

PRACTICE EXAM 33: ALEKS PPL SIMULATION

1. A store reduces a \$120 jacket by 20%. What is the sale price?

- A. \$96
- B. \$80
- C. \$100
- D. \$108

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

- A. $5x - 6$
- B. $5x + 3$
- C. $5x + 6$
- D. $5x - 3$

3. Solve: $4x - 7 = 9$.

- A. $x = 2$
- B. $x = 3$
- C. $x = 4$
- D. $x = 6$

4. A right triangle has legs of length 6 and 8. What is the hypotenuse?

- A. 12
- B. 10
- C. 14
- D. 48

5. Factor: $x^2 + 2x - 15$.

- A. $(x + 5)(x + 3)$
- B. $(x - 5)(x - 3)$
- C. $(x - 5)(x + 3)$
- D. $(x + 5)(x - 3)$

6. A box has dimensions $5 \times 6 \times 2$. What is the volume?

- A. 60
- B. 30
- C. 22
- D. 42

7. Simplify: $(x^3)^2 \cdot x$.

- A. x^5
- B. x^7
- C. x^8
- D. x^6

8. What is the area of a circle with radius 3? (Use π .)

- A. 6π
- B. 3π
- C. 9π
- D. 12π

9. A fair coin is flipped 3 times. What is the probability of getting all tails?

- A. $1/2$
- B. $1/4$
- C. $1/6$
- D. $1/8$

10. Solve: $5(x + 2) = 25$.

- A. $x = 3$
- B. $x = 5$
- C. $x = 7$
- D. $x = 9$

11. What is the slope of the line $y = -3x + 4$?

- A. 4
- B. 3
- C. -4
- D. -3

12. Simplify: $\sqrt{50} - \sqrt{8}$.

A. $\sqrt{42}$

B. $3\sqrt{2}$

C. $\sqrt{58}$

D. $6\sqrt{2}$

13. What is the exact value of $\cos(90^\circ)$?

A. 0

B. 1

C. -1

D. $\sqrt{2}/2$

14. A cylinder has radius 3 and height 4. What is its volume? (Use π .)

A. 12π

B. 24π

C. 36π

D. 48π

15. Evaluate: $|-5| - |3|$.

A. 8

B. 2

C. -2

D. -8

16. A rectangle has length 15 and width 8. What is the perimeter?

- A. 23
- B. 30
- C. 120
- D. 46

17. Simplify: $(x + 5)(x - 5)$.

- A. $x^2 - 25$
- B. $x^2 + 25$
- C. $x^2 - 10x - 25$
- D. $x^2 - 10x + 25$

18. What is 30% of 80?

- A. 20
- B. 26
- C. 24
- D. 32

19. Solve: $2x^2 = 50$.

- A. $x = 25$
- B. $x = \pm 5$
- C. $x = 5$
- D. $x = \pm 25$

20. A circle has circumference 12π . What is the radius?

- A. 2
- B. 3
- C. 4
- D. 6

21. What is the y-intercept of the line $3x + y = 9$?

- A. 3
- B. -3
- C. 9
- D. -9

22. Simplify: $\log(1)$.

- A. 0
- B. 1
- C. Undefined
- D. 10

23. If $f(x) = x + 3$ and $g(x) = 2x$, what is $(f \circ g)(4)$?

- A. 7
- B. 14
- C. 10
- D. 11

24. A trapezoid has parallel sides 6 and 10 and height 8. What is its area?

- A. 48
- B. 64
- C. 96
- D. 112

25. A number increased by 15% equals 46. What is the original number?

- A. 40
- B. 35
- C. 30
- D. 50

26. Factor: $4x^2 - 25$.

- A. $(2x + 5)^2$
- B. $(2x - 5)(2x - 5)$
- C. $(2x + 5)(2x - 5)$
- D. $2(x - 5)(x + 5)$

