

PRACTICE EXAM 24: ALEKS PPL SIMULATION

1. A recipe uses 3 eggs for every 2 cups of flour. If a baker uses 12 eggs, how many cups of flour are needed?

- A. 4 cups
- B. 6 cups
- C. 8 cups
- D. 18 cups

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

- A. $2x + 10$
- B. $2x + 14$
- C. $6x + 14$
- D. $2x + 2$

3. What is the solution to $7x - 4 = 2x + 11$?

- A. $x = 1$
- B. $x = 2$
- C. $x = 4$
- D. $x = 3$

4. Simplify: $\sqrt{(64)} + \sqrt{(81)}$.

A. 17

B. 15

C. 13

D. 11

5. A triangle has angles 30° , 60° , and 90° . The side opposite the 30° angle is 4. What is the side opposite the 60° angle?

A. 4

B. 8

C. $4\sqrt{3}$

D. $4\sqrt{2}$

6. Solve for x: $2(x - 1) + 3 = 7$.

A. $x = 1$

B. $x = 2$

C. $x = 5$

D. $x = 3$

7. If $f(x) = 4x^2 - 3$, what is $f(-2)$?

A. 13

B. 16

C. 19

D. -13

8. Solve: $5^x = 125$.

A. $x = 2$

B. $x = 3$

C. $x = 5$

D. $x = 25$

9. What is the volume of a cube with side length 6?

A. 36

B. 72

C. 180

D. 216

10. Simplify: $(x - 3)(x + 3)$.

A. $x^2 + 9$

B. $x^2 - 9x$

C. $x^2 - 9$

D. $x^2 - 6x - 9$

11. A rectangle has dimensions 10 cm by 4 cm. What is the length of its diagonal?

A. $\sqrt{116}$ cm

B. 14 cm

- C. 6 cm
- D. 40 cm

12. What is the probability of rolling a 6 on a standard die?

- A. $\frac{1}{2}$
- B. $\frac{1}{3}$
- C. $\frac{2}{6}$
- D. $\frac{1}{6}$

13. Simplify: $\log(1000)$.

- A. 2
- B. 3
- C. 4
- D. 10

14. What is the slope of the line perpendicular to $y = 3x + 2$?

- A. 3
- B. -3
- C. $-\frac{1}{3}$
- D. $\frac{1}{3}$

15. A circle has area 25π . What is its radius?

- A. 5

B. 10

C. 25

D. 50

16. Solve: $x/6 = 2/3$.

A. $x = 9$

B. $x = 2$

C. $x = 3$

D. $x = 4$

17. Expand: $(2x + 1)^2$.

A. $4x^2 + 1$

B. $4x^2 + 4x + 1$

C. $4x^2 + 2x + 1$

D. $2x^2 + 4x + 1$

18. Evaluate: $3! + 4!$.

A. 12

B. 24

C. 30

D. 36

19. A line passes through $(0, -2)$ with slope 4. What is its equation?

- A. $y = 4x - 2$
- B. $y = 4x + 2$
- C. $y = -4x - 2$
- D. $y = 4x$

20. Simplify: $(x^2 + 8x + 16)/(x + 4)$, assuming $x \neq -4$.

- A. $x^2 - 4$
- B. 4
- C. $x - 4$
- D. $x + 4$

21. What is the value of $\sin(0^\circ)$?

- A. 1
- B. 0
- C. -1
- D. $\sqrt{2}/2$

22. A number is increased by 50%, then decreased by 40%. If the original number is 100, what is the final value?

- A. 100
- B. 110
- C. 85

D. 90

23. Factor: $9x^2 - 25$.

A. $(3x + 5)(3x - 5)$

B. $(9x + 5)(x - 5)$

C. $(3x - 5)^2$

D. $(3x + 5)^2$

24. Simplify: $(x^{-1} \cdot y^2)/(x \cdot y^{-3})$.

A. y^5x

B. $x \cdot y^5$

C. y^5/x^2

D. y^5/x

25. What is the equation of a line with x-intercept 4 and y-intercept 8?

A. $y = 2x + 8$

B. $y = 4x - 8$

C. $y = 2x - 8$

D. $y = -2x + 8$

26. A box is 8 in by 6 in by 3 in. What is the volume?

A. 144 in^3

B. 72 in^3

C. 108 in^3

D. 24 in^3

27. Solve: $(x + 3)(x - 5) = 0$.

A. $x = 3$ or $x = 5$

