PRACTICE EXAM 6: ALEKS PPL MATH SIMULATION

1. A cyclist rides 45 miles in 2.5 hours. What is her average speed?

A. 16 mph

B. 17 mph

C. 19 mph

D. 18 mph

2. Solve for x: $3(2x + 1) = 4x + 15$.

A. 5

B. 6

C. 7

D. 8

3. Factor completely: $x^2 + 3x - 28$.

A. $(x + 7)(x - 4)$

B. $(x - 7)(x + 4)$

C. $(x + 14)(x - 2)$

D. $(x - 14)(x + 2)$

4. What is $5/6 - 2/9$ expressed in lowest terms?

A. 3/15

B. 3/18

C. 11/18

D. 5/18

5. The slope of the line $3x - 4y = 12$ is:

A. 3

B. $-3/4$

C. 4/3

D. 3/4

6. Simplify: $(4x^3y^2)^{-1}$.

A. $-4x^3y^2$

B. $1/(4x^3y^2)$

C. $4x^{-3}y^{-2}$

D. $-1/(4x^3y^2)$

7. Solve: $\log_3(x) = 2$.

A. 6

B. 3

C. 2

D. 9

8. A circle has circumference 18π. What is its area?

A. 81π

B. 36π

C. 18π

D. 324π

9. Solve: $(2x + 5)/3 = 7$.

A. 5

B. 10

C. 8

D. 9

10. In a right triangle with legs of 5 and 12, the hypotenuse is:

A. 13

B. 14

C. 15

D. 17

11. A savings account grows at 6% compound interest annually. After 2 years, $1,000 becomes approximately:

A. $1,120.00

B. $1,123.60

C. $1,060.00

D. $1,360.00

12. Which of the following is the quadratic formula?

A. $x = b \pm \sqrt{(b^2 - 4ac)} / 2a$

B. $x = -b \pm \sqrt{(b^2 + 4ac)} / 2a$

C. $x = -b \pm \sqrt{(b^2 - 4ac)} \cdot 2a$

D. $x = -b \pm \sqrt{(b^2 - 4ac)} / 2a$

13. Simplify: $(x^2 - 25)/(x + 5)$.

A. $x - 5$

B. $x + 5$

C. $x - 25$

D. $x^2 - 5$

14. The mean of {12, 18, 24, 30, 36} is:

A. 22

B. 23

C. 24

D. 25

15. Solve the inequality: $-2x + 7 \geq 1$.

A. $x \geq 3$

B. $x \geq -3$

C. $x \leq -3$

D. $x \leq 3$

16. A rectangle has length $(x + 4)$ and width $(x - 2)$. What is its area?

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

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

C. $x^2 + 6x + 8$

D. $x^2 + 2x + 8$

17. The 6th term of the arithmetic sequence 7, 11, 15, … is:

A. 23

B. 25

C. 27

D. 29

18. If $\sin \theta = 3/5$ and θ is acute, what is $\tan \theta$?

A. 4/5

B. 5/4

C. 5/3

D. 3/4

19. A line passes through (2, 1) and has slope 3. Its equation is:

A. $y = 3x + 1$

B. $y = 3x - 5$

C. $y = 3x + 5$

D. $y = 3x - 1$

20. Simplify: $\sqrt{(125)}$.

A. $25\sqrt{5}$

B. $5\sqrt{25}$

C. $15\sqrt{5}$

D. $5\sqrt{5}$

21. The probability of drawing a heart or a spade from a standard deck is:

A. 1/4

B. 1/3

C. 1/2

D. 2/3

22. Solve: $|2x - 3| = 9$.

A. $x = 6$ or $x = -3$

B. $x = 6$ or $x = 3$

C. $x = -6$ or $x = 3$

D. $x = 3$ or $x = 12$

23. The domain of $f(x) = 1/(x^2 - 9)$ is:

A. all real numbers

B. $x \neq 3$ only

C. $x \neq -3$ only

D. all real numbers except 3 and −3

24. A population of 500 bacteria doubles every hour. After 3 hours, the population is:

A. 1,500

B. 4,000

C. 3,000

D. 2,000

25. The solution to $2x^2 + 5x - 3 = 0$ is:

A. $x = 1/2$ or $x = -3$

B. $x = -1/2$ or $x = 3$

C. $x = 2$ or $x = -3$

D. $x = -2$ or $x = 3$

26. A bag contains 4 red, 6 blue, and 10 green marbles. The probability of drawing a red is:

A. 1/10

B. 1/4

C. 1/5

D. 2/5

27. Simplify: $\log(8) + \log(125)$.

A. $\log(1000)$ as product

B. 2

C. $\log(133)$ as sum

D. 3

28. The vertex of $y = 2(x - 5)^2 + 3$ is:

A. $(-5, 3)$

B. $(5, 3)$

C. $(5, -3)$

D. $(-5, -3)$

29. A 20-foot ladder leans against a wall, reaching 16 feet up the wall. How far is the base from the wall?

A. 8 feet

B. 10 feet

C. 12 feet

D. 14 feet

30. The expression $(x + 3)^2$ equals:

A. $x^2 + 6x + 9$

B. $x^2 + 9$

C. $x^2 + 3x + 9$

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

PRACTICE EXAM 6: ANSWER KEY AND EXPLANATIONS

1. D — 18 mph. Average speed is calculated by dividing total distance by total time, so $45 \div 2.5 = 18$ miles per hour. The calculation uses the basic rate formula distance = rate × time, rearranged to solve for rate. Dividing distance by time always yields the unit rate in miles per hour.
