

PRACTICE EXAM 15: ALEKS PPL SIMULATION

1. A bakery sells muffins in packs of 6 and donuts in packs of 8. What is the smallest number of muffins and donuts that can be bought in equal quantities?

- A. 14
- B. 48
- C. 24
- D. 16

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

- A. $27x^3y^{-2}$
- B. $27x^6y^{-2}$
- C. $27x^9y^{-2}$
- D. $9x^3y^2$

3. What is the remainder when $x^2 + 5x - 3$ is divided by $x - 2$?

- A. 1
- B. 3
- C. 7
- D. 11

4. A rectangular pool is 20 ft long and 15 ft wide. What is the length of its diagonal?

- A. 20 ft
- B. 25 ft
- C. 30 ft
- D. 35 ft

5. Solve: $(2x - 1)^2 = 25$.

- A. $x = 3$ or $x = -2$
- B. $x = 3$ or $x = -3$
- C. $x = 5$ or $x = -5$
- D. $x = 2$ or $x = -3$

6. If $f(x) = \sqrt{x + 4}$, what is $f(12)$?

- A. 3
- B. $2\sqrt{2}$
- C. 4
- D. 16

7. Simplify: $\log(x^2) + \log(x^{-3})$.

- A. $\log(x)$
- B. $\log(x^{-1})$
- C. $\log(x^5)$
- D. $-\log(x)$

8. What is the measure of each exterior angle of a regular octagon?

- A. 30°
- B. 36°
- C. 40°
- D. 45°

9. A function has the rule $f(x) = 3x - 2$. What is $f(f(1))$?

- A. 1
- B. 2
- C. 3
- D. 4

10. Simplify: $(x^3 + 2x^2 - 5x)/x$, assuming $x \neq 0$.

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

11. A jar has 3 red, 5 blue, and 2 yellow balls. What is the probability of drawing a yellow or red ball?

- A. $1/5$
- B. $1/2$
- C. $3/5$
- D. $2/5$

12. What is the solution to $5x - 3 \leq 12$?

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

13. Factor completely: $x^3 - 4x$.

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

14. The sum of the interior angles of a polygon is 1260° . How many sides does it have?

- A. 7
- B. 8
- C. 9
- D. 10

15. Simplify: $(\sin \theta)(1/\sin \theta) + (1 - \cos^2\theta)$.

- A. 1
- B. $\cos^2\theta$
- C. 2
- D. $1 + \sin^2\theta$

16. A rectangle has length $2x + 3$ and width $x - 1$. What is the perimeter?

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

17. Solve: $x/3 - 2 = 1$.

- A. $x = 6$
- B. $x = 3$
- C. $x = 9$
- D. $x = 1$

18. Find the midpoint of $(6, -2)$ and $(-4, 8)$.

- A. $(2, 6)$
- B. $(1, 3)$
- C. $(5, 3)$
- D. $(-1, 5)$

19. What is the value of $16^{(3/4)}$?

- A. 4
- B. 6
- C. 12

D. 8

20. A 45-45-90 triangle has a hypotenuse of length 12. What is the length of each leg?

A. $6\sqrt{2}$

B. 6

C. $12/\sqrt{3}$

D. $4\sqrt{3}$

21. If $\log_2(x) = -3$, what is x ?

A. 8

B. 6

C. $1/4$

D. $1/8$

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

A. $x = 9$

B. $x = 11$

C. $x = 13$

D. $x = 7$

23. A triangle has vertices at $(0, 0)$, $(6, 0)$, and $(0, 4)$. What is its area?

A. 24

B. 10

C. 12

D. 20

24. Simplify: $\frac{2}{x+1} + \frac{3}{x-2}$, combined into a single fraction.

A. $\frac{5x-1}{(x+1)(x-2)}$

B. $\frac{5x+5}{(x+1)(x-2)}$

C. $\frac{5}{(x+1)(x-2)}$

D. $\frac{5x-7}{(x+1)(x-2)}$

25. The first term of a geometric sequence is 3 and the common ratio is 2. What is the 5th term?

