PRACTICE EXAM 21: EQAO GRADE 6 MATHEMATICS SIMULATION (44 QUESTIONS)

STAGE 1 (Questions 1-11) — 30 minutes

1. (Number Sense) What is the value of the digit 8 in the number 84,592,176?

A) 80,000,000

B) 8,000,000

C) 800,000

D) 8,000

2. (Algebra) A pattern follows the rule "add 7 to the previous term, then divide by 2." If the first term is 5, what is the third term?

A) 12

B) 5

C) 6.5

D) 7.5

3. (Spatial Sense) How many vertices does a triangular prism have?

A) 5

B) 6

C) 8

D) 9

4. (Number Sense) Calculate: 9.6 ÷ 0.4

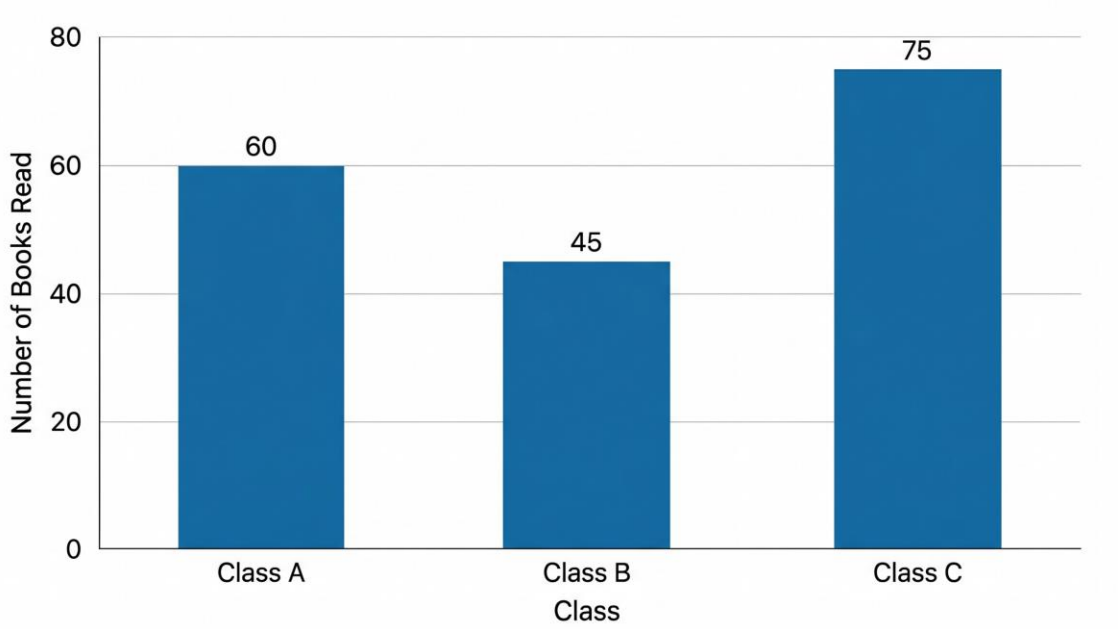
A) 2.4

B) 0.24

C) 3.84

D) 24

5. (Data Literacy) The bar graph shows the number of books read by students in three classes.



By how many books does Class C exceed Class B?

A) 30

B) 15

C) 45

D) 120

6. (Number Sense) What is the sum: 2 1/3 + 3 5/6?

A) 5 6/9

B) 5 1/2

C) 6 5/6

D) 6 1/6

7. (Financial Literacy) Lucas earned $45 from his first job and $32 from his second job. He spent 40% of his total earnings. How much does he have left?

A) $30.80

B) $44.20

C) $46.20

D) $50.80

8. (Algebra) If $2(x + 5) = 28$, what is the value of x?

A) 7

B) 9

C) 12

D) 14

9. (Spatial Sense) A cylinder has a radius of 6 cm. What is its diameter?

A) 3 cm

B) 36 cm

C) 6 cm

D) 12 cm

10. (Number Sense) Order these numbers from least to greatest: 0.7, 5/8, 0.55, 3/4

A) 0.55, 5/8, 0.7, 3/4

B) 3/4, 0.7, 5/8, 0.55

C) 5/8, 0.55, 0.7, 3/4

D) 0.55, 0.7, 5/8, 3/4

11. (Algebra) A linear pattern is given by $t = 8n - 12$. What is the value of t when $n = 6$?

