

ACT Math Practice Test 8

50 Minutes — 45 Questions

Choose the best answer for each question. A permitted calculator may be used. Figures are not necessarily drawn to scale.

- 1) A student buys 3 notebooks at \$2.40 each and 2 pens at \$1.35 each. What is the total cost before tax?
- ☐ A. \$9.90 ☐ C. \$10.35
- ☐ B. \$11.10 ☐ D. \$8.55
- 2) Which value of x satisfies $5(2x - 3) = 3(2x + 1) + 10$?
- ☐ F. 6 ☐ H. 7
- ☐ G. 5 ☐ J. 4
- 3) A circular fountain has a radius of 6 meters. A walkway of uniform width 2 meters surrounds the fountain. What is the area of the walkway, in square meters?
- ☐ A. 16π ☐ C. 32π
- ☐ B. 64π ☐ D. 28π
- 4) The data set $\{5, 6, 7, 8, 9\}$ has a median of 7. What happens to the median if the value 9 is changed to 20?
- ☐ F. The median becomes undefined ☐ H. The median decreases
- ☐ G. The median stays the same ☐ J. The median increases
- 5) Let $\mathbf{u} = \langle 3, -2 \rangle$ and $\mathbf{v} = \langle -5, 4 \rangle$. What is $\mathbf{u} + 2\mathbf{v}$?
- ☐ A. $\langle -7, 6 \rangle$ ☐ C. $\langle 13, 6 \rangle$
- ☐ B. $\langle -2, 2 \rangle$ ☐ D. $\langle -7, 2 \rangle$
- 6) A carpenter has a 12-foot board and cuts it into pieces that are each 18 inches long. Ignoring the width of the saw cut, how many whole pieces can be made?
- ☐ F. 6 ☐ H. 8
- ☐ G. 9 ☐ J. 7
- 7) Which inequality is equivalent to $2x - 3 < 7$?
- ☐ A. $x < 2$ ☐ C. $x > 2$
- ☐ B. $x < 5$ ☐ D. $x > 5$
- 8) For an acute angle θ , $\sin \theta = \frac{7}{25}$. What is $\tan \theta$?
- ☐ F. $\frac{7}{24}$ ☐ H. $\frac{7}{25}$
- ☐ G. $\frac{24}{25}$ ☐ J. $\frac{24}{7}$
- 9) The probability that a spinner lands on blue is 0.75. What is this probability as a percent?
- ☐ A. 7.5% ☐ C. 25%
- ☐ B. 75% ☐ D. 125%

- 10) A recipe uses $2\frac{1}{4}$ cups of flour to make 18 muffins. At the same rate, how many cups of flour are needed for 6 muffins?
- ☐ F. $\frac{3}{4}$ cup ☐ H. $\frac{1}{2}$ cup
- ☐ G. $1\frac{1}{4}$ cups ☐ J. 1 cup
- 11) Which expression is equivalent to $3(2x - 1) - 2(x + 4)$?
- ☐ A. $4x + 5$ ☐ C. $8x - 11$
- ☐ B. $8x + 5$ ☐ D. $4x - 11$
- 12) Which set of lengths CANNOT form a triangle?
- ☐ F. 5, 7, 10 ☐ H. 3, 4, 8
- ☐ G. 6, 8, 10 ☐ J. 5, 12, 13
- 13) Compare $\sqrt{8} + \sqrt{18}$ and 6. Which statement is correct?
- ☐ A. $\sqrt{8} + \sqrt{18} > 6$ ☐ C. The comparison cannot be made without a calculator
- ☐ B. $\sqrt{8} + \sqrt{18} = 6$ ☐ D. $\sqrt{8} + \sqrt{18} < 6$
- 14) What is the domain of $f(x) = \log_5(2x - 6)$?
- ☐ F. All real numbers ☐ H. $x > 3$
- ☐ G. $x > 0$ ☐ J. $x \geq 3$
- 15) An employee records daily sales of 18, 21, 24, 27, 33, and 39 items over six days. What is the median daily sales?
- ☐ A. 24 ☐ C. 27
- ☐ B. 25.5 ☐ D. 30
- 16) The table shows values of a linear function.

x	-2	4
y	7	-5

Which equation represents the function?

