. 80π

D. 400π

12. Simplify: $(2x + 5) + (3x - 7) - (x + 1)$.

A. $4x + 11$

B. $4x - 11$

C. $4x + 3$

D. $4x - 3$

13. Solve: $x^2 - 7x + 10 = 0$.

A. $x = 2$ or $x = 5$

B. $x = -2$ or $x = -5$

C. $x = 7$ or $x = 10$

D. $x = -5$ or $x = -2$

14. What is the slope of the line perpendicular to $y = (1/4)x + 2$?

A. $1/4$

B. 4

C. -4

D. $-1/4$

15. What is the exact value of $\sin(90°)$?

A. 0

B. $1/2$

C. $\sqrt{2}/2$

D. 1

16. Simplify: $3^{(x)} \cdot 3^{(-x)}$.

A. 3

B. 1

C. $3^{(2x)}$

D. 0

17. A triangle has sides 10, 10, and 12. What is the perimeter?

A. 32

B. 22

C. 24

D. 120

18. Simplify: $(x + 2)^2 - 4$.

A. $x^2 - 4$

B. $x^2 - 4x$

C. $4x$

D. $x^2 + 4x$

19. A bag has 4 red, 4 blue, and 2 green marbles. What is the probability of drawing a green marble?

A. 1/2

B. 2/5

C. 1/5

D. 1/3

20. Factor: $x^2 + 7x + 12$.

A. $(x - 3)(x - 4)$

B. $(x + 3)(x + 4)$

C. $(x + 2)(x + 6)$

D. $(x - 2)(x - 6)$

21. Solve: $4/x = 2/3$.

A. $x = 3/2$

B. $x = 3$

C. $x = 6$

D. $x = 8$

22. Simplify: $\log_4(64)$.

A. 3

B. 2

C. 4

D. 16

23. A right triangle has legs of 8 and 15. What is the hypotenuse?

A. 11

B. 13

C. 20

D. 17

24. Solve: $2x + 3 > 11$.

A. $x > 3$

B. $x > 4$

C. $x < 4$

D. $x < 3$

25. Simplify: $(x^3 \cdot x^{-2}) \cdot x^4$.

A. x^5

B. x^9

C. x^4

D. x^{-1}

26. A cone has volume 24π and height 9. What is the radius?

A. 2

B. 4

C. $2\sqrt{2}$

D. 3

27. What is the midpoint of (1, 7) and (5, 1)?

A. (5, 8)

B. (2, 4)

C. (4, 6)

D. (3, 4)

28. Simplify: $(x^2 - 9x + 20)/(x - 5)$, assuming $x \neq 5$.

A. $x - 9$

B. $x - 4$

C. $x + 4$

D. $x + 9$

29. A line passes through (0, 0) and has slope 5. What is its equation?

A. $y = 5x$

B. $y = x + 5$

C. $y = 5x + 1$

D. $y = x/5$

30. A box has volume 60 cm^3 and dimensions 3 cm by 4 cm by h cm. What is h?

A. 2 cm

B. 3 cm

C. 4 cm

D. 5 cm

PRACTICE EXAM 32: ANSWER KEY AND EXPLANATIONS

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1. C — 3 3/4 cups, calculated by multiplying the per-batch sugar amount by the number of batches. $5 \times 3/4 = 15/4 = 3\ 3/4$. Always multiply fractions by whole numbers by placing the whole over 1 and multiplying straight across. Recipe scaling uses direct proportionality — the sugar amount increases linearly with batch count.

2. A — $5x^2 + 13x - 6$, obtained by applying FOIL. First: $5x \cdot x = 5x^2$. Outer: $5x \cdot 3 = 15x$. Inner: $-2 \cdot x = -2x$. Last: $-2 \cdot 3 = -6$. Combine: $5x^2 + 15x - 2x - 6 = 5x^2 + 13x - 6$. The outer and inner products combine to form the middle coefficient — always verify signs carefully.

3. D — 28 in, calculated by finding the unknown width, then applying the perimeter formula. Width = area/length = 48/8 = 6 in. Perimeter = $2l + 2w = 16 + 12 = 28$ in. Always derive the unknown dimension from the given area before computing perimeter.

4. B — $x = 3$, obtained by isolating the variable. $7 - 3x = -2 \rightarrow -3x = -9 \rightarrow x = 3$. Dividing both sides by -3 preserves the equation since it is an equality, not an inequality. Always verify by substitution: $7 - 3(3) = -2$. ✓

5. C — 100, calculated by finding the side length and squaring it. Perimeter = $4s = 40$, so $s = 10$. Area = $s^2 = 100$ square units. A square's perimeter formula ($4s$) and area formula (s^2) both reference the same side length — always derive it first before computing either quantity.

6. A — $6\sqrt{2}$, obtained by factoring the radicand into perfect-square factors and simplifying. $\sqrt{72} = \sqrt{(36 \cdot 2)} = \sqrt{36} \cdot \sqrt{2} = 6\sqrt{2}$. Always extract the largest perfect-square factor before simplifying radicals. What remains inside the radical cannot be further simplified.

7. D — $y = 2x + 3$, derived using point-slope form. $y - 5 = 2(x - 1)$. Distribute: $y - 5 = 2x - 2$. Add 5: $y = 2x + 3$. Always simplify to slope-intercept form for standard presentation and verify by substituting the given point.

8. B — $x = -4$ or $x = 3$, applying the zero product property. Set each factor to zero: $x + 4 = 0$ gives $x = -4$; $x - 3 = 0$ gives $x = 3$. The zero product property is the foundation of factor-based quadratic solving — each factor produces one solution.

9. C — 25%, calculated by converting 1/4 to a decimal and then to a percent. 1/4 = 0.25; multiplied by 100: 25%. Fractions to percents always follow this two-step conversion: divide the numerator by the denominator, then multiply by 100.