A) 30

B) 32

C) 36

D) 42

STAGE 2 (Questions 12-22) — 30 minutes

12. (Number Sense) Calculate: 12 + (-8) - (-5)

A) 7

B) 9

C) -1

D) 15

13. (Spatial Sense) In a triangle, two angles measure 72° and 53°. What is the measure of the third angle?

A) 35°

B) 45°

C) 65°

D) 55°

14. (Data Literacy) In a survey, 60 students chose their favorite color. The data shows 18 chose blue, 15 chose red, 12 chose green, and the rest chose yellow. What is the probability of randomly choosing a student who picked yellow, in simplest form?

A) 15/60

B) 3/10

C) 1/4

D) 1/5

15. (Number Sense) What is the prime factorization of 90?

A) $2 \times 3^2 \times 5$

B) $2 \times 5 \times 9$

C) $2^2 \times 3 \times 5$

D) 3×30

16. (Algebra) Evaluate the expression $4x^2 - 2x + 7$ when $x = 3$.

A) 35

B) 37

C) 41

D) 43

17. (Financial Literacy) A jacket originally costs $80. It is on sale for 25% off. With an additional 10% off the sale price, what is the final price?

A) $48

B) $52

C) $54

D) $60

18. (Number Sense) A car uses 24 liters of fuel to travel 360 km. How many liters will it use to travel 540 km at the same rate?

A) 36 L

B) 24 L

C) 30 L

D) 40 L

19. (Spatial Sense) A square has a diagonal that divides it into two right triangles. If each side of the square is 6 cm, what is the area of one of the right triangles?

A) 36 cm^2

B) 12 cm^2

C) 9 cm^2

D) 18 cm^2

20. (Data Literacy) Five values are recorded: 14, 28, 21, 35, 17. What is the median?

A) 17

B) 21

C) 28

D) 23

21. (Algebra) A movie ticket costs $12 and a popcorn costs $5. Which expression represents the total cost for t tickets and p popcorns?

A) 12t + 5p

B) 5t + 12p

C) 17(t + p)

D) 60tp

22. (Number Sense) Which number is exactly 10,000 less than 5,283,791?

A) 5,183,791

B) 5,182,791

C) 5,273,791

D) 5,283,691

STAGE 3 (Questions 23-33) — 30 minutes

23. (Spatial Sense) Point P is at coordinates (2, 3). P is reflected across the y-axis, then translated 4 units down. What are the final coordinates?

A) (2, -1)

B) (-2, 3)

C) (2, 7)

D) (-2, -1)

24. (Number Sense) Calculate: $(5 + 3)^2 - 4 \times 6 \div 2$

A) 28

B) 52

C) 44

D) 64

25. (Algebra) Solve for w: 5w + 8 = 3w + 22

A) 4

B) 6

C) 7

D) 8

26. (Data Literacy) A class survey shows that 24 students like pizza, 18 like burgers, and the rest like sushi. If there are 50 students total, what percentage like sushi?

A) 16%

B) 18%

C) 24%

D) 32%

27. (Number Sense) Round 7,649,328 to the nearest hundred thousand.

A) 7,500,000

B) 7,600,000

C) 7,650,000

D) 7,700,000

28. (Financial Literacy) Sara invests $500 at 5% simple interest per year. After how many years will she earn exactly $100 in interest?

A) 2 years

B) 3 years

C) 5 years

D) 4 years

29. (Spatial Sense) A rectangle has an area of 96 cm^2 and a width of 8 cm. What is its perimeter?

A) 24 cm

B) 32 cm

C) 40 cm

D) 48 cm

30. (Algebra) In an arithmetic sequence with first term 8 and common difference 5, what is the 7th term?