- ☐ F. $y = -2x - 1$ ☐ H. $y = x + 9$
- ☐ G. $y = -2x + 3$ ☐ J. $y = 2x + 3$
- 17) The sequence 12, 7, 2, -3, ... is arithmetic. Which recursive formula describes the sequence?
- ☐ A. $a_1 = 12, a_n = a_{n-1} + 5$ ☐ C. $a_1 = 12, a_n = 5a_{n-1}$
- ☐ B. $a_1 = 12, a_n = a_{n-1} - 5$ ☐ D. $a_1 = 7, a_n = a_{n-1} - 5$
- 18) The graph of $y = 2^x$ is shifted up 3 units. What is the new horizontal asymptote?
- ☐ F. $y = 3$ ☐ H. $x = 3$
- ☐ G. $y = 0$ ☐ J. $y = -3$
- 19) A meal costs \$48 before tax. The sales tax is 8% of the meal price, and the customer leaves a tip equal to 20% of the pre-tax price. What is the total amount paid?
- ☐ A. \$63.36 ☐ C. \$55.68
- ☐ B. \$57.60 ☐ D. \$61.44

20) For what value of k does the system have infinitely many solutions?

$$\begin{cases} 3x - 2y = 7 \\ 6x - 4y = k \end{cases}$$

☐ F. 7

☐ H. 14

☐ G. 10

☐ J. 12

21) For $q(x) = -(x - 6)^2 + 20$, what is the maximum value of the function?

☐ A. 6

☐ C. 26

☐ B. 20

☐ D. -1

22) A circle has center $(-2, 3)$ and passes through the point $(4, 3)$. Which equation represents the circle?

☐ F. $(x - 2)^2 + (y + 3)^2 = 36$

☐ H. $(x + 2)^2 + (y - 3)^2 = 36$

☐ G. $(x + 2)^2 + (y - 3)^2 = 6$

☐ J. $(x + 2)^2 + (y - 3)^2 = 12$

23) For the function $f(x) = (x - 2)^2 - 5$, which values of x satisfy $f(x) = 4$?

☐ A. $x = -1$ or $x = 5$

☐ C. $x = 5$ only

☐ B. $x = -1$ only

☐ D. $x = 1$ or $x = 3$

24) A card is chosen from cards numbered 1 through 10. What is the probability of choosing a prime number?

☐ F. $\frac{3}{10}$

☐ H. $\frac{1}{2}$

☐ G. $\frac{4}{5}$

☐ J. $\frac{2}{5}$

25) A rectangle has a length that is 3 feet greater than its width. The rectangle is surrounded by 38 feet of fencing. What is its area, in square feet?

☐ A. 64

☐ C. 96

☐ B. 88

☐ D. 80

26) The four side lengths of a shape are $2x + 3$, $x^2 - x + 1$, $x^2 + 4x - 5$, and $3x - 2$. What polynomial represents the perimeter?

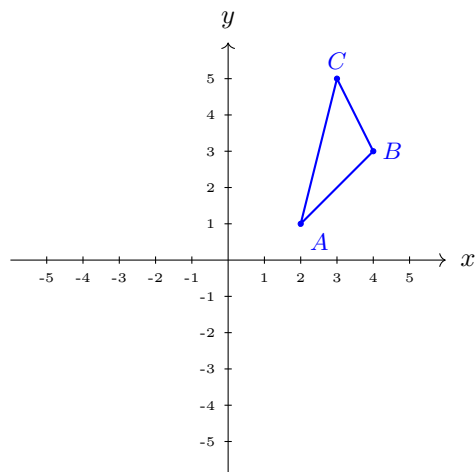
☐ F. $x^2 + 8x - 3$

☐ H. $2x^2 + 8x + 7$

☐ G. $2x^2 + 8x - 3$

☐ J. $2x^2 + 6x - 3$

- 27) Triangle ABC has vertices at $A(2, 1)$, $B(4, 3)$, and $C(3, 5)$. The triangle is rotated 90° counterclockwise about the origin.