2. B — 6. Distributing the 3 on the left side gives $6x + 3 = 4x + 15$. Subtracting 4x from both sides produces $2x + 3 = 15$, and subtracting 3 gives $2x = 12$. Dividing by 2 yields $x = 6$, which satisfies the original equation when checked.
3. A — $(x + 7)(x - 4)$. Factoring $x^2 + 3x - 28$ requires two numbers that multiply to −28 and add to +3, which are +7 and −4. The factored form $(x + 7)(x - 4)$ expands back to the original trinomial, confirming the factoring. Sign rules for factoring dictate that opposite signs are needed when the constant term is negative.
4. C — 11/18. The common denominator of 6 and 9 is 18, so $5/6 = 15/18$ and $2/9 = 4/18$. Subtracting gives $15/18 - 4/18 = 11/18$, which is already in lowest terms because 11 is prime. Fraction subtraction always requires a common denominator before combining numerators.
5. D — 3/4. To find the slope, rewrite the equation in slope-intercept form $y = mx + b$. Subtracting 3x from both sides gives $-4y = -3x + 12$, then dividing by −4 gives $y = (3/4)x - 3$. The coefficient of x in slope-intercept form is the slope, which is 3/4.
6. B — $1/(4x^3y^2)$. A negative exponent indicates a reciprocal, so $(4x^3y^2)^{-1} = 1/(4x^3y^2)$. The negative exponent applies to the entire expression inside the parentheses, flipping it to the denominator. This is a fundamental rule of exponents that appears frequently in simplification problems.
7. D — 9. The logarithmic equation $\log_3(x) = 2$ converts to exponential form as $3^2 = x$. Evaluating 3^2 gives 9, so $x = 9$. Logarithms always convert to exponential form by raising the base to the power on the right side of the equation.
8. A — 81π. The circumference formula $C = 2\pi r$ gives $18\pi = 2\pi r$, so $r = 9$. Substituting into the area formula $A = \pi r^2$ gives $A = \pi(9^2) = 81\pi$. Circle problems often chain formulas by using one to find the radius and another to find the area.
9. C — 8. Multiplying both sides of the equation by 3 eliminates the fraction: $2x + 5 = 21$. Subtracting 5 gives $2x = 16$, and dividing by 2 gives $x = 8$. Equations with fractions are solved most efficiently by clearing the denominator first.

10. A — 13. Using the Pythagorean theorem, $5^2 + 12^2 = c^2$ gives $25 + 144 = 169$, so $c = \sqrt{169} = 13$. This is one of the most common Pythagorean triples (5-12-13) and should be memorized for instant recognition on placement exams.

11. B — $1,123.60. The compound interest formula is $A = P(1 + r)^n$, where P is principal, r is the rate, and n is the number of years. Substituting gives $A = 1000(1.06)^2 = 1000(1.1236) = \$1{,}123.60$. Compound interest differs from simple interest because interest is calculated on the accumulated total each year.

12. D — $x = -b \pm \sqrt{(b^2 - 4ac)} / 2a$. The standard quadratic formula solves any quadratic equation in the form $ax^2 + bx + c = 0$. The expression under the radical $(b^2 - 4ac)$ is called the discriminant. Memorizing this formula exactly is essential because even a sign error in its form produces incorrect solutions every time.

13. A — $x - 5$. The numerator $x^2 - 25$ factors as a difference of squares: $(x + 5)(x - 5)$. Dividing by $(x + 5)$ cancels that common factor, leaving $x - 5$. This simplification is valid for all $x \neq -5$, where the original expression is undefined.

14. C — 24. Adding the five values gives $12 + 18 + 24 + 30 + 36 = 120$. Dividing by 5 yields the mean: $120 \div 5 = 24$. The mean is always the sum of the values divided by the count.

15. D — $x \leq 3$. Subtracting 7 from both sides gives $-2x \geq -6$. Dividing both sides by -2 requires flipping the inequality sign because the divisor is negative, producing $x \leq 3$. Forgetting to flip the inequality when multiplying or dividing by a negative is the most common error on inequality problems.