A) 38

B) 35

C) 43

D) 33

31. (Number Sense) Evaluate: $2 \times 3^3 - 4^2$

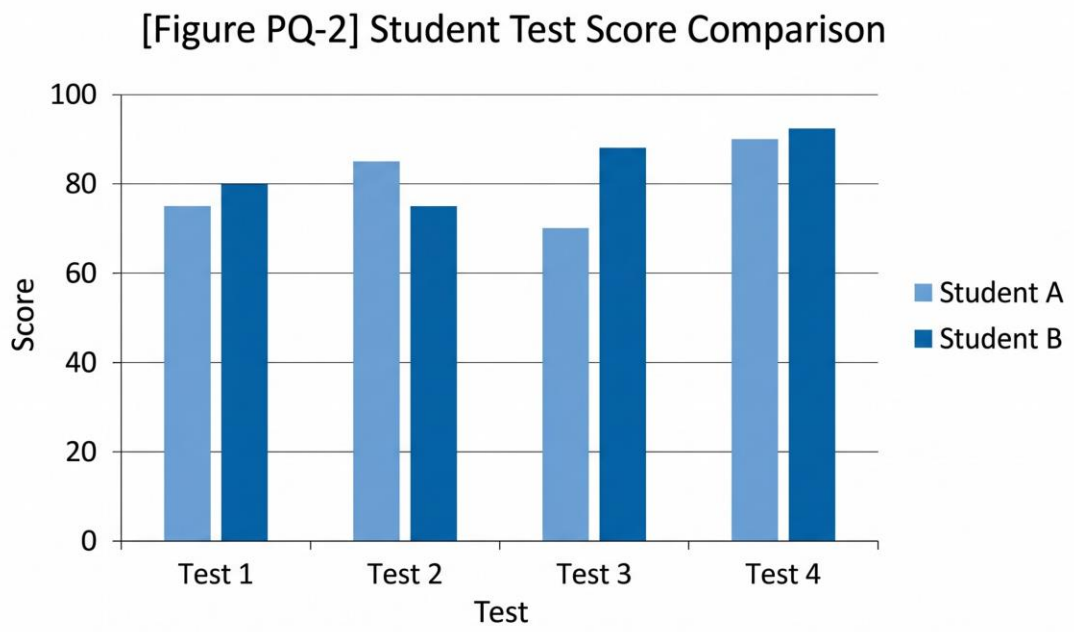
A) 8

B) 14

C) 24

D) 38

32. (Data Literacy) The double bar graph shows test scores for two students over four tests.



What was Student A's mean score across all four tests?

A) 82

B) 80

C) 78

D) 85

33. (Spatial Sense) A regular polygon has interior angles of 120° each. How many sides does it have?

A) 6

B) 8

C) 10

D) 5

STAGE 4 (Questions 34-44) — 30 minutes

34. (Number Sense) Which improper fraction is equivalent to the mixed number 4 2/5?

A) 8/5

B) 8/10

C) 22/5

D) 24/5

35. (Algebra) A rectangle has length 3x and width x + 4. Which expression represents the perimeter?

A) 4x + 4

B) 4x + 8

C) 6x + 8

D) 8x + 8

36. (Data Literacy) A pizza shop sold 60 pizzas. One-fourth were pepperoni, one-third were cheese, one-fifth were veggie, and the rest were other types. How many were other types?

A) 10

B) 13

C) 15

D) 18

37. (Data Literacy) In a school survey, 5 out of every 8 students said they own a bike. If there are 240 students in the school, how many own a bike?

A) 150

B) 120

C) 96

D) 180

38. (Financial Literacy) A laptop costs $640. Each year, its value decreases by 25% of its current value. What is its value after 1 year?

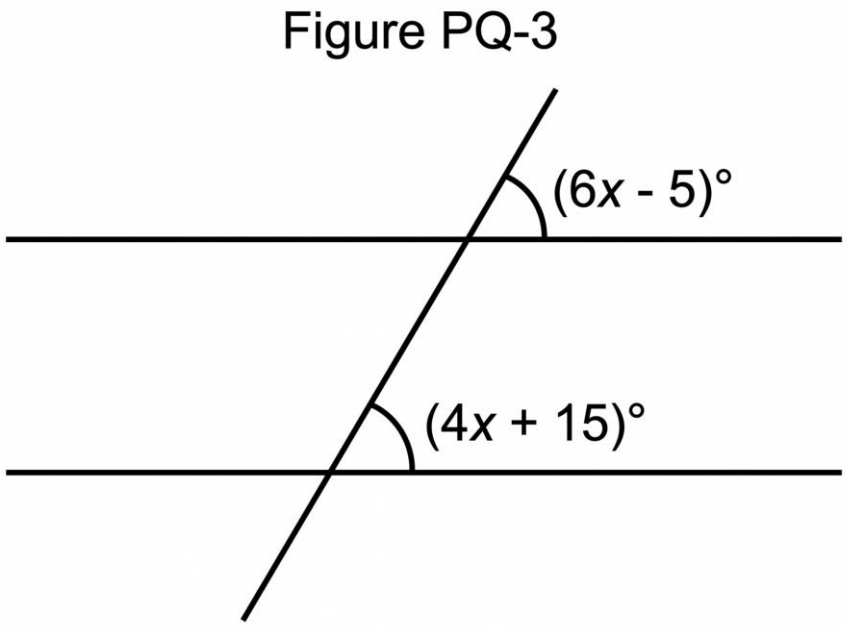
A) $160

B) $400

C) $480

D) $500

39. (Spatial Sense) The diagram shows two parallel lines cut by a transversal, with corresponding angles labeled.