What are the coordinates of point B' after the rotation?

- ☐ A. $(3, -4)$
☐ C. $(-4, 3)$
☐ B. $(4, -3)$
☐ D. $(-3, 4)$
- 28) A backpack is discounted by 30%, then an \$8 coupon is applied. The final price is \$20. What was the original price?
- ☐ F. \$40
 ☐ H. \$36
☐ G. \$32
 ☐ J. \$28
- 29) Which correlation coefficient suggests almost no linear association?
- ☐ A. $r = 0.03$
☐ C. $r = -0.72$
☐ B. $r = -0.88$
☐ D. $r = 0.91$
- 30) Which expression is equivalent to $-15a^3b + 10a^2b^2 - 5ab$ and has a positive leading term inside the parentheses?
- ☐ F. $-15ab(a^2 - 2ab + 1)$
☐ H. $-5ab(3a^2 - 2ab + 1)$
☐ G. $5ab(-3a^2 + 2ab - 1)$
☐ J. $-5ab(3a^2 + 2ab + 1)$
- 31) The table shows values of two linear functions $f(x)$ and $g(x)$.

x	$f(x)$	$g(x)$
0	1	13
1	4	10
2	7	7
3	10	4
4	13	1

For what value of x is $f(x) = 2g(x)$?

- ☐ A. $x = 3$
☐ C. $x = \frac{25}{9}$
☐ B. $x = \frac{5}{3}$
☐ D. $x = \frac{7}{2}$
- 32) Two triangles are similar. A side of the smaller triangle is 8 centimeters, and its corresponding side in the larger triangle is 12 centimeters. If the smaller triangle has an area of 32 square centimeters, what is the area of the larger triangle?
- ☐ F. 48 square centimeters
 ☐ H. 96 square centimeters
☐ G. 72 square centimeters
 ☐ J. 64 square centimeters

- 33) A delivery service charges a fixed fee of \$4 plus \$0.85 per mile. If the total charge is \$25.25, how many miles were traveled?

☐ A. 21

☐ C. 23

☐ B. 29

☐ D. 25

- 34) Which expression is equivalent to $\frac{18a^7b^4}{6a^2b^7}$?

☐ F. $12a^5b^{-3}$

☐ H. $\frac{3a^5}{b^3}$

☐ G. $3a^5b^3$

☐ J. $\frac{3a^9}{b^{11}}$

- 35) A parallelogram has vertices $A(1, 2)$, $B(6, 2)$, $C(8, 6)$, and $D(3, 6)$. What is its area?

☐ A. 25 square units

☐ C. 24 square units

☐ B. 20 square units

☐ D. 30 square units

- 36) What is the sum of the real solutions to $(x - 4)^2 = 3x + 10$?

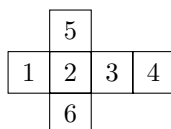
☐ F. -11

☐ H. 6

☐ G. 97

☐ J. 11

- 37) A cube net is shown below. When the net is folded into a cube, which face is opposite the face labeled 5?



☐ A. 2

☐ C. 1

☐ B. 4

☐ D. 6

- 38) If $\log_5 2 = a$, which expression is equal to $\log_5 \left(\frac{125}{4} \right)$?

☐ F. $3 - a$

☐ H. $2a - 3$

☐ G. $3 - 2a$

☐ J. $3 + 2a$

- 39) What is the value of $\frac{\left(\frac{2}{3}\right)^{-2} - \left(\frac{3}{2}\right)^{-1}}{\frac{1}{2}}$?