27. Solve: $3x + 2 \leq 11$.

- A. $x \geq 3$
- B. $x \geq -3$
- C. $x \leq -3$
- D. $x \leq 3$

28. Simplify: $\sin^2\theta + \cos^2\theta + 5$.

A. 5

B. 6

C. 7

D. $\sin \theta + 5$

29. A line passes through (4, 6) and (2, 2). What is the slope?

A. 2

B. 1

C. $1/2$

D. -2

30. A sphere has radius 2. What is its volume? (Use π .)

A. 8π

B. $16\pi/3$

C. $32\pi/3$

D. 16π

PRACTICE EXAM 33: ANSWER KEY AND EXPLANATIONS

1. A — \$96, calculated by applying the complement of the discount rate. A 20% reduction means 80% of the original price remains: $\$120 \times 0.80 = \96 . Always use $(1 - \text{discount rate})$ as the multiplier when computing a sale price after a percentage reduction. Discount problems reduce to simple multiplication once the complement is identified.
2. D — $5x - 3$, obtained by distributing both parenthetical expressions and combining like terms. $2(x - 3) = 2x - 6$; $3(x + 1) = 3x + 3$. Combine: $(2x + 3x) + (-6 + 3) = 5x - 3$. Always distribute completely before combining. Sign discipline during distribution prevents the most common algebra errors.
3. C — $x = 4$, obtained by isolating the variable. Add 7: $4x = 16$. Divide by 4: $x = 4$. Always reverse operations in the opposite order they were performed — addition before division in this case. Verify by substitution: $4(4) - 7 = 9$. ✓
4. B — 10, calculated using the Pythagorean theorem. Hypotenuse = $\sqrt{(6^2 + 8^2)} = \sqrt{(36 + 64)} = \sqrt{100} = 10$. The (6, 8, 10) triple is a multiple of (3, 4, 5) by a factor of 2 — recognizing Pythagorean triples eliminates unnecessary computation.
5. D — $(x + 5)(x - 3)$, found by identifying two numbers that multiply to -15 and add to 2. The pair is 5 and -3 . The sign of the product is negative, and the sign of the sum is positive. Always verify factoring by expanding: $(x + 5)(x - 3) = x^2 + 2x - 15$. ✓
6. A — 60, calculated by multiplying all three dimensions. $V = l \times w \times h = 5 \times 6 \times 2 = 60$ cubic units. Volume of a rectangular prism always equals the product of its three edge lengths, measured in cubic units.
7. B — x^7 , obtained by applying the power rule and then the product rule. $(x^3)^2 = x^6$ (multiply exponents). Then $x^6 \cdot x = x^{6+1} = x^7$. Always apply powers of powers before multiplying different factors. Exponents add only when multiplying like bases.
8. C — 9π , calculated using the circle area formula πr^2 with radius 3. $A = \pi(3)^2 = 9\pi$ square units. Always square the radius before multiplying by π . Keeping π symbolic preserves precision and avoids rounding errors.
9. D — $1/8$, calculated as the product of three independent $1/2$ probabilities. $P(\text{TTT}) = (1/2)(1/2)(1/2) = 1/8$. Independent events multiply their individual probabilities. Three consecutive identical outcomes on fair coins each have probability $1/8$.

