PRACTICE EXAM 30: ALEKS PPL SIMULATION

1. A store marks down all items by 15%. If a shirt originally cost $80, what is the sale price?

A. $65

B. $68

C. $70

D. $72

2. Simplify: $6x^2 - 2x^2(3 - x)$.

A. $6x^2 - 2x^3$

B. $2x^3 + 6x^2$

C. $2x^3$

D. $6x^2 + 2x^3$

3. Solve: $2(3x + 1) = 4x + 10$.

A. $x = 4$

B. $x = 2$

C. $x = 6$

D. $x = 8$

4. A triangle has angles 45°, 45°, 90° and the hypotenuse is 10. What is the length of each leg?

A. 5

B. $10/\sqrt{3}$

C. 10

D. $5\sqrt{2}$

5. What is the midpoint of (5, −3) and (−1, 7)?

A. (3, 5)

B. (2, 2)

C. (2, 5)

D. (4, 2)

6. Solve: 4^x = 16.

A. x = 2

B. x = 3

C. x = 4

D. x = 8

7. A rectangle has perimeter 28 and length 10. What is the width?

A. 2

B. 5

C. 6

D. 4

8. Simplify: $(x^2 - 3x + 2) + (x^2 + 3x - 1)$.

A. $x^2 + 1$

B. $2x^2 + 6x + 1$

C. $2x^2 + 1$

D. $2x^2 - 6x + 1$

9. What is the volume of a sphere with radius 4? (Use π.)

A. $256\pi/3$

B. $64\pi/3$

C. $128\pi/3$

D. $512\pi/3$

10. If $f(x) = 3x + 5$, what is $f^{-1}(11)$?

A. 3

B. 2

C. 4

D. 6

11. A box contains 4 white, 6 black, and 5 green balls. What is the probability of drawing a green ball?

A. 4/15

B. 2/5

C. 6/15

D. 1/3

12. What is $\cos(0°)$?

A. 1

B. 0

C. -1

D. $\sqrt{2}/2$

13. Factor: $2x^2 - 18$.

A. $2(x^2 + 9)$

B. $(2x - 6)(x + 3)$

C. $2(x - 3)(x + 3)$

D. $(x - 3)(2x + 6)$

14. Solve: $\log_5(x) = 3$.

A. 15

B. 125

C. 25

D. 8

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

A. $x^2 - 4$

B. 1

C. $(x + 2)/(x - 2)^2$

D. $(x + 2)/(x - 2)$

16. A line has equation $y = 4$. The line is:

A. Horizontal

B. Vertical

C. Diagonal with slope 4

D. Undefined

17. Simplify: $(5x^3y^{-2})/(x^2y^{-4})$.

A. $5xy^6$

B. $5x^5y^{-2}$

C. $5xy^2$

D. $5x^5y^6$

18. Solve: $|x - 4| \leq 3$.

A. $x \leq 7$

B. $1 \leq x \leq 7$

C. $x \geq 1$

D. $x \geq 7$ or $x \leq 1$

19. A cylinder has volume 100π and radius 5. What is its height?

A. 2

B. 5

C. 10

D. 4

20. Simplify: $\tan \theta \cdot \cos \theta$.

A. $\sin \theta$

B. 1

C. $\cos \theta$

D. $\sec \theta$

21. The perimeter of a regular octagon is 64 cm. What is the length of one side?

A. 8 cm

B. 7 cm

C. 6 cm

D. 10 cm

22. Simplify: $(x + 2)^2 + (x - 2)^2$.

A. $2x^2$

B. $4x^2 + 8$

C. $2x^2 + 4$

D. $2x^2 + 8$

23. Solve: $3(x - 4) + 2 = 5$.

A. $x = 3$

B. $x = 5$

C. $x = 7$

D. $x = 9$

24. What is the slope of a line that passes through $(-1, 4)$ and $(3, 4)$?

A. -1

B. 1

C. 0

D. Undefined

25. A square pyramid has base area 36 cm^2 and height 5 cm. What is its volume?

A. 60 cm^3

B. 180 cm^3

C. 120 cm^3

D. 90 cm^3

26. Evaluate: $\sqrt{(144)} + \sqrt{(16)} - \sqrt{(9)}$.

A. 11

B. 14

C. 16

D. 13

27. Simplify: $(x^2 + 5x)/(x)$, assuming $x \neq 0$.

A. $x^2 + 5$

B. $x + 5$

C. 5

D. $5x$

28. A circle has equation $(x - 3)^2 + (y + 2)^2 = 25$. What is the center?

A. $(3, -2)$

B. $(-3, 2)$

C. $(3, 2)$

D. $(-3, -2)$

29. Solve: $3x - 4(x + 1) = 8$.

A. $x = 4$

B. $x = -4$

C. $x = -12$

D. $x = 12$

30. The sum of three consecutive integers is 48. What is the smallest integer?

A. 14

B. 15

C. 16

D. 17

PRACTICE EXAM 30: ANSWER KEY AND EXPLANATIONS

1. B — $68, calculated by applying the complement of the discount rate. A 15% markdown means 85% of the original price remains: $80 × 0.85 = $68. Always use (1 − discount rate) as the multiplier when computing a sale price after a percentage reduction. Discount problems reduce to simple multiplication once the complement is identified.