☐ A. $\frac{19}{12}$

☐ C. $\frac{19}{3}$

☐ B. $\frac{11}{6}$

☐ D. $\frac{19}{6}$

- 40) Car A leaves a town traveling east at 40 miles per hour. Half an hour later, Car B leaves the same town traveling north at 40 miles per hour. How far apart are the cars 2 hours after Car A leaves?

☐ F. 80 miles

☐ H. 90 miles

☐ G. 100 miles

☐ J. 120 miles

- 41) The ratio of boys to girls in a school is 3 : 5. After 24 girls join the school, the ratio of boys to girls is 1 : 2. How many students were in the school originally?
- ☐ A. 192 ☐ C. 216
- ☐ B. 144 ☐ D. 168
- 42) Machine A can complete a job in 8 hours, and Machine B can complete the same job in 12 hours. The machines work together for 2 hours. What fraction of the job remains?
- ☐ F. $\frac{7}{12}$ ☐ H. $\frac{2}{3}$
- ☐ G. $\frac{1}{2}$ ☐ J. $\frac{5}{12}$
- 43) The graph of $y = f(x)$ passes through $(-2, 5)$. The function g is defined by $g(x) = -2f(x + 3) + 1$. Which point must lie on the graph of $y = g(x)$?
- ☐ A. $(-1, -9)$ ☐ C. $(1, 11)$
- ☐ B. $(-5, 9)$ ☐ D. $(-5, -9)$
- 44) A regression model predicts test score $\hat{y} = 4.2x + 18$ for class sizes x from 15 to 35. In a class of 22 students, the observed score is 104 points on a 120-point assessment. What is the residual, defined as observed value minus predicted value?
- ☐ F. -6.4 ☐ H. -18.4
- ☐ G. 110.4 ☐ J. 6.4
- 45) A jacket costs \$240. The store takes 25% off, then applies an additional 10% discount to the reduced price. Sales tax is 8% of the final discounted price. What is the total cost?
- ☐ A. \$178.20 ☐ C. \$194.40
- ☐ B. \$181.44 ☐ D. \$174.96

Scratch work

Answer Key and Explanations

1. A Standard: ACT Math: Integrating Essential Skills

Find the two subtotals, then add them. The notebooks cost $3(2.40) = \$7.20$, and the pens cost $2(1.35) = \$2.70$. Together, the student spends $7.20 + 2.70 = \$9.90$ before tax.

2. H Standard: ACT Math: Algebra

Distribute on both sides: $10x - 15 = 6x + 13$. Subtracting $6x$ leaves $4x - 15 = 13$, so $4x = 28$ and $x = 7$. Substitution gives $5(14 - 3) = 55$ and $3(14 + 1) + 10 = 55$, confirming the result.

3. D Standard: ACT Math: Geometry

The walkway fills the larger circle but not the fountain. Its outer radius is $6 + 2 = 8$ meters, so its area is $\pi(8^2) - \pi(6^2) = 64\pi - 36\pi = 28\pi$ square meters.

4. G Standard: ACT Math: Statistics & Probability

The median is the middle value when data is ordered. Changing $\{5, 6, 7, 8, 9\}$ to $\{5, 6, 7, 8, 20\}$ leaves 7 as the middle value, so the median remains 7.

5. A Standard: ACT Math: Number & Quantity

Double the components of $\mathbf{v}$ first: $2\mathbf{v} = \langle -10, 8 \rangle$. Then add component by component: $\mathbf{u} + 2\mathbf{v} = \langle 3 + (-10), -2 + 8 \rangle = \langle -7, 6 \rangle$. The first coordinates combine with each other, and the second coordinates do too.

6. H Standard: ACT Math: Integrating Essential Skills

Convert the board length to inches first: 12 feet is $12(12) = 144$ inches. Each piece is 18 inches long, and $144 \div 18 = 8$. The board makes eight whole pieces.

7. B Standard: ACT Math: Algebra

Add 3 to both sides, so $2x < 10$. Dividing by positive 2 keeps the inequality sign pointing the same way, giving $x < 5$.