10. A — $x = 3$, obtained by distributing and isolating x . $5x + 10 = 25 \rightarrow 5x = 15 \rightarrow x = 3$. Always distribute the coefficient before combining constants. Verify: $5(3 + 2) = 25$. ✓
11. D — -3 , because in slope-intercept form $y = mx + b$, the coefficient of x is the slope. For $y = -3x + 4$, $m = -3$. Negative slope indicates a line falling from left to right. The y -intercept is the constant term.
12. B — $3\sqrt{2}$, obtained by simplifying each radical and combining like terms. $\sqrt{50} = 5\sqrt{2}$; $\sqrt{8} = 2\sqrt{2}$. Difference: $5\sqrt{2} - 2\sqrt{2} = 3\sqrt{2}$. Like radicals must share the same radicand after simplification before combining their coefficients.
13. A — 0 , because $\cos(90^\circ)$ equals the x -coordinate of the unit-circle point at 90° , which is $(0, 1)$. Cosine is always the x -coordinate on the unit circle. Memorize the four quadrantal angle values: $\cos(0^\circ) = 1$, $\cos(90^\circ) = 0$, $\cos(180^\circ) = -1$, $\cos(270^\circ) = 0$.
14. C — 36π , calculated using the cylinder volume formula $V = \pi r^2 h$. Substitute: $\pi(9)(4) = 36\pi$ cubic units. Always square the radius before multiplying by height and π . Cubic units apply to all volume measurements.
15. B — 2 , obtained by evaluating each absolute value and subtracting. $|-5| = 5$ (distance from zero); $|3| = 3$. Difference: $5 - 3 = 2$. Absolute value measures distance from zero and is always non-negative.
16. D — 46 , calculated using the rectangle perimeter formula $P = 2l + 2w$. Substitute: $2(15) + 2(8) = 30 + 16 = 46$. Always distribute the 2 to both dimensions separately before adding. Perimeter is a one-dimensional measure.
17. A — $x^2 - 25$, applying the difference of squares pattern $(a + b)(a - b) = a^2 - b^2$. With $a = x$, $b = 5$: $x^2 - 5^2 = x^2 - 25$. Conjugate pairs always produce a clean $a^2 - b^2$ result with no middle term.
18. C — 24 , obtained by converting 30% to decimal and multiplying. $0.30 \times 80 = 24$. Alternatively, recognize 30% as $3/10$: $(3/10)(80) = 24$. Percent calculations always convert the percent to a decimal or fraction first before multiplying.
19. B — $x = \pm 5$, obtained by isolating x^2 and taking the square root. $2x^2 = 50 \rightarrow x^2 = 25 \rightarrow x = \pm 5$. Always include both positive and negative roots when solving by the square root method — dropping the negative loses half the solution.
20. D — 6 , derived from the circumference formula $C = 2\pi r$. Set $2\pi r = 12\pi$, then divide by 2π : $r = 6$. Always isolate the radius by dividing by 2π — the π cancels cleanly.
21. C — 9 , found by setting $x = 0$ and solving for y . $3(0) + y = 9 \rightarrow y = 9$. The y -intercept is always found by setting x to zero. In standard form $Ax + By = C$, the y -intercept equals C/B .

22. A — 0, because $\log(1) = 0$ for any base. This follows from $b^0 = 1$ for any nonzero base b . The logarithm of 1 is always zero regardless of the base — a fundamental property useful for simplification and equation-solving.
23. D — 11, found by evaluating the inner function first. $g(4) = 2(4) = 8$. Then $f(8) = 8 + 3 = 11$. Composition applies the inside function first; the output becomes the input of the outer function.
24. B — 64, calculated using the trapezoid area formula $(1/2)(b_1 + b_2)(h)$. Substitute: $(1/2)(6 + 10)(8) = (1/2)(16)(8) = 64$ square units. Always average the two parallel sides first, then multiply by the perpendicular height.
25. A — 40, obtained by setting up the percent-increase equation. $1.15x = 46$. Divide by 1.15: $x = 40$. Always use $(1 + \text{rate})$ as the multiplier for the result of a percent increase; solve for the original by dividing by this factor.
26. C — $(2x + 5)(2x - 5)$, applying the difference of squares pattern to $4x^2 - 25$. Rewrite as $(2x)^2 - 5^2$ and factor: $(2x + 5)(2x - 5)$. Recognize that both $4x^2$ and 25 are perfect squares — this is the hallmark of a difference-of-squares problem.
27. D — $x \leq 3$, obtained by subtracting 2 and dividing by 3. $3x + 2 \leq 11 \rightarrow 3x \leq 9 \rightarrow x \leq 3$. Dividing by a positive number preserves the inequality direction. Only negative divisors flip the inequality sign.
28. B — 6, because $\sin^2\theta + \cos^2\theta = 1$ by the Pythagorean identity, and adding 5 gives 6. Always look for identity simplifications first in trig expressions — this is one of the most frequently tested applications of the fundamental identity.
29. A — 2, calculated using the slope formula $(y_2 - y_1)/(x_2 - x_1)$. Substitute: $(6 - 2)/(4 - 2) = 4/2 = 2$. A positive slope indicates a line rising from left to right. Always subtract y -values over x -values in the same order.
30. C — $32\pi/3$, calculated using the sphere volume formula $V = (4/3)\pi r^3$. With radius 2: $V = (4/3)\pi(8) = 32\pi/3$ cubic units. Always cube the radius before multiplying. Keeping π symbolic preserves precision.