

ACT Math Practice Test 2

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) Each sealed cereal box contains 0.8 kilogram of cereal and weighs 0.15 kilogram when empty. What is the total weight of 6 full boxes?
- ☐ A. 4.8 kilograms ☐ C. 5.1 kilograms
- ☐ B. 5.7 kilograms ☐ D. 5.9 kilograms
- 2) A line on a coordinate plane passes through the origin and has a slope of $-\frac{3}{4}$. Which equation represents this line?
- ☐ F. $y = -\frac{3}{4}x$ ☐ H. $y = \frac{4}{3}x$
- ☐ G. $y = -\frac{3}{4}x + 1$ ☐ J. $y = -\frac{4}{3}x$
- 3) A relation consists of the points (1, 2), (2, 4), (3, 6), and (3, 8). What is the range?
- ☐ A. {1, 2, 3} ☐ C. {1, 2, 3, 4, 6, 8}
- ☐ B. {2, 4, 6} ☐ D. {2, 4, 6, 8}
- 4) A figure is composed of a rectangle with dimensions 12 centimeters by 8 centimeters and a semicircle with diameter 8 centimeters attached to one side. What is the total area of the figure? (Use $\pi \approx 3.14$)
- ☐ F. 121.12 cm² ☐ H. 129.12 cm²
- ☐ G. 125.12 cm² ☐ J. 133.12 cm²
- 5) A spinner lands on blue with probability 0.75. It is spun twice. What is the probability that it lands on blue both times?
- ☐ A. 0.1875 ☐ C. 0.5625
- ☐ B. 0.375 ☐ D. 0.75
- 6) An inequality is shown.

$$\frac{1}{5} < x < 25\%$$

Which value of x makes the inequality true?

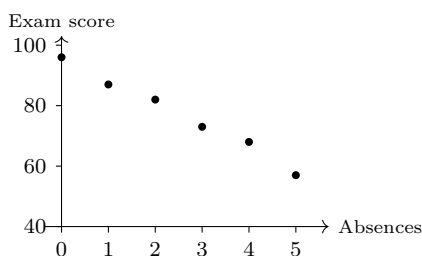
- ☐ F. $\sqrt{0.06}$ ☐ H. $\frac{1}{8}$
- ☐ G. 0.3 ☐ J. $\frac{1}{6}$
- 7) A 2.4-kilogram bag of rice costs \$7.20. At the same price per kilogram, how much would 3.5 kilograms cost?
- ☐ A. \$8.40 ☐ C. \$10.50
- ☐ B. \$9.60 ☐ D. \$11.20

- 8) What is the solution (x, y) of the system below?

$$\begin{cases} y = 0.5x + 4 \\ 2x + y = 14 \end{cases}$$

- ☐ F. (2, 5)
 ☐ H. (5, 6.5)
- ☐ G. (3, 5.5)
 ☐ J. (4, 6)
- 9) A sequence is defined by $a_1 = 5$ and $a_n = a_{n-1} + 4$ for $n \geq 2$. What is a_6 ?
- ☐ A. 21
 ☐ C. 29
- ☐ B. 25
 ☐ D. 33
- 10) Which expression is equivalent to $(x + 5)^2 - (x - 5)^2$ for all real values of x ?
- ☐ F. $10x$
☐ H. $2x^2 - 50$
- ☐ G. $2x^2 + 50$
☐ J. $20x$
- 11) What is the mean absolute deviation for the data set: 4, 6, 5, 7, 8?
- ☐ A. 1.0
 ☐ C. 6.0
- ☐ B. 8.0
 ☐ D. 1.2
- 12) The population of a town increased from 4,500 to 5,400. What is the percent increase?
- ☐ F. 20%
 ☐ H. 24%
- ☐ G. 22%
 ☐ J. 26%
- 13) If $3(2x - 5) + 4 = 2(x + 7) - 4$, what is the value of x ?
- ☐ A. $\frac{17}{4}$
☐ C. $\frac{23}{4}$
- ☐ B. $\frac{21}{4}$
☐ D. $\frac{25}{4}$
- 14) If $\log_2(x - 1) = 3$, what is the value of x ?
- ☐ F. 7
 ☐ H. 9
- ☐ G. 8
 ☐ J. 10
- 15) Which set of side lengths CANNOT form a triangle?
- ☐ A. 9 cm, 12 cm, 16 cm
 ☐ C. 11 cm, 13 cm, 20 cm
- ☐ B. 7 cm, 10 cm, 15 cm
 ☐ D. 5 cm, 8 cm, 14 cm
- 16) Which of the following expressions has a value that is greater than 0?
- ☐ F. -2^3
☐ H. $(-4)^{-4}$
- ☐ G. $(-1)^{-3}$
☐ J. $(-5)^{-5}$