16. A — $x^2 + 2x - 8$. The area of a rectangle is length × width, so $A = (x + 4)(x - 2)$. Expanding using FOIL gives $x^2 - 2x + 4x - 8$, which combines to $x^2 + 2x - 8$. FOIL is the standard method for multiplying two binomials.

17. C — 27. Using the arithmetic sequence formula $a_n = a_1 + (n - 1)d$ with $a_1 = 7$, $d = 4$, and $n = 6$: $a_6 = 7 + 5(4) = 7 + 20 = 27$. Arithmetic sequences add a constant difference at each step, and the nth-term formula gives any term directly.

18. D — 3/4. If $\sin \theta = 3/5$, then the opposite side is 3 and the hypotenuse is 5. Using the Pythagorean theorem, the adjacent side is $\sqrt{(25 - 9)} = 4$. Since $\tan \theta$ = opposite/adjacent, $\tan \theta = 3/4$. Right-triangle trigonometry questions often require finding the missing side first.

19. B — $y = 3x - 5$. Using point-slope form $y - y_1 = m(x - x_1)$ with (2, 1) and $m = 3$ gives $y - 1 = 3(x - 2)$. Expanding produces $y - 1 = 3x - 6$, and adding 1 to both sides gives $y = 3x - 5$. Point-slope form converts directly to slope-intercept form through distribution.

20. D — $5\sqrt{5}$. Factor 125 as 25 × 5, where 25 is a perfect square. Taking the square root gives $\sqrt{125} = \sqrt{25} \cdot \sqrt{5} = 5\sqrt{5}$. Simplifying radicals always involves identifying perfect square factors within the number under the radical sign.

21. C — 1/2. A standard deck contains 13 hearts and 13 spades, so there are 26 favorable cards out of 52 total. Probability = 26/52 = 1/2. Since hearts and spades are mutually exclusive suits, the probabilities add directly without subtracting any intersection.

22. A — $x = 6$ or $x = -3$. The absolute value equation splits into two cases: $2x - 3 = 9$ and $2x - 3 = -9$. Solving the first gives $x = 6$, and solving the second gives $x = -3$. Every absolute value equation with a nonzero right side produces two separate linear equations to solve.

23. D — all real numbers except 3 and −3. The denominator $x^2 - 9$ factors as $(x + 3)(x - 3)$, and the function is undefined wherever the denominator equals zero. Setting each factor to zero gives $x = 3$ and $x = -3$, which must be excluded from the domain. Rational functions exclude any input that produces a zero denominator.

24. B — 4,000. The population doubles every hour, so after 3 hours it has been multiplied by $2^3 = 8$. Starting with 500, the population becomes $500 \times 8 = 4{,}000$. Exponential growth problems use the formula $A = P \cdot r^n$, where r is the growth factor and n is the number of growth periods.

25. A — $x = 1/2$ or $x = -3$. Factoring $2x^2 + 5x - 3$ gives $(2x - 1)(x + 3) = 0$. Setting each factor equal to zero yields $2x - 1 = 0$ (so $x = 1/2$) and $x + 3 = 0$ (so $x = -3$). The zero product property converts a factored quadratic into two linear equations.

26. C — 1/5. The bag contains $4 + 6 + 10 = 20$ marbles total, and 4 are red. The probability of drawing a red marble is 4/20, which simplifies to 1/5. Probability is always calculated as favorable outcomes divided by total possible outcomes.

27. D — 3. Using the logarithm product rule, $\log(8) + \log(125) = \log(8 \times 125) = \log(1000)$. Since $10^3 = 1000$, $\log(1000) = 3$. Logarithmic product problems often simplify to whole numbers when the combined argument is a power of 10.

28. B — (5, 3). The vertex form of a parabola is $y = a(x - h)^2 + k$, where (h, k) is the vertex. Matching with $y = 2(x - 5)^2 + 3$ gives $h = 5$ and $k = 3$, so the vertex is (5, 3). Vertex form makes the coordinates of the turning point directly readable from the equation.

29. C — 12 feet. Using the Pythagorean theorem with the ladder as the hypotenuse, the wall height and base distance as the legs: $16^2 + b^2 = 20^2$. Solving gives $256 + b^2 = 400$, so $b^2 = 144$ and $b = 12$ feet. Real-world Pythagorean problems often appear with ladders, poles, and cables leaning against walls.

30. A — $x^2 + 6x + 9$. Expanding $(x + 3)^2$ using the square of a sum pattern $a^2 + 2ab + b^2$ gives $x^2 + 2(x)(3) + 3^2 = x^2 + 6x + 9$. Memorizing the three special product patterns saves time compared to expanding through FOIL each time. The middle term 6x is the cross-product that students often forget to include.