8. F Standard: ACT Math: Geometry

Sine gives opposite over hypotenuse, so take those side lengths to be 7 and 25. By the Pythagorean theorem, the adjacent side is $\sqrt{25^2 - 7^2} = \sqrt{576} = 24$. Tangent is opposite over adjacent, so $\tan \theta = 7/24$.

9. B Standard: ACT Math: Statistics & Probability

Write the decimal as a fraction out of 100: $0.75 = 75/100$. That fraction is already a percent, so the spinner has a 75% chance of landing on blue.

10. F Standard: ACT Math: Integrating Essential Skills

Six muffins are one-third of 18, so the flour amount should also be one-third of $2\frac{1}{4}$ cups. Since $2\frac{1}{4} = \frac{9}{4}$, one-third of that is $\frac{9}{4} \cdot \frac{1}{3} = \frac{3}{4}$ cup.

11. D Standard: ACT Math: Algebra

First distribute the 3 and the negative 2, keeping that minus sign with both terms in the second parentheses: $3(2x - 1) = 6x - 3$ and $-2(x + 4) = -2x - 8$. Now combine the x -terms and constants: $6x - 2x = 4x$ and $-3 - 8 = -11$, so the expression is $4x - 11$.

12. H Standard: ACT Math: Geometry

The triangle inequality says that the sum of any two side lengths must be greater than the third. For the choice that cannot form a triangle, the two shorter lengths add to $3 + 4 = 7$, which is less than 8, so those lengths cannot close to make a triangle. The other choices pass the same check: $5 + 7 > 10$, $5 + 12 > 13$, and $6 + 8 > 10$.

13. A Standard: ACT Math: Number & Quantity

Simplify the radicals first: $\sqrt{8} = 2\sqrt{2}$ and $\sqrt{18} = 3\sqrt{2}$, so their sum is $5\sqrt{2}$. Both $5\sqrt{2}$ and 6 are positive, so squaring preserves their order. Their squares are 50 and 36, respectively, which means $5\sqrt{2} > 6$.

14. H Standard: ACT Math: Functions

The expression inside a logarithm must be positive. Set $2x - 6 > 0$, then add 6 and divide by 2 to get $x > 3$. The endpoint is excluded because $x = 3$ would make the logarithm's input 0.

15. B Standard: ACT Math: Statistics & Probability

The six values are already in order. With an even number of observations, the median is halfway between the two middle values, which are 24 and 27. Their average is $(24 + 27)/2 = 25.5$ items.

16. G Standard: ACT Math: Functions

The slope is $m = \frac{-5-7}{4-(-2)} = \frac{-12}{6} = -2$. Using the point $(-2, 7)$ in $y = mx + b$, we get $7 = -2(-2) + b = 4 + b$, so $b = 3$. The equation is $y = -2x + 3$.

17. B Standard: ACT Math: Functions

A recursive formula starts with the first term and tells how to get the next term. The first term is 12, and each term changes by $7 - 12 = -5$, so the rule is $a_1 = 12$ and $a_n = a_{n-1} - 5$.

18. F Standard: ACT Math: Functions

The parent function $y = 2^x$ has horizontal asymptote $y = 0$. Shifting the graph up 3 units also shifts the asymptote up 3 units. The new horizontal asymptote is $y = 3$.

19. D Standard: ACT Math: Integrating Essential Skills

Calculate the tax and tip using the meal price of \$48, as the question specifies. The tax is $0.08(48) = \$3.84$, and the tip is $0.20(48) = \$9.60$. Adding both to the meal price gives $48 + 3.84 + 9.60 = \$61.44$.

20. H Standard: ACT Math: Algebra

For infinitely many solutions, the equations must be equivalent. Doubling the first equation gives $6x - 4y = 14$. k must be 14 so the second equation represents the same line.

21. B Standard: ACT Math: Functions

The function is in vertex form, and the vertex is $(6, 20)$. Since the coefficient is negative, the parabola opens downward, so the vertex gives the maximum value. The maximum value is 20.

