In addition to the above lesson-level features, each *Common Core Achieve* module also includes the features to help you check your understanding as you prepare for the test.

- The end-of-chapter **Review** tests your understanding of the chapter content and skills.
- **Check Your Understanding** charts allow you to check your knowledge of the skills you have practiced, and references where you can go to review skills that you should revisit.
- The **Answer Key** explains the answers for the questions in the book.
- After you have worked through the book, take the **Posttest** to see how well you have learned the skills presented in this book.

Good luck with your studies, and remember: you are here because you have chosen to achieve important and exciting new goals for yourself. Every time you begin working within the materials, keep in mind that the skills you develop in *Common Core Achieve: Mastering Essential Test Readiness Skills* are not just important for passing the high school equivalency test; they are keys to lifelong success.

1. Order the following numbers from largest to smallest.

$2.3,\ 2\frac{1}{3},\ 2.03$

A. $2.3 > 2\frac{1}{3} > 2.03$
B. $2\frac{1}{3} > 2.3 > 2.03$
C. $2.3 > 2.03 > 2\frac{1}{3}$
D. $2\frac{1}{3} > 2.03 > 2.3$

2. What is the prime factorization of 378?

$2 \times \_\_ \times \_\_$

3. The approximate volume of a beach volleyball court is 64,000,000,000 cubic millimeters. If there are 8 grains of sand in each cubic millimeter, how many grains of sand are contained in a beach volleyball court, expressed in scientific notation?

A. 5.12×10^{10}
B. 6.4×10^{10}
C. 5.12×10^{11}
D. 6.4×10^{11}

4. Which property is illustrated in the following equation?

$4^3 \times 4^{-2} = 4^{3+(-2)} = 4^1 = 4$

A. Product of Powers Property
B. Quotient of Powers Property
C. Power of a Power Property
D. Power of a Product Property

5. The bottom of a square pizza box has an area of 196 square inches. What is the length of a side of the pizza box, rounded to the nearest inch?

A. 6
B. 14
C. 49
D. 98

6. You want to get an old family photograph enlarged and framed as a present. The original picture was 3 inches wide and 5 inches long, and the enlarged photograph is 20 inches long. How wide is the enlarged photograph?

____ inches

7. If your restaurant bill comes to $13 and you want to leave a 15% tip, how much is the total cost of your meal?

A. $1.95
B. $11.05
C. $14.95
D. $15.00

8. A student borrows $5,000.00 at a fixed 4.8% simple interest rate. The loan period is 3 years. How much interest will the student pay on the loan?

9. Sam's Salads offers 4 different types of specialty vegetables, 2 different types of cheese, and 5 different dressings. If you can only choose one from each category, how many unique salads can be formed?

10. A grocery store offers raffle tickets to all customers who pick the "lucky" checkout line. If the chance of winning a prize in the raffle is $\frac{1}{6}$ and the chance of picking the "lucky" checkout line is $\frac{1}{3}$, what is the probability of both getting a raffle ticket and then winning a prize?

A. $\frac{1}{18}$
B. $\frac{1}{9}$
C. $\frac{1}{6}$
D. $\frac{1}{2}$

11. Evaluate the expression $7x + 8y$ for $x = 3$ and $y = -2$.

12. If $7(n - 3) = 35$, what is the value of $2n$?

A. 2
B. 4
C. 8
D. 16

13. A highway has a minimum speed limit of 45 mph, and a maximum speed limit of 65 mph. If a car's speed is represented by the variable x, which of the following inequalities describes the legal speeds that a car can drive on the highway?

A. $45 \geq x \leq 65$
B. $45 \leq x \geq 65$
C. $45 \leq x \leq 65$
D. $45 \geq x \geq 65$

14. A nursery sells perennial flowers for \$7 and annual flowers for \$5.50. If you bought 3 perennials and some annuals and spent a total of \$43, how many annuals did you buy?

____ annuals

15. Jack invested \$10,000 in an account earning simple interest. After 7 years, the account is worth \$11,960. What is the rate of simple interest that Jack earns in this account?