A. 24

B. 48

C. 96

D. 16

26. The graph of $y = |x + 2|$ has its vertex at which point?

A. (2, 0)

B. (0, 2)

C. (0, -2)

D. (-2, 0)

27. What is $\cos(180^\circ)$?

A. -1

- B. 0
- C. 1
- D. $\sqrt{3}/2$

28. A right triangle has one leg 7 and hypotenuse 25. What is the length of the other leg?

- A. 12
- B. 18
- C. 24
- D. 26

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

- A. $4x^2$
- B. $8x$
- C. 0
- D. $4x$

30. A cone has a radius of 3 and a volume of 12π . What is its height?

- A. 1
- B. 2
- C. 3
- D. 4

PRACTICE EXAM 15: ANSWER KEY AND EXPLANATIONS

1. C — Find the least common multiple of 6 and 8: $6 = 2 \times 3$, $8 = 2^3$. $\text{LCM} = 2^3 \times 3 = 24$. The LCM is the smallest quantity that is a multiple of both pack sizes. Problems asking for "equal quantities bought in different pack sizes" always require the LCM.
2. A — Apply the power rule to each factor: $(3x^2y^{-2})^3 = 27x^6y^{-6}$. Multiply by $x^{-3}y^4$: $27x^{(6-3)}y^{(-6+4)} = 27x^3y^{-2}$. Rational and negative exponents follow the same rules as integer exponents — always apply outer exponents first.
3. D — By the remainder theorem, the remainder when $p(x)$ is divided by $(x - 2)$ equals $p(2)$. Substitute: $4 + 10 - 3 = 11$. The remainder theorem bypasses long division when only the remainder is needed.
4. B — By the Pythagorean theorem: $d^2 = 20^2 + 15^2 = 400 + 225 = 625$, so $d = 25$ ft. The (15, 20, 25) combination is $5 \times$ the (3, 4, 5) triple. Recognizing proportional triples saves time on rectangular diagonal problems.
5. A — Take square root of both sides (including \pm): $2x - 1 = \pm 5$. Two cases: $2x = 6$ or $2x = -4$, giving $x = 3$ or $x = -2$. Always include both \pm when solving by the square root method to capture both solutions.
6. C — $f(12) = \sqrt{(12 + 4)} = \sqrt{16} = 4$. Evaluate under the radical first, then take the square root. The principal square root is always non-negative.
7. B — Apply the product law: $\log(x^2 \cdot x^{-3}) = \log(x^{-1})$. The product law converts a sum of logs to a log of a product, and exponent rules combine the powers. Negative exponents indicate reciprocals.
8. D — Sum of exterior angles for any convex polygon is 360° . A regular octagon has 8 equal exterior angles: $360^\circ/8 = 45^\circ$. This rule applies to every regular polygon regardless of the number of sides.
9. A — Evaluate the inner function: $f(1) = 3(1) - 2 = 1$. Then evaluate $f(1) = 1$ again. Final answer: 1. Composition applies the inside function first; the output becomes the new input.
10. C — Divide each term in the numerator by x : $x^3/x = x^2$; $2x^2/x = 2x$; $-5x/x = -5$. Result: $x^2 + 2x - 5$. Always divide term-by-term when the denominator is a monomial.
11. B — Favorable outcomes: 3 red + 2 yellow = 5. Total: 10. Probability = $5/10 = 1/2$. "Or" probabilities for mutually exclusive events add directly — a single ball cannot be both red and yellow.