- 17) The scatterplot compares the number of absences a student has in a semester with the student's exam score. Which statement best describes the association?



- ☐ A. Strong negative association
 ☐ C. Strong positive association
☐ B. Weak positive association
 ☐ D. No association
- 18) Points $A(2, 3)$ and $B(k, 9)$ are 10 units apart. What are the possible values of k ?
- ☐ F. -10 or 6
☐ H. 10 only
☐ G. -6 or 6
☐ J. -6 or 10
- 19) A line passes through $(3, -5)$ and $(-2, k)$. It is perpendicular to the line $3x + 5y = 10$. What is k ?
- ☐ A. $-\frac{40}{3}$
☐ C. $-\frac{10}{3}$
☐ B. $-\frac{25}{3}$
☐ D. $\frac{40}{3}$
- 20) The graphs of $f(x) = x^2 - 4x + 1$ and $g(x) = -2x + 9$ intersect at two points. What is the sum of the x -coordinates of the intersection points?
- ☐ F. -2
☐ H. 4
☐ G. 2
☐ J. 6
- 21) Point $(8, 12)$ is dilated by a scale factor of $\frac{1}{4}$ about the origin and then translated 2 units left. What are its final coordinates?
- ☐ A. $(-2, 3)$
☐ C. $(2, 1)$
☐ B. $(0, 3)$
☐ D. $(10, 3)$
- 22) A school sold 100 tickets to a concert. Student tickets cost \$5 each and adult tickets cost \$12 each. If ticket sales totaled \$780, how many adult tickets were sold?
- ☐ F. 40
 ☐ H. 45
☐ G. 35
 ☐ J. 60
- 23) One integer is chosen at random from 1 through 20. What is the probability that it is prime or a multiple of 3?
- ☐ A. $\frac{11}{20}$
☐ C. $\frac{7}{10}$
☐ B. $\frac{3}{5}$
☐ D. $\frac{13}{20}$
- 24) For $x \neq 0$, which expression is equivalent to $\frac{(x^3)^4}{x^5}$?
- ☐ F. x^7
☐ H. x^{17}
☐ G. x^{12}
☐ J. x^{60}
- 25) A quadrilateral has side lengths $2x + 3$, $x^2 - x + 1$, $x^2 + 4x - 5$, and $3x - 2$. If its perimeter is 21 and $x > 0$, what is x ?
- ☐ A. 1
 ☐ C. 3
☐ B. 2
 ☐ D. 4

- 26) The sequence $12, 7, 2, -3, \dots$ is arithmetic. What is the sum of its first 8 terms?

☐ F. -35

☐ H. -55

☐ G. -40

☐ J. -44

- 27) A 25-foot cable runs from the top of a vertical pole to a ground anchor 7 feet from the pole. A second cable runs from the same point atop the pole to a ground anchor 10 feet from the pole. How much longer is the second cable?

☐ A. 2 feet

☐ C. 26 feet

☐ B. 17 feet

☐ D. 1 foot

- 28) A driver travels 12 miles at 30 miles per hour and then 24 miles at 48 miles per hour. What is the driver's average speed for the 36-mile trip?

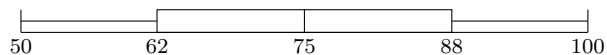
☐ F. 36 mph

☐ H. 40 mph

☐ G. 39 mph

☐ J. 42 mph

- 29) The box plot below shows the distribution of test scores for a class of students. Each score is transformed by multiplying it by 1.5 and then subtracting 10. What is the interquartile range of the transformed scores?