10. A — 12, found by evaluating each function at $x = 3$ and adding. $f(3) = 2(3) - 1 = 5$; $g(3) = 3 + 4 = 7$. $(f + g)(3) = 5 + 7 = 12$. Sums of functions evaluate each function individually, then combine the results.

11. B — 160π, calculated using the cylinder volume formula $V = \pi r^2 h$. Substitute: $\pi(16)(10) = 160\pi$ cubic units. Always square the radius before multiplying by the height and π. Cubic units apply to all volume measurements.

12. D — $4x - 3$, obtained by distributing all signs and combining like terms. $(2x + 5) + (3x - 7) - (x + 1) = 2x + 5 + 3x - 7 - x - 1$. Combine: $(2x + 3x - x) + (5 - 7 - 1) = 4x - 3$. Always flip the sign when subtracting each term inside the parentheses.

13. A — $x = 2$ or $x = 5$, obtained by factoring the quadratic. Factor: $(x - 2)(x - 5) = 0$. Solutions: $x = 2$ or $x = 5$. For trinomials with leading coefficient 1, find two numbers whose product equals the constant and whose sum equals the middle coefficient.

14. C — -4, the negative reciprocal of $1/4$. Perpendicular slopes always multiply to -1, so the perpendicular slope to $1/4$ is -4. Always flip the fraction AND change the sign when finding a perpendicular slope — both steps are required.

15. D — 1, because $\sin(90°)$ equals the y-coordinate of the unit-circle point at angle $90°$, which is $(0, 1)$. Sine is always the y-coordinate on the unit circle. Memorize the four quadrantal angle values: $\sin(0°) = 0$, $\sin(90°) = 1$, $\sin(180°) = 0$, $\sin(270°) = -1$.

16. B — 1, because any number raised to the zero power equals 1. $3^x \cdot 3^{(-x)} = 3^{(x - x)} = 3^0 = 1$. Exponent addition with opposite signs always produces a zero exponent, and anything nonzero raised to zero equals 1.

17. A — 32, calculated by summing all three sides. Perimeter $= 10 + 10 + 12 = 32$. The triangle is isosceles (two equal sides), but the perimeter is simply the sum of all sides regardless of whether the triangle is equilateral, isosceles, or scalene.

18. D — $x^2 + 4x$, obtained by expanding the square and combining constants. $(x + 2)^2 = x^2 + 4x + 4$. Subtract 4: $x^2 + 4x + 4 - 4 = x^2 + 4x$. The constant terms cancel cleanly, leaving only the expanded polynomial without the constant.

19. C — $1/5$, calculated by dividing favorable outcomes by total outcomes. Green marbles: 2. Total marbles: 10. Probability $= 2/10 = 1/5$. Always reduce probability fractions to simplest form before submitting.

20. B — $(x + 3)(x + 4)$, found by identifying two numbers that multiply to 12 and add to 7. The pair is 3 and 4. Both are positive because both the product and the sum are positive. Always verify by expanding: $(x + 3)(x + 4) = x^2 + 7x + 12$. ✓

21. C — $x = 6$, obtained by cross-multiplying the proportion. $4(3) = 2x \rightarrow 12 = 2x \rightarrow x = 6$. Cross-multiplication is the standard approach for equations equating two fractions.

22. A — 3, because $4^3 = 64$ matches the argument of the logarithm. $\log_4(64) = 3$. A logarithm is always an exponent — the value that makes the base equal the argument. Memorize powers of 2, 3, and 4 for rapid logarithmic evaluation.

23. D — 17, calculated using the Pythagorean theorem. Hypotenuse = $\sqrt{(8^2 + 15^2)} = \sqrt{(64 + 225)} = \sqrt{289} = 17$. The (8, 15, 17) triple is one of the frequently tested Pythagorean combinations — recognize it for instant results.

24. B — $x > 4$, obtained by subtracting 3 and then dividing by 2. $2x + 3 > 11 \rightarrow 2x > 8 \rightarrow x > 4$. Dividing both sides of an inequality by a positive number preserves the inequality direction.

25. A — x^5, obtained by adding all exponents with the same base. $x^{(3 + (-2) + 4)} = x^5$. Always apply the product rule step by step when multiplying three or more like-base factors. Negative exponents are treated identically to positive ones during addition.

26. C — $2\sqrt{2}$, derived from the cone volume formula $V = (1/3)\pi r^2 h$. Substitute: $24\pi = (1/3)\pi(r^2)(9) \rightarrow 24 = 3r^2 \rightarrow r^2 = 8 \rightarrow r = 2\sqrt{2}$. Always isolate r^2 first before taking the square root and simplify surds to their standard form.

27. D — (3, 4), calculated by averaging both x-coordinates and both y-coordinates. Midpoint = $((1 + 5)/2, (7 + 1)/2) = (6/2, 8/2) = (3, 4)$. The midpoint formula averages each coordinate independently.

28. B — $x - 4$, obtained by factoring the numerator and canceling. Factor: $x^2 - 9x + 20 = (x - 4)(x - 5)$. Cancel $(x - 5)$: result is $x - 4$. For trinomials with leading coefficient 1, find two numbers multiplying to 20 and adding to -9.

29. A — $y = 5x$, because a line through the origin with slope m has equation $y = mx$. With $m = 5$: $y = 5x$. All lines through the origin have the form $y = mx$ with y-intercept zero.

30. D — 5 cm, derived from the rectangular prism volume formula $V = lwh$. Substitute: $3 \cdot 4 \cdot h = 60 \rightarrow 12h = 60 \rightarrow h = 5$ cm. Always isolate the unknown dimension by dividing the volume by the product of the known dimensions.