

PRACTICE EXAM 20: ALEKS PPL SIMULATION

1. A bookstore sells hardcover books for \$25 and paperbacks for \$12. If 48 books were sold for a total of \$888, how many hardcovers were sold?

- A. 24
- B. 21
- C. 27
- D. 30

2. Simplify: $(3\sqrt{5})^2$.

- A. 15
- B. $9\sqrt{5}$
- C. 45
- D. 25

3. The line $2x + y = 6$ has what x-intercept?

- A. 6
- B. 3
- C. 2
- D. 1

4. Simplify: $(x^{-2}y^3)/(x^3y^{-2})$, assuming $x, y \neq 0$.

A. y^5x^{-5}

B. y^3/x^5

C. y/x^5

D. y^5/x^5

5. A car uses 12 gallons of gas to travel 300 miles. How many miles per gallon does it get?

A. 25 mpg

B. 20 mpg

C. 30 mpg

D. 28 mpg

6. Factor completely: $x^2 + 12x + 36$.

A. $(x - 6)^2$

B. $(x + 36)(x - 1)$

C. $(x + 6)^2$

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

7. Solve for x : $2x^2 - 8 = 0$.

A. $x = 4$ only

B. $x = \pm 2$

C. $x = \pm 4$

D. $x = 8$

8. A bag contains 5 red, 3 blue, and 2 yellow marbles. What is the probability of drawing a blue marble?

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{1}{2}$

D. $\frac{3}{10}$

9. What is 25% of 120?

A. 30

B. 40

C. 50

D. 60

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

A. $x = 1$

B. $x = 4$

C. $x = 6$

11. Simplify: $(x + 3)(x^2 - 3x + 9)$.

A. $x^3 - 27$

B. $x^3 + 9$

C. $x^3 - 9$

D. $x^3 + 27$

12. A cylinder has a diameter of 6 cm and a height of 5 cm. What is its volume? (Use π .)

- A. $45\pi \text{ cm}^3$
- B. $60\pi \text{ cm}^3$
- C. $90\pi \text{ cm}^3$
- D. $30\pi \text{ cm}^3$