☐ A. 26

☐ C. 39

☐ B. 29

☐ D. 49

- 30) Which statement about k makes the system have no solution?

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

☐ F. $k = 12$

☐ H. Any value of k except 12

☐ G. No value of k

☐ J. Every value of k

- 31) The table gives values of two linear functions.

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

What is the value of $f(6) - g(6)$?

☐ A. 12

☐ C. 24

☐ B. 18

☐ D. 30

- 32) The sum of the interior angles of a regular polygon is 40 times the measure of one exterior angle. How many sides does the polygon have?

☐ F. 8

☐ H. 12

☐ G. 10

☐ J. 16

- 33) A 12-liter solution is 30% acid. How many liters of pure water must be added to make the solution 20% acid?

☐ A. 6 liters

☐ C. 8 liters

☐ B. 4 liters

☐ D. 9 liters

- 34) What is the solution of $\sqrt{2x+3} = x$?
- ☐ F. -3 ☐ H. 1
- ☐ G. -1 ☐ J. 3
- 35) A line of fit passes through $(2, 52)$ and $(8, 28)$. At $x = 5$, an observed value is 3 units below the value predicted by the line. What is the observed value?
- ☐ A. 34 ☐ C. 43
- ☐ B. 40 ☐ D. 37
- 36) The amount of water in a tank increases at a constant rate. At 4 minutes, the tank contains 35 liters; at 10 minutes, it contains 77 liters. If the same linear pattern continues, how many liters will be in the tank after 15 minutes?
- ☐ F. 98 liters ☐ H. 112 liters
- ☐ G. 105 liters ☐ J. 119 liters
- 37) If $f(x) = 2x + 1$ and $g(x) = x^2 - 3$, what is the positive value of x for which $f(g(x)) = 29$?
- ☐ A. 17 ☐ C. $\sqrt{17}$
- ☐ B. 12 ☐ D. $\sqrt{12}$
- 38) Two cubes, each with edge length 7 centimeters, are joined face to face. What is the exterior surface area of the resulting solid?
- ☐ F. 392 cm^2 ☐ H. 588 cm^2
- ☐ G. 490 cm^2 ☐ J. 686 cm^2
- 39) A number is increased by 20% and then the result is decreased by 20%. The final value is 384. What was the original number?
- ☐ A. 400 ☐ C. 416
- ☐ B. 384 ☐ D. 480
- 40) What is the value of x that satisfies $(\frac{1}{9})^{x-1} = 27^{2x-1}$?
- ☐ F. $\frac{3}{8}$ ☐ G. $\frac{1}{2}$ ☐ H. $\frac{5}{8}$ ☐ J. $\frac{7}{8}$
- 41) A club charges an \$18 membership fee and \$4.50 per ticket. A \$6 coupon is deducted from the ticket subtotal when at least 5 tickets are purchased. A 5% tax is then applied to the discounted total. What is the greatest number of tickets a member can buy for at most \$42?
- ☐ A. 5 ☐ C. 7
- ☐ B. 6 ☐ D. 8
- 42) A quadratic function has zeros at $x = 1$ and $x = 5$, and $f(0) = 20$. What is the minimum value of $f(x)$?
- ☐ F. -20 ☐ H. 0
- ☐ G. -16 ☐ J. 16

43) A rectangle has perimeter 42 units and diagonal length 15 units. What is its area, in square units?

☐ A. 96

☐ C. 112

☐ B. 108

☐ D. 120

44) A box contains 4 green balls and 6 yellow balls. Four balls are drawn without replacement. What is the probability that exactly 2 of the 4 balls are green?

☐ F. $\frac{1}{3}$

☐ H. $\frac{3}{7}$

☐ G. $\frac{2}{5}$

☐ J. $\frac{1}{2}$

45) Two similar triangles have perimeters of 32 centimeters and 56 centimeters. The larger triangle's area is 99 square centimeters more than the smaller triangle's area. One side of the smaller triangle is 12 centimeters long. What is the altitude to the corresponding side of the larger triangle?