22. H Standard: ACT Math: Geometry

A circle with center (h, k) has equation $(x-h)^2 + (y-k)^2 = r^2$. Here the center is $(-2, 3)$, so the equation begins $(x+2)^2 + (y-3)^2 = r^2$. The point $(4, 3)$ is 6 units from the center, which makes $r = 6$ and $r^2 = 36$.

23. A Standard: ACT Math: Functions

Set the function equal to 4: $(x-2)^2 - 5 = 4$, so $(x-2)^2 = 9$. Taking both square roots gives $x-2 = 3$ or $x-2 = -3$, which leads to $x = 5$ or $x = -1$. Both values work, so the answer includes both.

24. J Standard: ACT Math: Statistics & Probability

The prime numbers from 1 through 10 are 2, 3, 5, and 7. That gives 4 favorable cards out of 10 total cards. The probability is $\frac{4}{10} = \frac{2}{5}$.

25. B Standard: ACT Math: Algebra

Let the width be w feet, so the length is $w + 3$. The perimeter equation is $2w + 2(w + 3) = 38$, which simplifies to $4w + 6 = 38$ and $w = 8$. The length is therefore 11 feet, and the area is $8(11) = 88$ square feet.

26. G Standard: ACT Math: Algebra

Perimeter is the sum of all side lengths. The quadratic terms are $x^2 + x^2 = 2x^2$, the linear terms are $2x - x + 4x + 3x = 8x$, and the constants are $3 + 1 - 5 - 2 = -3$. The perimeter is $2x^2 + 8x - 3$.

27. D Standard: ACT Math: Geometry

For a 90° counterclockwise rotation, each point (x, y) moves to $(-y, x)$. Apply that rule to $B(4, 3)$: its image is $B' = (-3, 4)$. The other vertices help show the whole triangle, but the rotation rule alone is enough to locate point B .

28. F Standard: ACT Math: Integrating Essential Skills

After the coupon, the backpack costs 20, so its price just before the coupon was $20 + 8 = 28$ dollars. The 30% discount means that 28 is 70% of the original price. If P is the original price, then $0.70P = 28$, so $P = 40$. The original price was \$40.

29. A Standard: ACT Math: Statistics & Probability

A correlation coefficient close to 0 suggests little or no linear association. The value 0.03 is much closer to 0 than the other choices, so it suggests almost no linear association.

30. H Standard: ACT Math: Algebra

The common factor in all three terms is $5ab$, and using $-5ab$ makes the first term inside the parentheses positive. Divide each term by $-5ab$: $-15a^3b$ gives $3a^2$, $10a^2b^2$ gives $-2ab$, and $-5ab$ gives 1. So the factored form is $-5ab(3a^2 - 2ab + 1)$.

31. C Standard: ACT Math: Functions

Read the table patterns: $f(x)$ starts at 1 and increases by 3 each step, so $f(x) = 3x + 1$. The values of $g(x)$ start at 13 and decrease by 3, giving $g(x) = 13 - 3x$. Set $3x + 1 = 2(13 - 3x)$ and solve: $9x = 25$, so $x = \frac{25}{9}$.

32. G Standard: ACT Math: Geometry

The side-length scale factor from the smaller triangle to the larger one is $12/8 = 1.5$. Areas scale by the square of that factor, so the larger area is $32(1.5)^2 = 32(2.25) = 72$ square centimeters.

33. D Standard: ACT Math: Integrating Essential Skills

First remove the fixed fee: $25.25 - 4 = \$21.25$ is the mileage charge. At \$0.85 per mile, the distance is $21.25/0.85 = 25$ miles. Substituting confirms it: $4 + 0.85(25) = 25.25$.

34. H Standard: ACT Math: Number & Quantity

Simplify: Coefficients: $18 \div 6 = 3$. For a : $a^7 \div a^2 = a^{7-2} = a^5$. For b : $b^4 \div b^7 = b^{4-7} = b^{-3} = \frac{1}{b^3}$. Result: $\frac{18a^7b^4}{6a^2b^7} = \frac{3a^5}{b^3}$.