What is the value of x?

A) 5

B) 15

C) 20

D) 10

40. (Algebra) A music streaming service charges a $5 monthly fee plus $0.50 per song downloaded. If Tom paid $12.50 last month, how many songs did he download?

A) 15

B) 12

C) 20

D) 25

41. (Number Sense) Mark has 3/4 of a chocolate bar. He gives 2/3 of what he has to a friend. What fraction of the original chocolate bar does Mark have left?

A) 1/2

B) 1/4

C) 2/3

D) 3/12

42. (Data Literacy) A spinner has 8 equal sections numbered 1 through 8. What is the probability of spinning an even number greater than 3?

A) 1/2

B) 5/8

C) 3/8

D) 1/4

43. (Spatial Sense) A cone has a circular base with a radius of 4 cm. What is the area of the base? (Use $\pi \approx 3.14$)

A) 12.56 cm^2

B) 25.12 cm^2

C) 100.48 cm^2

D) 50.24 cm^2

44. (Number Sense) A recipe calls for 4 cups of flour to make 24 cookies. How much flour is needed to make 36 cookies?

A) 5 cups

B) 6 cups

C) 8 cups

D) 9 cups

Practice Exam 21: Answer Key and Explanations

1. A — The digit 8 occupies the ten-millions place in 84,592,176. Reading positions from right to left (ones, tens, hundreds, thousands, ten-thousands, hundred-thousands, millions, ten-millions), the digit 8 sits in the eighth position with a value of 8 × 10,000,000 = 80,000,000.

2. C — Starting at 5 and applying "add 7, then divide by 2": term 1 = 5, term 2 = (5 + 7) ÷ 2 = 6, term 3 = (6 + 7) ÷ 2 = 6.5. Compound rules require performing both operations in sequence to each new term, even when the result is a decimal.

3. B — A triangular prism has 6 vertices total: 3 vertices on the top triangular face and 3 vertices on the bottom triangular face. Each vertex marks a corner where edges meet. Understanding vertex counts supports spatial reasoning and surface area calculations.

4. D — Divide 9.6 by 0.4 by multiplying both numbers by 10 to eliminate decimals: 96 ÷ 4 = 24. Alternatively, 0.4 × 24 = 9.6 ✓. Multiplying both numbers by the same power of 10 preserves the quotient while simplifying the calculation.

5. A — Subtract Class B's count from Class C's: 75 - 45 = 30 books. Reading specific values from a bar graph and finding the difference between categories measures the gap between groups. Bar graphs make these comparisons direct and visual.

6. D — Find common denominator (6): 2 1/3 = 2 2/6. Add: 2 2/6 + 3 5/6 = 5 7/6. Convert improper part: 7/6 = 1 1/6, so 5 + 1 1/6 = 6 1/6. Mixed number addition requires common denominators for fractional parts, then regrouping when necessary.

7. C — Calculate total earnings: $45 + $32 = $77. Calculate spending: 40% of $77 = 0.40 × $77 = $30.80. Subtract: $77 - $30.80 = $46.20. Multi-step problems require completing each calculation in sequence.

8. B — Distribute first: 2(x + 5) = 28 → 2x + 10 = 28. Subtract 10: 2x = 18. Divide by 2: x = 9. Check: 2(9 + 5) = 2(14) = 28 ✓. Equations with parentheses require distributing before isolating the variable.

9. D — Diameter equals twice the radius: d = 2r = 2 × 6 = 12 cm. The radius extends from center to edge, while the diameter extends edge-to-edge through the center. Understanding this relationship supports circle measurement calculations.

10. A — Convert all values to decimals for comparison: 0.7, 5/8 = 0.625, 0.55, 3/4 = 0.75. Order from least to greatest: 0.55 < 0.625 < 0.7 < 0.75, which corresponds to 0.55, 5/8, 0.7, 3/4. Converting to common form enables accurate comparison.