B. $x = -3$ or $x = 5$

C. $x = 3$ or $x = -5$

D. $x = -3$ or $x = -5$

28. A sphere has a diameter of 10. What is its volume? (Use π .)

A. $125\pi/3$

B. $1000\pi/3$

C. $250\pi/3$

D. $500\pi/3$

29. Simplify: $\tan(x) \cdot \cot(x)$.

A. 1

B. 0

C. \sin^2x

D. \cos^2x

30. The quadratic $x^2 + 4x + c = 0$ has a repeated real solution. What is c ?

A. 1

B. 2

C. 4

D. 8

PRACTICE EXAM 24: ANSWER KEY AND EXPLANATIONS

1. C — 8 cups, calculated using direct proportionality between eggs and flour. Set up the proportion: $3 \text{ eggs}/2 \text{ cups} = 12 \text{ eggs}/x \text{ cups}$. Cross-multiply: $3x = 24$, giving $x = 8$. Recipe scaling always uses direct proportionality, and the ratio of ingredients stays constant as the recipe scales up or down.
2. B — $2x + 14$, found by distributing both parenthetical expressions and combining like terms. $4(x + 2) = 4x + 8$; $-2(x - 3) = -2x + 6$. Combine: $(4x - 2x) + (8 + 6) = 2x + 14$. Always apply the distributive property completely — including the negative sign — before combining like terms.
3. D — $x = 3$, obtained by moving variables to one side and constants to the other. Subtract $2x$: $5x - 4 = 11$. Add 4: $5x = 15$. Divide by 5: $x = 3$. Always move the variable with the smaller coefficient to avoid working with negative coefficients unnecessarily.
4. A — 17, obtained by evaluating each radical as a perfect square and adding. $\sqrt{64} = 8$ (since $8^2 = 64$); $\sqrt{81} = 9$ (since $9^2 = 81$). Sum: $8 + 9 = 17$. Memorize perfect squares through 225 to recognize them instantly without computation.
5. C — $4\sqrt{3}$, determined by applying the 30-60-90 triangle ratio $1 : \sqrt{3} : 2$. The side opposite 30° is 4, so the side opposite 60° is $4\sqrt{3}$ (obtained by multiplying by $\sqrt{3}$). Memorizing standard triangle ratios eliminates the need for trigonometric function evaluation on common angles.
6. D — $x = 3$, obtained by distributing and then isolating x . $2x - 2 + 3 = 7 \rightarrow 2x + 1 = 7 \rightarrow 2x = 6 \rightarrow x = 3$. Always distribute through parentheses first, combine like terms, then move constants and variables to opposite sides.
7. A — 13, found by substituting -2 for x and evaluating carefully. $f(-2) = 4(-2)^2 - 3 = 4(4) - 3 = 16 - 3 = 13$. Always wrap negative substitutions in parentheses to preserve the sign — squaring always produces a positive result regardless of the original sign.
8. B — $x = 3$, because $5^3 = 125$ matches the base 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 the faster method when applicable.
9. D — 216, obtained by cubing the side length. Volume of a cube = $s^3 = 6^3 = 216$ cubic units. Volume of any cube equals the cube of its edge length, measured in cubic units. Always check that units are appropriate for three-dimensional measurement.