A. 1.196%
B. 2.3%
C. 2.8%
D. 17%

16. What is the degree of the product of these two polynomials?

$(4x^2 - 15 + x)(x^3 - 19x)$

A. 3
B. 5
C. 6
D. 8

17. Which factor pair can you use to find m and n in the equation $(x + m)(x + n) = x^2 - 3x - 18$?

A. −3 and 6
B. 3 and −6
C. −2 and 9
D. 2 and −9

18. Solve the quadratic equation $(x + 7)^2 = 81$. Which of the following are solutions to the equation?

A. 2 and −16
B. 7 and −7
C. 9 and −9
D. 16 and −2

19. Which shows the first step in using the Quadratic Formula to solve the quadratic equation $3x^2 - 5x + 17 = 0$?

A. $x = \frac{-5 \pm \sqrt{5^2 - 4(3)(17)}}{2(3)}$

B. $x = \frac{5 \pm \sqrt{(-5)^2 - 4(3)(17)}}{2(3)}$

C. $x = \frac{-3 \pm \sqrt{(3)^2 - 4(-5)(17)}}{2(3)}$

D. $x = \frac{3 \pm \sqrt{(3)^2 - 4(-5)(17)}}{2(3)}$

20. What are the restricted values of $\frac{x - 7}{x^2 - 49}$?

$x \neq$ _____

21. What is the slope of a line that passes through the points (2, 7) and (3, 1)?

$m =$ _____

22. Janet can stuff 35 envelopes in 20 minutes. What is her unit rate of envelopes per minute?

A. $\frac{3}{5}$
B. $\frac{3}{4}$
C. $1\frac{3}{5}$
D. $1\frac{3}{4}$

23. A line has slope 8 and passes through (0, 0). What is the equation of the line in slope-intercept form?

A. $x + y = 8$
B. $y = 8x + 8$
C. $y = 8x$
D. $8x + 8y = 0$

24. Fill in the values of y in the following table of points that lie on the line y = –3x + 4.

x	0	1	2	3
y				

25. Which statement or statements are true of the system of linear equations?

$3x - 5y = 13$
$8x + 7y = -6$

A. The system is independent.
B. The system is dependent.
C. The solution of the system is (1, −2).
D. The solution of the system is (2, −3).

26. For every element in the domain, how many values can a function have in the range?

27. Which of the following is not an example of a quadratic function?

A. $f(x) = 3x^2 - 15x + 2$
B. $f(x) = (x - 1)(x + 2)$
C. $f(x) = -1 + x^2 + 7x$
D. $f(x) = \sqrt{x^2 + 7}$

28. Which of the following functions when graphed does not have an x-intercept?

A. $f(x) = 3x$
B. $f(x) = -3x$
C. $f(x) = x^2 + 3$
D. $f(x) = x^2 - 3$

29. If a car drives at a constant speed, the function comparing distance versus time is a proportional relationship. If after 3 hours, the car has traveled 96 miles, what is the slope of the graph of that proportional relationship?

30. A pool needs to be fenced in for safety. The rectangular deck area containing the pool is 18 feet wide by 25 feet long. How many feet of fencing will need to be bought?

31. The area of a trapezoid is 64 square centimeters. Its height is 8 centimeters and one of its bases measures 10 centimeters. What is the length of the other base?

A. 6 centimeters
B. 8 centimeters
C. 10 centimeters
D. 12 centimeters

32. An Indy-style racecar has to have certain engine, body, and wheel specifications in order to compete in a race. The diameter of the wheel must be 15 inches. What is the circumference of the wheel?

33. What is the approximate area of a circle with a circumference of 18π centimeters?

A. 9π cm^2
B. 18π cm^2
C. 81π cm^2
D. 324π cm^2

34. A standard shoe box is 11.5 inches by 7 inches by 3.75 inches. What is the volume of the shoe box in cubic inches?

35. A farmer has a corn silo in the shape of a cylinder with a radius of 3 meters and a height of 8 meters. The top of the silo is a hemisphere. What is the approximate volume of the silo?