11. C — Substitute n = 6 into the formula: 8(6) - 12 = 48 - 12 = 36. Linear term formulas allow direct calculation for any position without listing previous terms. Order of operations requires multiplication before subtraction.

12. B — Apply integer operations: 12 + (-8) = 4 (adding a negative is subtraction). Then 4 - (-5) = 4 + 5 = 9 (subtracting a negative is addition). Understanding sign rules for integer operations is essential for accurate calculations.

13. D — The interior angles of any triangle sum to 180°. The third angle equals 180° - 72° - 53° = 180° - 125° = 55°. This angle sum property holds for all triangles, making it a powerful tool for finding missing angles.

14. C — Calculate yellow students: 60 - 18 - 15 - 12 = 15 students. Probability of choosing yellow: 15/60. Simplify by dividing both by 15: 15/60 = 1/4 in simplest form. Reducing fractions provides cleaner probability expressions.

15. A — Prime factorization of 90: $90 = 2 \times 45 = 2 \times 9 \times 5 = 2 \times 3 \times 3 \times 5 = 2 \times 3^2 \times 5$. The other options contain composite numbers (9), incorrect exponents, or partial factorizations. Verification: $2 \times 9 \times 5 = 90$ ✓.

16. B — Substitute x = 3: $4(3^2) - 2(3) + 7 = 4(9) - 6 + 7 = 36 - 6 + 7 = 37$. Order of operations requires exponent first, then multiplication, then addition/subtraction left to right. Evaluating quadratic expressions tests multi-step substitution.

17. C — First discount: 25% of $80 = $20. Sale price: $80 - $20 = $60. Second discount: 10% of $60 = $6. Final price: $60 - $6 = $54. Sequential discounts compound on the reduced price, not the original, so order matters.

18. A — Calculate fuel efficiency: 360 km ÷ 24 L = 15 km/L. Calculate fuel needed for 540 km: 540 ÷ 15 = 36 L. Rate problems use the relationship total = rate × quantity. Finding the unit rate first enables flexible calculations.

19. D — A diagonal of a square divides it into two congruent right triangles. Each triangle has legs equal to the square's side: 6 cm and 6 cm. Area = (1/2)(6)(6) = 18 cm². The two triangles together equal the square's area (36 cm²).

20. B — Order the values: 14, 17, 21, 28, 35. With 5 values (odd count), the median is the middle value at position 3, which is 21. Two values fall below and two above this middle point. Median represents the center of ordered data.

21. A — Multiply each price by its quantity: tickets cost $12 \times t = 12t$ and popcorns cost $5 \times p = 5p$. Total cost combines both: $12t + 5p$. Linear expressions model real-world pricing by combining variable terms representing different items.

22. C — Subtract 10,000 from 5,283,791: change the ten-thousands digit (8) to (7), giving 5,273,791. Subtracting a power of 10 affects only the digit at that place value position. Verification: 5,283,791 - 5,273,791 = 10,000 ✓.

23. D — Reflection across y-axis: (2, 3) → (-2, 3). Then translation 4 units down subtracts 4 from y: (-2, 3) → (-2, -1). Compound transformations apply each operation in sequence, with each result becoming the input for the next transformation.

24. B — Apply order of operations: brackets first: (5 + 3) = 8; then exponent: $8^2 = 64$; then multiplication and division left to right: 4 × 6 = 24, then 24 ÷ 2 = 12; finally subtraction: 64 - 12 = 52. BEDMAS ensures consistent evaluation.

25. C — Subtract 3w from both sides: 5w + 8 - 3w = 22 → 2w + 8 = 22. Subtract 8: 2w = 14. Divide by 2: w = 7. Check: 5(7) + 8 = 43 and 3(7) + 22 = 43 ✓. Variables on both sides require combining like terms first.

26. A — Calculate students who like sushi: 50 - 24 - 18 = 8 students. Convert to percent: 8/50 = 16/100 = 16%. Percent calculations express part-to-whole ratios using 100 as the standard total.

27. B — To round 7,649,328 to the nearest hundred thousand, examine the digit immediately to the right (ten-thousands place): 4. Since 4 < 5, round down. The hundred-thousands digit stays at 6, giving 7,600,000. Rounding rules depend on the next-place digit.

28. D — Use the simple interest formula: I = P × r × t. Solve for t: 100 = 500 × 0.05 × t → 100 = 25t → t = 4 years. Verification: \$500 × 0.05 × 4 = \$100 ✓. Rearranging the interest formula isolates the unknown variable.