2. C — $2x^3$, obtained by distributing and combining like terms. $6x^2 - 2x^2(3 - x) = 6x^2 - 6x^2 + 2x^3$. The $6x^2$ terms cancel, leaving $2x^3$. Always distribute the negative coefficient through every term in the parentheses before combining — missing a sign flip produces a wrong answer.

3. A — $x = 4$, obtained by distributing and solving the resulting linear equation. $6x + 2 = 4x + 10 \rightarrow 2x = 8 \rightarrow x = 4$. Always distribute through parentheses first, then move variables to one side and constants to the other. Verify by substitution: $2(3(4) + 1) = 26 = 4(4) + 10 = 26$. ✓

4. D — $5\sqrt{2}$, derived from the 45-45-90 triangle ratio $1 : 1 : \sqrt{2}$. If hypotenuse = 10, then leg = $10/\sqrt{2} = 5\sqrt{2}$ after rationalization. Memorizing the side ratios of standard triangles (45-45-90 and 30-60-90) eliminates the need for trigonometric computation on common angles.

5. B — (2, 2), calculated by averaging both x-coordinates and both y-coordinates. Midpoint = $((5 + (-1))/2, (-3 + 7)/2) = (4/2, 4/2) = (2, 2)$. The midpoint formula averages each coordinate independently — addition, not subtraction, distinguishes it from the distance formula.

6. A — $x = 2$, because $4^2 = 16$ matches the base of 4 on the left side. When exponential bases match on both sides of an equation, the exponents must be equal. Always attempt base-matching before resorting to logarithms — it is faster when recognizable.

7. D — 4, obtained by substituting into the rectangle perimeter formula. $2l + 2w = 28 \rightarrow 2(10) + 2w = 28 \rightarrow 20 + 2w = 28 \rightarrow w = 4$. Always isolate the unknown by subtracting known quantities and dividing by the coefficient.

8. C — $2x^2 + 1$, obtained by combining like terms from the two polynomials. $(x^2 + x^2) + (-3x + 3x) + (2 - 1) = 2x^2 + 0x + 1 = 2x^2 + 1$. Adding polynomials involves adding coefficients of like terms — the opposing middle coefficients cancel cleanly here.

9. A — $256\pi/3$, calculated using the sphere volume formula $V = (4/3)\pi r^3$. With radius 4: $V = (4/3)\pi(64) = 256\pi/3$ cubic units. Always cube the radius before multiplying. Keeping π symbolic preserves precision and is often preferred on the ALEKS assessment.

10. B — 2, found by setting f(x) = 11 and solving for x. $3x + 5 = 11 \rightarrow 3x = 6 \rightarrow x = 2$. So $f^{-1}(11) = 2$. Finding a specific inverse value is often faster than constructing the entire inverse function — just solve the equation for that output value.

11. D — 1/3, calculated by dividing favorable outcomes by total outcomes. Green balls: 5. Total balls: 4 + 6 + 5 = 15. Probability = 5/15 = 1/3. Always reduce probability fractions to simplest form before submitting. Probability equals favorable outcomes divided by total outcomes.

12. A — 1, because cos(0°) corresponds to the x-coordinate of the unit-circle point at angle zero: (1, 0). Cosine is always the x-coordinate on the unit circle. Memorize the four quadrantal angle values for sine and cosine.

13. C — $2(x - 3)(x + 3)$, obtained by factoring out the GCF first and then applying the difference of squares pattern. $2x^2 - 18 = 2(x^2 - 9) = 2(x - 3)(x + 3)$. Always extract the GCF before applying special factoring patterns to achieve complete factoring.

14. B — 125, obtained by converting logarithmic to exponential form. $\log_5(x) = 3$ means $x = 5^3 = 125$. Always convert logarithmic equations to exponential form to solve for the argument. The base raised to the log's value gives the argument.