A. 74π m^3
B. 78π m^3
C. 90π m^3
D. 108π m^3

36. Which of the following measures of central tendency could have a negative value? Select all that apply.

A. Mean
B. Median
C. Mode
D. Range

37. Which is greater, the mean or the mode of the following data set?

12, 20, 3, 8, 12

38. A sector in a circle graph with a central angle of 90° corresponds to what percent?

A. 9%
B. 25%
C. 45%
D. 90%

39. Identify the outlier in the following set of data points:

9, 12, 15, 13, 40, 10, 14, 14, 11, 10

40. If a scatter plot shows a steep negative trend, which would best describe a line modeling the data?

A. Positive slope
B. Negative slope
C. Horizontal line
D. Vertical line

1. B To compare the numbers convert the fraction to a decimal. $2\frac{1}{3} \approx 2.33$ so it is greater than 2.3, and 2.3 is greater than 2.03. Incorrect responses may result from errors when converting from a fraction to a decimal, or comparing the decimals incorrectly.

2. $2 \times 3^3 \times 7$ Finding the prime factorization involves breaking a number down into the product of prime numbers. Incorrect responses may include composite numbers that would need to be broken down further into their prime factors. Other incorrect responses may result from computational errors while dividing.

3. C The volume of the court can be expressed in scientific notation as 6.4×10^{10} cubic millimeters and then multiplied by 8 grains of sand. $6.4 \times 10^{10} \times 8 = 6.4 \times 8 \times 10^{10} = 51.2 \times 10^{10} = 5.12 \times 10^{11}$. Answer choices B and D, express the volume in scientific notation, but do not calculate the number of grains of sand and answer choice D incorrectly applies scientific notation. Answer choice A follows the right steps but incorrectly uses scientific notation and makes an error in the power of 10.

4. A You are multiplying two powers with the same base. This is the same as adding the exponents according to the Product of Powers Property. The other properties describe different situations involving quotients of powers, powers of a power, or powers of a product.

5. B To find the length of the side, you have to take the square root of $\sqrt{196} = 14$. Answer choice A is the cube root of the area. Answer choice D divides the area by 2 and answer choice C divides the area by 4, instead of taking the square root.

6. 12 inches To solve this problem you can set up a proportion $\frac{3}{5} = \frac{x}{20}$ or solve for the scale factor. The original photo is 5 inches long and gets enlarged to 20 inches; this is 4 times as large. The width of the picture will be 4 times larger, or $3 \times 4 = 12$ inches. Incorrect responses may occur by setting up the wrong proportion, or multiplying by the wrong scale factor.

7. C To find the amount of the tip, multiply the amount of the bill by 0.15, $13 \times 0.15 = 1.95$. The total cost of the meal is \$13 plus the amount of the tip \$1.95, or \$14.95. The incorrect responses may mean you calculated only the amount of the tip, or subtracted the tip from the cost instead of adding.

8. \$720 Simple interest is calculated by the formula $I = P \times r \times t$. Substitute the values given in the problem and solve for the amount of interest: $I = 5{,}000 \times 0.0048 \times 3 = 720$. Incorrect responses may make a mistake converting the percentage interest rate to a decimal, or may use the wrong formula to calculate simple interest.

9. 40 salads If you can choose one from each category, you can multiply the number in each category to determine how many unique combinations there are: $4 \times 2 \times 5 = 40$. Incorrect responses may result from adding the categories instead of multiplying, or errors in computation.

10. A The probability of both getting a ticket and winning a prize, is the product of the probability of each event happening: $\frac{1}{3} \times \frac{1}{6} = \frac{1}{18}$. Answer choice B could result from adding the denominators instead of multiplying. Answer choice C could result from subtracting the probabilities, and answer choice D could result from adding the probabilities.

11. **5** To evaluate the expression substitute the values for each variable and perform the calculations: $7x + 8y = 7(3) + 8(-2) = 21 - 16 = 5$. Incorrect responses may switch the variables when substituting or make an error when performing the calculations.

12. **D** To solve this equation use inverse operations to isolate the variable, and find that $n = 8$. Then evaluate the expression $2n$ for the value of n: $2n = 2(8) = 16$. Incorrect responses may just solve for n, or incorrectly apply inverse operations in order to find n.

13. **C** A car can legally drive between 45 and 65 mph, so the value of x must be greater than or equal to 45 and less than or equal to 65. This looks like $45 \leq x \leq 65$. Incorrect responses use the incorrect inequality symbols to compare x to 45 and 65 mph.