10. C — $x^2 - 9$, applying the difference of squares pattern $(a + b)(a - b) = a^2 - b^2$. With $a = x$, $b = 3$: $x^2 - 3^2 = x^2 - 9$. The middle terms cancel when multiplying conjugates, leaving only the squared difference.
11. A — $\sqrt{116}$ cm, derived from the Pythagorean theorem applied to rectangle sides. Diagonal = $\sqrt{(10^2 + 4^2)} = \sqrt{(100 + 16)} = \sqrt{116}$. The diagonal of a rectangle equals the square root of the sum of squared sides, a direct extension of the Pythagorean theorem.
12. D — $1/6$, calculated as favorable outcomes (one: the number 6) divided by total outcomes (six sides). Every face of a fair die has equal probability of $1/6$. Always reduce probability fractions to simplest form before submitting.
13. B — 3, because $\log(1000) = \log_{10}(1000) = 3$, since $10^3 = 1000$. The common log (base 10) of any power of 10 equals that power. Memorize powers of 10 for instant logarithmic evaluation.
14. C — $-1/3$, obtained by taking the negative reciprocal of the given slope. Slope of $y = 3x + 2$ is 3; negative reciprocal is $-1/3$. Perpendicular slopes always multiply to -1 . Always flip the fraction AND change the sign to find a perpendicular slope.
15. A — 5, found by solving the area equation $\pi r^2 = 25\pi$. Divide both sides by π : $r^2 = 25$. Take the positive square root: $r = 5$. Radius must be positive, so reject the negative root. Always divide by π first before taking the square root.
16. D — $x = 4$, obtained by cross-multiplying the proportion. $3x = 6(2) = 12$, so $x = 4$. Alternatively, multiply both sides by 6: $x = 6 \times (2/3) = 4$. Proportion problems reduce to simple multiplication or cross-multiplication.
17. B — $4x^2 + 4x + 1$, obtained by applying the pattern $(a + b)^2 = a^2 + 2ab + b^2$ with $a = 2x$, $b = 1$. $(2x)^2 = 4x^2$; $2(2x)(1) = 4x$; $(1)^2 = 1$. Combined: $4x^2 + 4x + 1$. Never drop the middle cross term when squaring a binomial.
18. C — 30, obtained by evaluating both factorials and adding. $3! = 6$ ($3 \times 2 \times 1$); $4! = 24$ ($4 \times 3 \times 2 \times 1$). Sum: $6 + 24 = 30$. Memorize small factorials (through $6!$) for rapid evaluation on the ALEKS.
19. A — $y = 4x - 2$, using slope-intercept form $y = mx + b$ with slope 4 and y-intercept -2 . The y-intercept is the point where the line crosses the y-axis: $(0, -2)$, so $b = -2$. Always identify slope and intercept from given information before writing the equation.
20. D — $x + 4$, found by factoring the numerator as a perfect square and canceling. Numerator: $x^2 + 8x + 16 = (x + 4)^2$. Divided by $(x + 4)$: result is $x + 4$. Perfect square trinomials always factor into $(a \pm b)^2$ when the middle term equals ± 2 times the product of the square roots.
21. B — 0, because $\sin(0^\circ)$ equals the y-coordinate of the unit-circle point at angle zero, which is $(1, 0)$. The sine of zero is the y-coordinate at the starting position on the positive x-axis. Memorize the four quadrantal angle values: $(1, 0)$, $(0, 1)$, $(-1, 0)$, $(0, -1)$.

22. D — 90, calculated by applying each percent change sequentially. $100 \times 1.50 = 150$ (after 50% increase). $150 \times 0.60 = 90$ (after 40% decrease). Sequential percent changes compound multiplicatively — they do not cancel algebraically. Always apply changes in order to the current value.
23. A — $(3x + 5)(3x - 5)$, applying the difference of squares pattern to $9x^2 - 25$. Rewrite as $(3x)^2 - 5^2$; factor as $(3x + 5)(3x - 5)$. Recognize that $9x^2$ and 25 are both perfect squares — this is the hallmark of the difference-of-squares pattern.
24. C — y^5/x^2 , obtained by applying the quotient rule for exponents to each base. $x^{(-1 - 1)} = x^{-2}$. Move to denominator: $1/x^2$. $y^{(2 - (-3))} = y^5$. Combined: y^5/x^2 . Always simplify to positive exponents in the final form.
25. D — $y = -2x + 8$, derived from the two intercepts. Slope = $(8 - 0)/(0 - 4) = -2$. Using y-intercept 8: $y = -2x + 8$. Lines crossing both axes have negative slope when intercepts have opposite signs from what would produce positive slope.
26. A — 144 in^3 , calculated by multiplying all three dimensions. Volume of rectangular prism = $l \times w \times h = 8 \times 6 \times 3 = 144$ cubic inches. Always label the units as cubic inches, cubic feet, or cubic centimeters depending on the input units.
27. B — $x = -3$ or $x = 5$, applying the zero product property. Set each factor equal to zero: $x + 3 = 0$ gives $x = -3$; $x - 5 = 0$ gives $x = 5$. The zero product property is the foundation of factor-based quadratic solving — each factor contributes one solution.
28. D — $500\pi/3$, calculated using the sphere volume formula $V = (4/3)\pi r^3$. Diameter 10 \rightarrow radius 5. $V = (4/3)\pi(125) = 500\pi/3$ cubic units. Always halve the diameter to get the radius before substituting into volume formulas.
29. A — 1, because tan and cot are reciprocal functions. $\tan(x) \cdot \cot(x) = \tan(x) \times (1/\tan(x)) = 1$. Reciprocal pairs always multiply to 1 within their common domain. The pairs are sin/csc, cos/sec, and tan/cot.
30. C — 4, derived from the discriminant condition for a repeated real solution. $b^2 - 4ac = 0$ for repeated roots. With $a = 1$, $b = 4$: $16 - 4c = 0$, so $c = 4$. The discriminant determines the number and nature of quadratic solutions — zero means exactly one repeated root.