☐ A. 12 centimeters

☐ C. 14 centimeters

☐ B. 13 centimeters

☐ D. 16 centimeters

Scratch work

Answer Key and Explanations

1. B Standard: ACT Math: Integrating Essential Skills

Add the cereal and box weights first: each full box weighs $0.8 + 0.15 = 0.95$ kilogram. For six boxes, multiply $6(0.95) = 5.7$ kilograms. This includes the cereal and the weight of all six boxes.

2. F Standard: ACT Math: Algebra

A line in slope-intercept form is $y = mx + b$. Its slope is $m = -\frac{3}{4}$. Because the line passes through the origin, substituting $(0, 0)$ shows that the intercept is $b = 0$. That leaves $y = -\frac{3}{4}x$, choice F.

3. D Standard: ACT Math: Functions

Read the second coordinate of each point, since the range records outputs. The values are 2, 4, 6, and 8. The repeated input $x = 3$ gives two different outputs, 6 and 8, so both belong in the range: $\{2, 4, 6, 8\}$.

4. F Standard: ACT Math: Geometry

The rectangle contributes $12(8) = 96$ square centimeters. The attached semicircle has radius 4, so its area is half the area of a radius-4 circle: $\frac{1}{2}(3.14)(4^2) = 25.12$ square centimeters. Add the two nonoverlapping areas to get $96 + 25.12 = 121.12$ square centimeters.

5. C Standard: ACT Math: Statistics & Probability

Because the spinner is spun twice and the outcome of the first spin does not change the second spin, the events are independent. Multiply the probability of blue on each spin: $0.75 \times 0.75 = 0.5625$. So the probability of getting blue twice is 0.5625, or 56.25% (choice C).

6. F Standard: ACT Math: Number & Quantity

The endpoints are 0.20 and 0.25. Since $0.20^2 = 0.04$ and $0.25^2 = 0.0625$, the positive number $\sqrt{0.06}$ lies between them. The other choices are either below 0.20 or above 0.25, so $\sqrt{0.06}$ is the value that works.

7. C Standard: ACT Math: Integrating Essential Skills

First find the price for 1 kilogram: 7.20 divided by 2.4 is \$3 per kilogram. For 3.5 kilograms, multiply \$3 by 3.5 to get \$10.50. Scaling by the unit price keeps the cost proportional to the amount of rice.

8. J Standard: ACT Math: Algebra

The first equation already gives y , so substitute $0.5x + 4$ for y in the second: $2x + 0.5x + 4 = 14$. This reduces to $2.5x = 10$, so $x = 4$. Then $y = 0.5(4) + 4 = 6$. Both equations are satisfied by $(4, 6)$, choice J.

9. B Standard: ACT Math: Functions

From the first term to the sixth term there are five increases of 4, not six. Starting at 5 and adding $5(4)$ gives $a_6 = 25$. You can check by listing the terms: 5, 9, 13, 17, 21, 25. So choice B is correct.

10. J Standard: ACT Math: Algebra

Expand each square before combining terms: $(x + 5)^2 = x^2 + 10x + 25$ and $(x - 5)^2 = x^2 - 10x + 25$. Subtracting the second expression cancels both x^2 terms and the constants, leaving $10x - (-10x) = 20x$.

11. D Standard: ACT Math: Statistics & Probability

The data average to 6. Measure each value's distance from 6: the distances are 2, 0, 1, 1, and 2. Their average is $6/5 = 1.2$, so the typical absolute distance from the mean is 1.2. That is the mean absolute deviation.

12. F Standard: ACT Math: Integrating Essential Skills

The population grew by $5,400 - 4,500 = 900$ people. Compare that change with the starting population, 4,500: $900/4,500 = 0.20$. Converting 0.20 to a percent gives a 20 percent increase.