15. D — $(x + 2)/(x - 2)$, obtained by factoring both numerator and denominator and canceling. Numerator: $x^2 - 4 = (x + 2)(x - 2)$. Denominator: $x^2 - 4x + 4 = (x - 2)^2$. Cancel $(x - 2)$: $(x + 2)/(x - 2)$. Always factor completely before canceling common factors.

16. A — Horizontal, because a line with constant y-value and no x-dependence runs parallel to the x-axis. y = 4 means the y-coordinate is always 4 regardless of x. Horizontal lines have slope zero, while vertical lines have undefined slope.

17. C — $5xy^2$, obtained by applying the quotient rule for exponents to each base. x^(3 − 2) = x; y^(−2 − (−4)) = y^2. Combined with the coefficient 5: $5xy^2$. Always simplify to positive exponents in the final form by subtracting the denominator's exponent from the numerator's.

18. B — $1 \leq x \leq 7$, obtained by splitting the absolute value inequality into a compound AND. $|x - 4| \leq 3$ becomes $-3 \leq x - 4 \leq 3$. Add 4 to all parts: $1 \leq x \leq 7$. Absolute value "less than or equal to" always produces a bounded interval, never a disjoint union.

19. D — 4, derived from the cylinder volume formula $V = \pi r^2 h$. Substitute: $100\pi = \pi(25)h \rightarrow 25h = 100 \rightarrow h = 4$ units. Always isolate h by dividing by πr^2 before solving. Keeping π symbolic simplifies the arithmetic cleanly.

20. A — sin θ, obtained by expressing tangent in terms of sine and cosine. $\tan\theta \cdot \cos\theta = (\sin\theta/\cos\theta) \cdot \cos\theta = \sin\theta$. The cos θ in the numerator and denominator cancel. Always rewrite tangent in terms of sine and cosine when simplifying trig expressions.

21. A — 8 cm, calculated by dividing the perimeter by the number of sides. A regular octagon has 8 equal sides: 64/8 = 8 cm. Any regular polygon has equal side lengths, so dividing the perimeter by the number of sides gives the individual side length.

22. D — $2x^2 + 8$, obtained by expanding both squares and combining like terms. $(x + 2)^2 = x^2 + 4x + 4$; $(x - 2)^2 = x^2 - 4x + 4$. Add: $2x^2 + 0x + 8 = 2x^2 + 8$. The middle cross terms $\pm 4x$ cancel when the two squares are added, leaving only the squared terms.

23. B — $x = 5$, obtained by distributing and solving the linear equation. $3x - 12 + 2 = 5 \rightarrow 3x - 10 = 5 \rightarrow 3x = 15 \rightarrow x = 5$. Always distribute through parentheses first, combine like terms, then isolate the variable.

24. C — 0, because both points share the same y-coordinate of 4. Slope = $(4 - 4)/(3 - (-1)) = 0/4 = 0$. A horizontal line has zero slope because there is no vertical change between any two points on the line.

25. A — 60 cm^3, calculated using the pyramid volume formula $V = (1/3)(\text{base area})(\text{height})$. Substitute: $V = (1/3)(36)(5) = 60\ cm^3$. Always include the one-third factor for pyramids and cones — this distinguishes pointed solids from prisms and cylinders.

26. D — 13, obtained by evaluating each radical as a perfect square and combining. $\sqrt{144} = 12$; $\sqrt{16} = 4$; $\sqrt{9} = 3$. Calculate: $12 + 4 - 3 = 13$. Memorize perfect squares through 225 to recognize them instantly without computation.

27. B — $x + 5$, obtained by dividing each term in the numerator by x. $x^2/x = x$; $5x/x = 5$. Result: $x + 5$. Always divide term by term when the denominator is a monomial.

28. A — $(3, -2)$, from the standard form of a circle $(x - h)^2 + (y - k)^2 = r^2$. The center is (h, k), read with opposite signs from the parenthetical expressions. For $(x - 3)^2 + (y + 2)^2 = 25$, center = $(3, -2)$. Always flip signs when extracting the center from standard form.

29. C — $x = -12$, obtained by distributing and solving the linear equation. $3x - 4x - 4 = 8 \rightarrow -x - 4 = 8 \rightarrow -x = 12 \rightarrow x = -12$. Pay close attention to the sign when the variable coefficient becomes negative — multiplying both sides by -1 flips the sign.

30. B — 15, obtained by setting up an equation for three consecutive integers. Let n = smallest; integers are n, n + 1, n + 2. Sum: $3n + 3 = 48 \rightarrow 3n = 45 \rightarrow n = 15$. Verify: $15 + 16 + 17 = 48$. ✓ Consecutive integer problems always use n and its successors.