13. What is the equation of a vertical line through $(-5, 2)$?

- A. $y = 2$
- B. $y = -5$
- C. $x = -5$
- D. $x = 2$

14. Simplify: $6/(x + 1) - 2/(x + 1)$, assuming $x \neq -1$.

- A. $4x/(x + 1)$
- B. $4/(x + 1)$
- C. $8/(x + 1)$
- D. $4/(x + 1)^2$

15. A triangle has angles in the ratio 2 : 3 : 4. What is the largest angle?

- A. 40°
- B. 60°
- C. 70°
- D. 80°

16. Simplify: $\log(100) - \log(10)$.

- A. 1
- B. 10
- C. 90
- D. 2

17. If $f(x) = x + 2$ and $g(x) = 3x$, find $(f \cdot g)(2)$.

- A. 8
- B. 12
- C. 24
- D. 16

18. Solve: $(x - 2)^2 = 16$.

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

19. What is the exact value of $\sin^2(30^\circ) + \cos^2(30^\circ)$?

- A. $1/4$
- B. $3/4$
- C. $\sqrt{3}/2$
- D. 1

20. A rectangle has dimensions $x + 4$ and $x - 2$. What is its area?

A. $x^2 + 2x - 8$

B. $x^2 - 8x + 8$

C. $2x + 2$

D. $x^2 - 8$

21. Solve: $e^x = e^3$.

A. $x = e$

B. $x = 3$

C. $x = 3e$

D. $x = e^3$

22. The mean of 5 numbers is 14. If one of the numbers is removed and the new mean is 13, what was the removed number?

A. 14

B. 15

C. 17

D. 18

23. Find the equation of the line with slope 2 passing through (3, 5).

A. $y = 2x - 1$

B. $y = 2x + 1$

C. $y = 2x + 5$

D. $y = 2x + 11$

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

A. $x + 2$

B. $x^2 - 2$

C. $x - 2$

D. 2

25. A box holds 24 pens. If $1/4$ of the pens are red and $1/3$ are blue, how many pens are neither red nor blue?

A. 6

B. 10

C. 8

D. 12

26. The function $f(x) = 3x^2 + 1$ has what minimum value?

A. 0

B. 3

C. -1

D. 1

27. A spinner has 10 equal sectors numbered 1 to 10. What is the probability of spinning an odd number?

A. $1/2$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

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

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

B. $2x^2 + 6x + 5$

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

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

29. What is the value of $2! + 3! + 4!$?

A. 9

B. 32

C. 24

D. 30

30. Solve for x : $\log(x^2) = 2$.

A. $x = \pm 100$

B. $x = 50$

C. $x = 100$ only

D. $x = 10$ or $x = -10$

PRACTICE EXAM 20: ANSWER KEY AND EXPLANATIONS

1. A — Let h = hardcovers; paperbacks = $48 - h$. Revenue equation: $25h + 12(48 - h) = 888$, giving $25h + 576 - 12h = 888$ and $13h = 312$, so $h = 24$. Two-item pricing problems always reduce to a single equation in one variable when total count is known.
2. C — Apply the power of a product: $(3)^2(\sqrt{5})^2 = 9 \times 5 = 45$. Always square each factor independently when a product is raised to a power.
3. B — Set $y = 0$: $2x = 6$, so $x = 3$. The x -intercept is always found by setting y equal to zero. In standard form $Ax + By = C$, the x -intercept equals C/A .
4. D — Apply the quotient rule: $y^{(3 - (-2))}/x^{(3 - (-2))} = y^5/x^5$. Negative exponents move between numerator and denominator when the sign flips. Always simplify to positive exponents in the final form.
5. A — Miles per gallon = total miles \div total gallons = $300 \div 12 = 25$ mpg. Rate problems always divide the larger unit (miles) by the smaller unit (gallons) to express the rate per unit.
6. C — Check for a perfect square trinomial: $\sqrt{(x^2)} = x$, $\sqrt{36} = 6$, $2(x)(6) = 12x$. \checkmark Factored: $(x + 6)^2$. Perfect square trinomials have middle coefficient equal to ± 2 times the product of the square roots.
7. B — Divide both sides by 2: $x^2 = 4$. Take square root: $x = \pm 2$. Always include both roots when solving by the square root method.
8. D — Total marbles: $5 + 3 + 2 = 10$. Favorable (blue): 3. Probability = $3/10$. Probability equals favorable outcomes divided by total outcomes.
9. A — 25% of 120 = $0.25 \times 120 = 30$. Convert percent to decimal, then multiply. Alternatively, recognize 25% as $1/4$ and compute $120/4 = 30$.
10. C — Distribute: $3x + 4 = 2x + 10$. Subtract $2x$: $x + 4 = 10$. Subtract 4: $x = 6$. Always distribute before moving variables across the equation.
11. D — Apply the sum of cubes pattern $(a + b)(a^2 - ab + b^2) = a^3 + b^3$ with $a = x$, $b = 3$: $x^3 + 3^3 = x^3 + 27$. Recognize the sum-of-cubes structure by the pattern of the quadratic factor.
12. A — Diameter 6 \rightarrow radius 3. Volume = $\pi r^2 h = \pi(9)(5) = 45\pi \text{ cm}^3$. Always halve the diameter to find the radius before substituting into volume formulas.

13. C — A vertical line has constant x-value and equation $x = c$. The line through $(-5, 2)$ that is vertical has equation $x = -5$. Vertical lines have undefined slope.
14. B — Both fractions share the same denominator: $(6 - 2)/(x + 1) = 4/(x + 1)$. Subtract numerators when denominators are identical; the denominator stays unchanged.
15. D — Let the angles be $2x, 3x, 4x$. Sum: $9x = 180^\circ$, so $x = 20^\circ$. Largest: $4x = 80^\circ$. Ratio problems always sum the parts and divide into the total.
16. A — Apply the quotient law: $\log(100/10) = \log(10) = 1$. The common log of 10 equals 1 because $10^1 = 10$.
17. C — $(f \cdot g)(2) = f(2) \cdot g(2) = 4 \cdot 6 = 24$. Products of functions evaluate each function separately, then multiply the results.
18. B — Take the square root of both sides: $x - 2 = \pm 4$. Two cases: $x = 6$ or $x = -2$. Always include both positive and negative roots when taking the square root.
19. D — By the fundamental Pythagorean identity, $\sin^2\theta + \cos^2\theta = 1$ for every angle θ . This identity holds without needing to evaluate individual sine and cosine values.
20. A — Use FOIL: $(x + 4)(x - 2) = x^2 - 2x + 4x - 8 = x^2 + 2x - 8$. Always combine the outer and inner terms as the final middle coefficient.
21. B — When exponentials with the same base are equal, their exponents must be equal: $e^x = e^3$ means $x = 3$. The same rule applies to any equal exponential bases.
22. D — Original sum: $5 \times 14 = 70$. New sum: $4 \times 13 = 52$. Removed number: $70 - 52 = 18$. Mean problems always benefit from computing totals before and after changes.
23. A — Point-slope form: $y - 5 = 2(x - 3)$. Distribute and simplify: $y = 2x - 6 + 5 = 2x - 1$. Always simplify to slope-intercept form for standard presentation.
24. C — Factor numerator as a difference of squares: $x^2 - 4 = (x - 2)(x + 2)$. Cancel $(x + 2)$: result is $x - 2$. Only factors connected by multiplication can be canceled.
25. B — Red: $(1/4)(24) = 6$. Blue: $(1/3)(24) = 8$. Neither: $24 - 6 - 8 = 10$. Sequential fractional operations apply to the original total, not to the remaining quantity.
26. D — The parabola opens upward ($a = 3 > 0$), with vertex at $x = 0$ because there is no linear term. Minimum value = $f(0) = 1$. Parabolas in the form $ax^2 + c$ have their vertex on the y-axis.
27. A — Odd numbers from 1 to 10: 1, 3, 5, 7, 9 \rightarrow 5 favorable. Probability = $5/10 = 1/2$. Always reduce probability fractions to simplest form.
28. C — Distribute: $2x(x + 3) = 2x^2 + 6x$. Subtract $x^2 - 5$: $2x^2 + 6x - x^2 + 5 = x^2 + 6x + 5$. Always flip every sign in the subtracted polynomial before combining.

29. B — $2! = 2$, $3! = 6$, $4! = 24$. Sum: $2 + 6 + 24 = 32$. Memorize small factorials (up to $6!$) for rapid evaluation.
30. D — $\log(x^2) = 2$ converts to exponential form: $x^2 = 10^2 = 100$. Take square root: $x = \pm 10$. Both roots are valid because the logarithm of a positive number is defined regardless of whether x is positive or negative.