14. **4 annuals** You can represent the problem using a variable to represent the number of annuals: $7(3) + 5.50A = 43$. Use inverse operations to solve for the variable, and find the number of annuals purchased, $A = 4$. Incorrect responses may result from mixing up the number of perennials and annuals, or incorrectly setting up or solving the equation.

15. **C** In order to solve this problem use the simple interest formula: $I = P \times r \times t$. The amount of interest Jack earns is equal to the final value of his investment minus his original investment: $11{,}960 - 10{,}000 = 1{,}960$. Substitute all the known values in the formula and solve for the rate: $1{,}960 = 10{,}000 \times r \times 7$, $r = 0.028 = 2.8\%$. Incorrect responses may result from substituting the ending value instead of the initial value for the principal, or incorrectly using the simple interest formula.

16. **B** The degree of a polynomial is the highest exponent of the variable. To find the degree of a product, look at the degree of each factor, and add. The first factor has degree 2, and the second factor has degree 3, so the degree of the product will be 5. You can see this by a simple example: $x^2x^3 = x^{2+3} = x^5$. Incorrect responses may multiply the degrees, or just choose the factor with the higher degree.

17. **B** The factor pair must satisfy the following conditions: $m + n = -3$ and $m \times n = -18$. 3 and -6 are the only factor pair that satisfy both conditions. The incorrect responses make a sign error or do not satisfy both conditions.

18. **A** To solve, take the square root of both sides of the equation and get the resulting equation $x + 7 = \pm 9$. Set the left side of the equation to both values 9 and -9 and solve. The solutions of the equation are 2 and -16. Incorrect responses may result from only taking the square root of the right side, or incorrectly applying inverse operations to solve.

19. **B** The Quadratic Formula is $x = \frac{5 \pm \sqrt{(-5)^2 - 4(3)(17)}}{2(3)}$. In this problem $a = 3$, $b = -5$, and $c = 17$. Substitute the values of a, b, and c to set up the Quadratic Formula. Incorrect responses mistake the values of a and b, or make a sign error in setting up the Quadratic Formula.

20. **$x \neq 7$** The restricted values can be found by factoring the denominator: $\frac{x-7}{x^2-49} = \frac{x-7}{(x-7)(x+7)}$ The denominator of an expression cannot equal 0, so the restricted values are any values of x that make the denominator 0, or $x = -7$ or 7. Incorrect responses may make an error when finding values that make the denominator 0.

21. **-6** The slope of a line between two points is the quotient of the change in y over the change in x. You can substitute the points into the equation: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1-7}{3-2} = \frac{-6}{1} = -6$. Incorrect responses may result from mixing up the x and y values, or incorrectly setting up the slope formula.

22. **D** The unit rate is the number of envelopes Janet can stuff in one minute. The unit rate can be found by dividing 35 by 20, to get $1\frac{3}{4}$ envelopes per minute. Incorrect responses come from dividing the number of minutes by the number of envelopes, or incorrectly leaving off, or adding, the whole number part.

23. **C** Slope-intercept form is written as $y = mx + b$. The slope is 8, and the y-intercept is 0, because the line passes through the point (0, 0). By substituting the values of m and b, the equation is $y = 8x$. Incorrect responses may be written in standard form, and incorrectly calculate the value of m and b.

24. **(0, 4), (1, 1), (2, −2), and (3, −5)** To fill in missing values of the table, substitute the value of x into the equation and solve for y. Incorrect responses may result from substituting for y instead of x, or errors in calculation.

25. **A and C** The point that satisfies both equations is (1, −2), so it is a solution of the system. There is only one unique solution to the system, so the system of equations is independent. Incorrect responses may only identify one of the correct responses, or incorrectly identify the system as dependent, or make a calculation error when finding the solution.

26. **one** For every element in the domain, a function can only have one value in the range. If a function has more than one value of $f(x)$ for a value of x then the graph of the equation will not pass the vertical line test, and the equation is not a function. Incorrect responses come from a misunderstanding of the rules of functions.

27. **D** A quadratic function's highest degree variable is raised to the second power. Answer choice D includes x to the second power, but it is underneath a radical sign, so it does not count as a quadratic function. Incorrect responses result from misunderstanding the definition of a quadratic function.