29. C — Find the length: area ÷ width = 96 ÷ 8 = 12 cm. Calculate perimeter: 2(length) + 2(width) = 2(12) + 2(8) = 24 + 16 = 40 cm. Multi-step problems require finding missing dimensions before applying the perimeter formula.

30. A — In an arithmetic sequence, the nth term equals first term plus (n - 1) × common difference. For the 7th term: 8 + (7 - 1) × 5 = 8 + 30 = 38. The formula skips the need to list all intermediate terms.

31. D — Apply order of operations: exponents first: $3^3 = 27$ and $4^2 = 16$. Then multiplication: 2 × 27 = 54. Finally subtraction: 54 - 16 = 38. BEDMAS dictates exponents before multiplication before subtraction.

32. B — Calculate mean by summing Student A's scores and dividing by count: (75 + 85 + 70 + 90) ÷ 4 = 320 ÷ 4 = 80. The mean represents the central balancing point of the dataset where all values contribute equally.

33. A — Use the interior angle formula: (n - 2) × 180° / n = 120°. Solve: (n - 2) × 180 = 120n → 180n - 360 = 120n → 60n = 360 → n = 6. A regular hexagon has interior angles of 120°. Verification: (6 - 2) × 180 / 6 = 120° ✓.

34. C — Convert mixed number to improper fraction: $4\ 2/5 = (4 \times 5 + 2)/5 = (20 + 2)/5 = 22/5$. Multiplying the whole number by the denominator and adding the numerator gives the new numerator. Verification: 22/5 = 4.4 = 4 2/5 ✓.

35. D — Perimeter = 2(length) + 2(width) = 2(3x) + 2(x + 4) = 6x + 2x + 8 = 8x + 8. Distribute 2 across each pair of parentheses, then combine like terms (6x + 2x = 8x). This expression represents the perimeter for any value of x.

36. B — Calculate each pizza type: pepperoni = 60/4 = 15, cheese = 60/3 = 20, veggie = 60/5 = 12. Subtract from total: 60 - 15 - 20 - 12 = 13 other pizzas. Finding parts of a whole requires calculating each fraction, then subtracting from the total.

37. A — Apply the ratio proportionally: 5/8 of 240 = (5 × 240) / 8 = 1,200/8 = 150 students. Ratios in form "x out of y" can be applied as fractions to scale to any total. Verification: 150 + 90 = 240, where 90 students don't own bikes (3/8 × 240).

38. C — Calculate the value decrease: 25% of $640 = 0.25 × $640 = $160. Subtract from original value: $640 - $160 = $480. Depreciation reduces an item's value by a fixed percentage of the current value each period.

39. D — Corresponding angles formed by parallel lines and a transversal are equal: 6x - 5 = 4x + 15. Subtract 4x from both sides: 2x - 5 = 15. Add 5: 2x = 20. Divide by 2: x = 10. Check: 6(10) - 5 = 55 and 4(10) + 15 = 55 ✓.

40. A — Subtract the monthly fee from total payment: $12.50 - $5.00 = $7.50 for songs. Divide by cost per song: $7.50 ÷ $0.50 = 15 songs. Two-step problems separate fixed costs from variable costs before solving for quantity.

41. B — Calculate fraction given away: (2/3) × (3/4) = 6/12 = 1/2 of the original bar. Find Mark's remaining portion: 3/4 - 1/2 = 3/4 - 2/4 = 1/4 of the original bar. Multi-step fraction problems require careful tracking of what each fraction represents.

42. C — Identify even numbers greater than 3 in the range 1-8: 4, 6, 8 (three numbers). Total possible outcomes: 8. Probability: 3/8. Compound conditions (both even AND greater than 3) require finding numbers satisfying all conditions.

43. D — Area of a circle = $\pi \times r^2 = 3.14 \times 4^2 = 3.14 \times 16 = 50.24$ cm². The radius is squared first, then multiplied by π. Squaring the radius gives the area of the corresponding square; multiplying by π adjusts for the circular shape.

44. B — Calculate flour per cookie: 4 cups ÷ 24 cookies = 1/6 cup per cookie. Calculate flour for 36 cookies: 36 × 1/6 = 6 cups. Unit rates enable scaling to any quantity. Alternatively, 36/24 = 3/2 times the recipe, so 4 × 3/2 = 6 cups.