35. B Standard: ACT Math: Geometry

Segment AB is horizontal and has length $6 - 1 = 5$. The opposite side lies on $y = 6$, while AB lies on $y = 2$, so the perpendicular height is $6 - 2 = 4$. A parallelogram's area is base times height, giving $5 \cdot 4 = 20$ square units.

36. J Standard: ACT Math: Algebra

Expand and collect terms: $x^2 - 8x + 16 = 3x + 10$, so $x^2 - 11x + 6 = 0$. For a quadratic $x^2 + bx + c = 0$, the sum of its roots is $-b$; here that sum is 11. The discriminant is $121 - 24 = 97 > 0$, so both roots are real and the sum requested is 11.

37. D Standard: ACT Math: Geometry

Fold the four squares in a row around the sides of the cube. Faces 1 and 3 become opposite, as do faces 2 and 4. The two squares attached above and below face 2 close the remaining ends, placing faces 5 and 6 opposite each other.

38. G Standard: ACT Math: Functions

Use the quotient rule to write $\log_5(125/4) = \log_5 125 - \log_5 4$. Since $125 = 5^3$, the first term is 3. Also, $4 = 2^2$, so $\log_5 4 = 2\log_5 2 = 2a$. Subtracting gives $3 - 2a$.

39. D Standard: ACT Math: Number & Quantity

Negative exponents mean reciprocals: $(\frac{2}{3})^{-2} = (\frac{3}{2})^2 = \frac{9}{4}$ and $(\frac{3}{2})^{-1} = \frac{2}{3}$. Their difference is $\frac{9}{4} - \frac{2}{3} = \frac{27}{12} - \frac{8}{12} = \frac{19}{12}$. Dividing by $\frac{1}{2}$ doubles that result, giving $\frac{19}{6}$.

40. G Standard: ACT Math: Integrating Essential Skills

By the 2-hour mark, Car A has traveled $40(2) = 80$ miles. Car B has been driving for only 1.5 hours, so it has traveled $40(1.5) = 60$ miles. Their paths are perpendicular, making the separation the hypotenuse of a right triangle: $d = \sqrt{80^2 + 60^2} = \sqrt{10,000} = 100$ miles.

41. A Standard: ACT Math: Number & Quantity

Let the original numbers of boys and girls be $3k$ and $5k$. After 24 girls join, the new ratio gives $\frac{3k}{5k+24} = \frac{1}{2}$. Cross-multiplying yields $6k = 5k + 24$, so $k = 24$. The original total was $3k + 5k = 8k = 192$ students.

42. F Standard: ACT Math: Integrating Essential Skills

Machine A completes $1/8$ of the job per hour, and Machine B completes $1/12$. Together they complete $1/8 + 1/12 = 3/24 + 2/24 = 5/24$ per hour. In 2 hours they finish $10/24 = 5/12$ of the job, leaving $1 - 5/12 = 7/12$ unfinished.

43. D Standard: ACT Math: Functions

We know $f(-2) = 5$, so first make the input inside f equal to -2 : $x + 3 = -2$, which gives $x = -5$. Then apply the outside operations in order: multiply 5 by -2 and add 1, so $g(-5) = -10 + 1 = -9$. The transformed graph therefore contains $(-5, -9)$.

44. F Standard: ACT Math: Statistics & Probability

First use the model to predict the score for 22 students: $4.2(22) + 18 = 92.4 + 18 = 110.4$. A residual is observed minus predicted, so it is $104 - 110.4 = -6.4$. The negative sign means the observed score is 6.4 points below the model's prediction.

45. D Standard: ACT Math: Integrating Essential Skills

The first discount leaves 75% of the original price: $0.75(240) = 180$. The second discount is applied to 180, giving $0.90(180) = 162$. The tax is $0.08(162) = 12.96$, so the final cost is $162 + 12.96 = \$174.96$.