12. D — Add 3: $5x \leq 15$. Divide by 5: $x \leq 3$. Dividing by a positive number preserves the inequality direction. Always isolate the variable with a positive coefficient to avoid flipping the inequality sign.
13. A — Factor out the GCF x : $x(x^2 - 4)$. Then factor the difference of squares: $x^2 - 4 = (x - 2)(x + 2)$. Complete factoring: $x(x - 2)(x + 2)$. Always check for a GCF before applying special factoring patterns.
14. C — Apply the formula $(n - 2)(180^\circ) = 1260^\circ$. Divide by 180: $n - 2 = 7$, so $n = 9$. The formula works for every convex polygon. Always divide the sum by 180 first before solving for n .
15. D — $\sin \theta \cdot (1/\sin \theta) = 1$ (reciprocal identity). $1 - \cos^2 \theta = \sin^2 \theta$ (Pythagorean identity). Sum: $1 + \sin^2 \theta$. Always simplify using the fundamental identities before attempting further manipulation.
16. A — Perimeter = $2(\text{length} + \text{width}) = 2(2x + 3) + 2(x - 1) = 4x + 6 + 2x - 2 = 6x + 4$. Always distribute the factor of 2 to every term in the expressions for length and width.
17. C — Add 2: $x/3 = 3$. Multiply by 3: $x = 9$. Always isolate the fraction first, then clear it by multiplying both sides by the denominator.
18. B — Midpoint = $((6 + (-4))/2, (-2 + 8)/2) = (2/2, 6/2) = (1, 3)$. The midpoint formula averages both coordinates separately. Addition — not subtraction — distinguishes this from the distance formula.
19. D — Apply the rational exponent: $16^{(3/4)} = (16^{(1/4)})^3 = 2^3 = 8$. Take the root first when the root index is manageable, then raise to the integer power. Smaller intermediate numbers reduce arithmetic errors.
20. A — In a 45-45-90 triangle, the ratio of sides is $1 : 1 : \sqrt{2}$, with the hypotenuse being $\text{leg} \times \sqrt{2}$. $\text{Leg} = 12/\sqrt{2} = 12\sqrt{2}/2 = 6\sqrt{2}$. Rationalize the denominator for standard form.
21. D — $\log_2(x) = -3$ converts to exponential form: $x = 2^{-3} = 1/8$. Negative logarithms indicate arguments less than 1. Always convert logarithmic equations to exponential form to solve.
22. B — Distribute: $3x + 2 = 5x - 20$. Subtract $3x$: $2 = 2x - 20$. Add 20: $22 = 2x$, so $x = 11$. Distribution before combining like terms is the standard order for linear equations.
23. C — The triangle has a horizontal leg from $(0,0)$ to $(6,0)$ of length 6, and a vertical leg from $(0,0)$ to $(0,4)$ of length 4. Area = $(1/2)(6)(4) = 12$. Right triangles formed by horizontal and vertical legs have perpendicular sides as their base and height.
24. A — LCD = $(x + 1)(x - 2)$. Rewrite: $2(x - 2)/[(x + 1)(x - 2)] + 3(x + 1)/[(x + 1)(x - 2)] = (2x - 4 + 3x + 3)/[(x + 1)(x - 2)] = (5x - 1)/[(x + 1)(x - 2)]$. Always combine numerators carefully after LCD conversion.

25. B — The n th term of a geometric sequence: $a_n = a_1 \cdot r^{(n-1)}$. For $n = 5$: $a_5 = 3 \cdot 2^4 = 3 \cdot 16 = 48$. Geometric sequences multiply by the common ratio, while arithmetic sequences add the common difference.
26. D — Absolute value function $y = |x - h| + k$ has vertex (h, k) . For $y = |x + 2|$, rewrite as $|x - (-2)|$, so $h = -2$, $k = 0$. Vertex: $(-2, 0)$. The sign inside the absolute value flips when identifying h .
27. A — $\cos(180^\circ) = -1$ is a memorized unit-circle value at the quadrantal angle 180° . The terminal side of 180° lies along the negative x -axis, giving coordinates $(-1, 0)$. Cosine is the x -coordinate at any angle.
28. C — By the Pythagorean theorem: $7^2 + b^2 = 25^2$. Solve: $b^2 = 625 - 49 = 576$, so $b = 24$. The $(7, 24, 25)$ triple is one of the frequently tested Pythagorean combinations.
29. B — Apply the pattern $(a + b)^2 - (a - b)^2 = 4ab$ with $a = x$, $b = 2$: $4(x)(2) = 8x$. Direct expansion also works: $(x^2 + 4x + 4) - (x^2 - 4x + 4) = 8x$. The identity is faster than full expansion.
30. D — Volume of cone = $(1/3)\pi r^2 h$. Substitute: $12\pi = (1/3)\pi(9)h = 3\pi h$. Divide by 3π : $h = 4$. Always isolate h by dividing by the coefficient $(1/3)\pi r^2$ before solving.