13. B Standard: ACT Math: Algebra

Distribute first: the left side becomes $6x - 15 + 4 = 6x - 11$, and the right side becomes $2x + 14 - 4 = 2x + 10$. Subtract $2x$ from both sides to get $4x - 11 = 10$, then add 11: $4x = 21$. Therefore $x = \frac{21}{4}$, choice B. Keeping the constants with their signs is the key step here.

14. H Standard: ACT Math: Functions

The equation $\log_2(x - 1) = 3$ says that $2^3 = x - 1$. Since $2^3 = 8$, we have $x - 1 = 8$, so $x = 9$. This value also satisfies the logarithm's domain requirement, because $x - 1$ is positive.

15. D Standard: ACT Math: Geometry

For three lengths to make a triangle, the two shorter sides must add to more than the longest side. In choice D, $5 + 8 = 13$, which is less than 14, so those segments cannot close to form a triangle. Each other set passes that test. The answer is D.

16. H Standard: ACT Math: Number & Quantity

A negative exponent takes a reciprocal; it does not change the sign by itself. An even power of a negative base is positive, so $(-4)^{-4} = 1/(-4)^4 = 1/256$. In contrast, the odd negative powers in B and D stay negative, and A is negative too. Only choice H is greater than zero.

17. A Standard: ACT Math: Statistics & Probability

As the number of absences increases from left to right, the exam scores tend to fall. The points also stay fairly close to that downward pattern, so the association is strong and negative.

18. J Standard: ACT Math: Integrating Essential Skills

The vertical difference between the points is 6, so the distance formula gives $(k-2)^2 + 6^2 = 10^2$. Subtract 36 to get $(k-2)^2 = 64$, which means $k-2 = 8$ or $k-2 = -8$. Therefore the two possible values are 10 and -6 .

19. A Standard: ACT Math: Algebra

Rewrite $3x + 5y = 10$ as $y = -\frac{3}{5}x + 2$, so its slope is $-3/5$. A perpendicular line has slope $5/3$, the negative reciprocal. For the line through the two given points, the slope is $(k+5)/(-5)$; set this equal to $5/3$ and solve: $k+5 = -25/3$, so $k = -40/3$.

20. G Standard: ACT Math: Functions

To find the intersection inputs, set the outputs equal: $x^2 - 4x + 1 = -2x + 9$. Rearranging gives $x^2 - 2x - 8 = 0$, which factors as $(x-4)(x+2) = 0$. The two x -coordinates are 4 and -2 ; their sum is 2, choice G.

21. B Standard: ACT Math: Geometry

A dilation about the origin multiplies both coordinates by the scale factor: $(8, 12) \mapsto (2, 3)$. Translating 2 units left subtracts 2 from the x -coordinate and leaves the y -coordinate unchanged, so $(2, 3) \mapsto (0, 3)$. The order matters because the translation happens after the dilation. The final point is $(0, 3)$, choice B.

22. F Standard: ACT Math: Algebra

Let a be the number of adult tickets, so the number of student tickets is $100 - a$. The revenue equation is $12a + 5(100 - a) = 780$. Simplifying gives $7a + 500 = 780$, so $7a = 280$ and $a = 40$. This also means 60 student tickets; checking, $40(12) + 60(5) = 780$.

23. D Standard: ACT Math: Statistics & Probability

The primes from 1 through 20 are 2, 3, 5, 7, 11, 13, 17, 19, and the multiples of 3 are 3, 6, 9, 12, 15, 18. The number 3 belongs to both groups, so count it only once: there are $8 + 6 - 1 = 13$ favorable integers. Out of 20 equally likely choices, the probability is $13/20$.

24. F Standard: ACT Math: Number & Quantity

First use the power-of-a-power rule: $(x^3)^4 = x^{3 \cdot 4} = x^{12}$. When dividing powers with the same nonzero base, subtract the exponents, giving $x^{12}/x^5 = x^{12-5} = x^7$. The condition $x \neq 0$ ensures the original quotient is defined. Choice F is correct.

25. B Standard: ACT Math: Algebra

Adding the four sides gives the perimeter $2x^2 + 8x - 3$. Set that equal to 21 and simplify: $2x^2 + 8x - 24 = 0$, or $x^2 + 4x - 12 = 0$. This factors as $(x+6)(x-2) = 0$. Since x must be positive, $x = 2$.