28. **C** This problem can be solved by graphing all four functions and determining which graph does not intersect the x-axis, or you can set each function equal to 0, and find the function that cannot be solved for 0.

29. **32** A proportional relationship is defined as $y = kx$, where k is the slope of the line. Substitute the known values for x and y and solve for k: $96 = 3k$, $k = 32$. Incorrect responses may make errors in calculation, or switch the values of y and x.

30. **86 feet of fencing** The fence will define the perimeter of the pool area and is rectangular in shape. The perimeter of a rectangle is 2 times the width plus 2 times the length: $P = 2(18) + 2(25) = 86$. Incorrect responses may find the area of the rectangle instead of the perimeter, or use the incorrect formula for perimeter.

31. A The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Substitute all the known values in the problem and solve for the missing base length: $64 = \frac{1}{2}(8)(10 + b_2)$, $b_2 = 6$. Incorrect responses result from not knowing the area formula for a trapezoid or making errors in the calculation.

32. 15π or approximately 47.12 The circumference of a circle is found using the formula $C = \pi d$, or π times the diameter. By multiplying the diameter of the wheel, 15 inches, by π, you find the circumference of the Indy car wheel. Incorrect responses may confuse radius and diameter, or use the area formula of a circle instead of the circumference.

33. C The circumference of a circle is π times the diameter, therefore this circle has a diameter of 18, so the radius of the circle is 9. Plug the value of the radius into the area formula, the area of the circle is 81π cm^2. Incorrect responses may confuse the radius and the diameter, or use the incorrect area and circumference formulas.

34. 301.875 cubic inches A shoebox is a rectangular prism, so the volume of the shoebox is the product of the dimensions, $11.5 \times 7 \times 3.75 = 301.875$. Incorrect responses may use the incorrect formula or make an error when multiplying the decimals.

35. C The volume of the silo is the sum of the volume of the cylinder and the hemisphere, $V = \pi r^2 h + \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$. Substitute all of the known values and simplify, $V = \pi(3)^2\,(8) + \frac{1}{2}\left(\frac{4}{3}\pi(3)^3\right)$ $= 72\pi + 18\pi = 90\pi$. The incorrect responses make an error in calculating the volume formulas.

36. A, B, and C If a set of data values includes negative numbers, than the mean, median and mode can all be negative. However the range is always the positive difference between the largest and smallest number and cannot be negative. Incorrect responses may not understand the definitions of each term.

37. the mode The mean of the data set is the sum of the numbers (55) divided by the number of data points (5), $55 \div 5 = 11$. The mode of the data set is the number that appears most often, or 12. Therefore the mode is greater than the mean of the data set. Incorrect responses make an error in calculating mean.

38. B The central angle 90° is $\frac{1}{4}$ of the whole circle, so the percentage is $\frac{1}{4}$ of 100% or 25%. The other answers confuse angles and percentages.

39. 40 The outlier of a data set is a number that is extremely different from the other values in the data set. In this set 40 is 25 away from the next closest data point. Incorrect responses may find the mode of the data set, or choose the one digit number as the outlier.

40. B A scatter plot with a negative trend can be modeled with a line with a steep negative slope. All of the other lines model situations with positive correlation, no correlation, or no change.

Check Your Understanding

On the following chart, circle any items you missed. This helps you determine which areas you need to study the most. If you missed many of the questions that correspond to a certain skill, you should pay special attention to that skill as you work through this book.

Item #	Reference	Item #	Reference	Item #	Reference	Item #	Reference
1	1.1	11	3.1	21	5.1	31	7.1
2	1.2	12	3.2	22	5.1	32	7.2
3	1.3	13	3.3	23	5.2	33	7.2
4	1.3	14	3.4	24	5.3	34	7.3
5	1.4	15	3.4	25	5.4	35	7.4
6	2.1	16	4.1	26	6.1	36	8.1
7	2.2	17	4.2	27	6.2	37	8.1
8	2.2	18	4.3	28	6.3	38	8.2
9	2.3	19	4.3	29	6.4	39	8.3
10	2.4	20	4.4	30	7.1	40	8.4