26. J Standard: ACT Math: Functions

There are seven steps of -5 from the first term to the eighth, so $a_8 = 12 + 7(-5) = -23$. Pair the first and last terms: $12 + (-23) = -11$. The next three pairs also each sum to -11 , giving four pairs total; therefore the sum is $4(-11) = -44$, choice J.

27. D Standard: ACT Math: Geometry

The first cable and its 7-foot horizontal distance form a right triangle, so the pole is $\sqrt{25^2 - 7^2} = \sqrt{576} = 24$ feet tall. The second cable is the hypotenuse of a right triangle with legs 24 and 10, so its length is $\sqrt{24^2 + 10^2} = \sqrt{676} = 26$ feet. The first cable is 25 feet, making the second exactly 1 foot longer.

28. H Standard: ACT Math: Integrating Essential Skills

Average speed is total distance divided by total travel time; averaging 30 and 48 directly would give the wrong result because the driver spends different amounts of time at each speed. The first 12 miles take $12/30 = 0.4$ hour, and the next 24 miles take $24/48 = 0.5$ hour. The whole trip takes 0.9 hour, so the average speed is $36/0.9 = 40$ miles per hour.

29. C Standard: ACT Math: Statistics & Probability

From the labeled box, the original quartiles are 62 and 88, so the original IQR is $88 - 62 = 26$. Subtracting 10 from every score shifts both quartiles equally and leaves their difference unchanged. Multiplying every score by 1.5 multiplies that difference by 1.5, giving a new IQR of $1.5(26) = 39$.

30. H Standard: ACT Math: Algebra

The left side of the second equation is twice the left side of the first. Doubling the first equation gives $4x + 6y = 12$. If the constant is anything except 12, the equations have matching left sides but different constants, creating a contradiction, so the system has no solution.

31. C Standard: ACT Math: Functions

Each time x increases by 1, $f(x)$ increases by 3, so its rule is $f(x) = 3x + 1$. Over the same step, $g(x)$ decreases by 3 from 13, giving $g(x) = 13 - 3x$. At $x = 6$, these are 19 and -5 , respectively. Their difference is $19 - (-5) = 24$, choice C.

32. G Standard: ACT Math: Geometry

Let n be the number of sides. The sum of the interior angles is $180(n-2)$ degrees, while one exterior angle of a regular polygon is $360/n$ degrees. Set the first quantity equal to 40 times the second: $180(n-2) = 40(360/n)$. After simplifying, $n^2 - 2n - 80 = 0$, which factors as $(n-10)(n+8) = 0$. A polygon must have a positive number of sides, so $n = 10$.

33. A Standard: ACT Math: Integrating Essential Skills

The amount of acid stays at $0.30(12) = 3.6$ liters when water is added. In the new mixture, those 3.6 liters must be 20% of the total, so the final volume is $3.6/0.20 = 18$ liters. The starting volume was 12 liters; the difference, $18 - 12 = 6$, is the amount of water to add.

34. J Standard: ACT Math: Number & Quantity

Because a principal square root is nonnegative, any solution must have $x \geq 0$. Squaring both sides gives $2x + 3 = x^2$, or $(x - 3)(x + 1) = 0$, so the candidates are $x = 3$ and $x = -1$. The negative candidate cannot equal a nonnegative square root, and checking $x = 3$ gives $\sqrt{9} = 3$. Thus the only solution is 3, choice J.

35. D Standard: ACT Math: Statistics & Probability

The slope of the line is $(28 - 52)/(8 - 2) = -4$. Starting from $(2, 52)$, the line predicts $52 - 4(5 - 2) = 40$ when $x = 5$. Three units below that prediction is $40 - 3 = 37$, so the observed value is 37.

36. H Standard: ACT Math: Integrating Essential Skills

Between 4 and 10 minutes, the amount changes by $77 - 35 = 42$ liters over 6 minutes, so the rate is 7 liters per minute. Working backward from minute 4 gives $35 - 4(7) = 7$ liters at minute 0. At minute 15, the model gives $7 + 15(7) = 112$ liters.

37. C Standard: ACT Math: Functions

First evaluate the inner function, $g(x) = x^2 - 3$, then use that output as the input to f . This gives $f(g(x)) = 2(x^2 - 3) + 1 = 2x^2 - 5$. Set this equal to 29: $2x^2 - 5 = 29$, so $x^2 = 17$. The question asks for the positive value, so $x = \sqrt{17}$.

38. G Standard: ACT Math: Geometry

Each cube has surface area $6(7^2) = 294$ square centimeters, so two separate cubes have 588 square centimeters altogether. When they are joined, the two touching square faces are inside the solid and are not part of the exterior; subtract their combined area, $2(7^2) = 98$. The exterior surface area is $588 - 98 = 490$ square centimeters, choice G.

39. A Standard: ACT Math: Integrating Essential Skills

Let the original number be n . After a 20% increase it is $1.20n$; reducing that result by 20% leaves $0.80(1.20n) = 0.96n$. Thus $0.96n = 384$, so $n = 384/0.96 = 400$. The two percentage changes do not cancel because the decrease is taken from the already increased amount.

40. H Standard: ACT Math: Number & Quantity

Rewrite both sides using base 3: $1/9 = 3^{-2}$ and $27 = 3^3$. The equation becomes $3^{-2(x-1)} = 3^{3(2x-1)}$. Since the positive bases are equal, set the exponents equal: $-2x + 2 = 6x - 3$. Solving gives $5 = 8x$, so $x = 5/8$, choice H.

41. B Standard: ACT Math: Integrating Essential Skills

For 5 or more tickets, the taxed total is $1.05(18 + 4.50n - 6)$, so the budget requires $1.05(12 + 4.50n) \leq 42$. Dividing by 1.05 gives $12 + 4.50n \leq 40$, hence $n \leq 28/4.5$, or about 6.22. Six tickets cost \$40.95 including tax, while seven cost \$45.68 including tax. The greatest affordable whole number is 6; it also meets the coupon's five-ticket condition.

42. G Standard: ACT Math: Functions

A quadratic with zeros 1 and 5 can be written $f(x) = a(x-1)(x-5)$. Use $f(0) = 20$ to find the scale factor: $20 = a(-1)(-5) = 5a$, so $a = 4$. The zeros are equally spaced around $x = 3$, so the axis of symmetry is $x = 3$. Because the leading coefficient $a = 4$ is positive, the parabola opens upward and its minimum occurs at the vertex, where $x = 3$. Thus $f(3) = 4(3-1)(3-5) = 4(2)(-2) = -16$.

43. B Standard: ACT Math: Geometry

Let the side lengths be a and b . The perimeter gives $a + b = 21$, while the Pythagorean theorem gives $a^2 + b^2 = 15^2 = 225$. Square the first equation: $441 = a^2 + 2ab + b^2 = 225 + 2ab$, so $ab = 108$. Since the area is ab , the rectangle's area is 108 square units.

44. H Standard: ACT Math: Statistics & Probability

Count the favorable groups by choosing 2 of the 4 green balls and 2 of the 6 yellow balls: $\binom{4}{2}\binom{6}{2} = 6 \cdot 15 = 90$. The total number of groups of 4 balls from 10 is $\binom{10}{4} = 210$. Therefore the probability is $90/210 = 3/7$. Because the balls are drawn without replacement, combinations count groups directly without treating the draws as independent.

45. C Standard: ACT Math: Geometry

Similar triangles scale lengths by the perimeter ratio, $56/32 = 7/4$, and areas by $(7/4)^2 = 49/16$. Let the smaller area be A . Then $(49/16)A - A = 99$, so $A = 48$ square centimeters and the larger area is 147. The corresponding side in the larger triangle is $(7/4)(12) = 21$ centimeters. Using $147 = \frac{1}{2}(21)h$ gives $h = 14$ centimeters. These values are feasible: the smaller triangle can have sides 10, 10, and 12.