

Arithmetic

There are 17 questions administered on the Arithmetic test, divided into the following content areas:

- Operations with whole numbers and fractions. Topics include addition, subtraction, multiplication, division, recognizing equivalent fractions and mixed numbers, and estimating.
- Operations with decimals and percents. Topics include addition, subtraction, multiplication, and division with decimals; percent problems; recognition of decimals; percent equivalencies; and estimating.
- Applications and problem solving. Topics include rate, percent and measurement problems; simple geometry problems; and distribution of a quantity into its fractional parts.

Arithmetic Sample Questions

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. $2.75 + 0.003 + 0.158 =$
A. 0.436
B. 2.911
C. 2.938
D. 4.36
2. $7.86 \times 4.6 =$
A. 36.156
B. 36.216
C. 351.56
D. 361.56
3. $\frac{7}{20} =$
A. 0.035
B. 0.35
C. 0.858
D. 3.5
4. Which of the following is the least?
A. 0.105
B. 0.501
C. 0.015
D. 0.15
5. All of the following are ways to write 25 percent of N EXCEPT
A. $(0.25)N$
B. $\frac{25}{100}N$
C. $\frac{1}{4}N$
D. $25N$
6. Which of the following is closest to 27.8×9.6 ?
A. 280
B. 300
C. 2,800
D. 3,000
7. A soccer team played 160 games and won 65 percent of them. How many games did the team win?
A. 94
B. 104
C. 114
D. 124

8. There are 3 people who work full-time and are to work together on a project, but their total time on the project is to be equivalent to that of only one person working full-time. If one of the people is budgeted for $\frac{1}{2}$ of his time to the project and a second person for $\frac{1}{3}$ of her time, what part of the third worker's time should be budgeted to this project?
- A. $\frac{1}{8}$
 B. $\frac{1}{6}$
 C. $\frac{1}{3}$
 D. $\frac{3}{5}$
9. 32 is 40% of what number?
- A. 12.8
 B. 128
 C. 80
 D. 800
10. $3\frac{1}{3} - 2\frac{2}{5} =$
- A. $\frac{1}{15}$
 B. $\frac{14}{15}$
 C. $1\frac{1}{15}$
 D. $1\frac{1}{2}$
11. $2\frac{1}{2} + 4\frac{2}{3} =$
- A. $6\frac{1}{6}$
 B. $6\frac{5}{6}$
 C. $7\frac{1}{6}$
 D. $7\frac{5}{6}$
12. What is $\frac{1,345}{99}$ rounded to the nearest integer?
- A. 12
 B. 13
 C. 14
 D. 15
13. Three of four numbers have a sum of 22. If the average of the four numbers is 8, what is the fourth number?
- A. 4
 B. 6
 C. 8
 D. 10
14. $46.2 \times 10^{-2} =$
- A. 0.0462
 B. 0.462
 C. 4.62
 D. 462
15. If $\frac{3}{2} \div \frac{1}{4} = n$, then n is between
- A. 1 and 3
 B. 3 and 5
 C. 5 and 7
 D. 7 and 9
16. What is 12% of 120?
- A. 10
 B. 14.4
 C. 18.4
 D. 28.8
17. A box in a college bookstore contains books, and each book in the box is a history book, an English book or a science book. If $\frac{1}{3}$ of these books are history books and $\frac{1}{6}$ are English books, what fraction of the books are science books?
- A. $\frac{1}{3}$
 B. $\frac{1}{2}$
 C. $\frac{2}{3}$
 D. $\frac{3}{4}$
18. The measures of two angles of a triangle are 35° and 45° . What is the measure of the third angle of the triangle?
- A. 95°
 B. 100°
 C. 105°
 D. 110°
19. Erica bought $3\frac{1}{2}$ yards of fabric. If she uses $\frac{2}{3}$ of the fabric to make a curtain, how much will she have left?
- A. $\frac{1}{6}$ yard
 B. $\frac{1}{3}$ yard
 C. $1\frac{1}{6}$ yards
 D. $2\frac{1}{3}$ yards
20. Jen wants to tile the floor of her kitchen. The floor is rectangular and measures 12 feet by 8 feet. If it costs \$2.50 per square foot for the materials, what is the total cost of the materials for tiling the kitchen floor?
- A. \$160
 B. \$200
 C. \$220
 D. \$240

Elementary Algebra

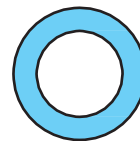
There are 12 questions administered on the Elementary Algebra test, divided into the following content areas:

- Numbers and quantities. Topics include integers and rational numbers, computation with integers and negative rationals, absolute value, and ordering.
- Algebraic expressions. Topics include evaluation of simple formulas and expressions, adding and subtracting monomials and polynomials, multiplying and dividing monomials and polynomials, evaluating positive rational roots and exponents, simplifying algebraic fractions, and factoring.
- Problem solving. Topics include translating written phrases into algebraic expressions, solving linear equations and inequalities, quadratic equations (by factoring), and verbal problems presented in an algebraic context.

Elementary Algebra Sample Questions

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. If A represents the number of apples purchased at 15 cents each, and B represents the number of bananas purchased at 10 cents each, which of the following represents the total value of the purchases in cents?
 - A. $A + B$
 - B. $25(A + B)$
 - C. $10A + 15B$
 - D. $15A + 10B$
2. $\sqrt{2} \times \sqrt{15} = ?$
 - A. $\sqrt{17}$
 - B. $\sqrt{30}$
 - C. 17
 - D. 30
3. What is the value of the expression $2x^2 + 3xy - 4y^2$ when $x = 2$ and $y = -4$?
 - A. -80
 - B. -32
 - C. 32
 - D. 80
4. In the figure below, both circles have the same center, and the radius of the larger circle is R . If the radius of the smaller circle is 3 units less than R , which of the following represents the area of the shaded region?



- A. πR^2
 - B. $\pi(R - 3)^2$
 - C. $\pi R^2 - \pi \times 3^2$
 - D. $\pi R^2 - \pi(R - 3)^2$
5. $(3x - 2y)^2 =$
 - A. $9x^2 - 4y^2$
 - B. $9x^2 + 4y^2$
 - C. $9x^2 - 6xy + 4y^2$
 - D. $9x^2 - 12xy + 4y^2$

6. If $x > 2$, then $\frac{x^2 - x - 6}{x^2 - 4} =$

- A. $\frac{x-3}{2}$
- B. $\frac{x-3}{x-2}$
- C. $\frac{x-3}{x+2}$
- D. $\frac{3}{2}$

7. $\frac{4 - (-6)}{-5} =$

- A. -2
- B. $-\frac{2}{5}$
- C. $\frac{2}{5}$
- D. 2

8. If $2x - 3(x + 4) = -5$, then $x =$

- A. -17
- B. -7
- C. 7
- D. 17

9. $-3(5 - 6) - 4(2 - 3) =$

- A. -7
- B. -1
- C. 1
- D. 7

10. $20 - \frac{4}{5}x \geq 16$

Which of the following inequalities is equivalent to the inequality shown above?

- A. $x \leq 5$
- B. $x \geq 5$
- C. $x \leq \frac{65}{2}$
- D. $x \geq \frac{65}{2}$

11. Which of the following lists of numbers is ordered from least to greatest?

- A. $-\frac{1}{3}, -\frac{3}{5}, \frac{2}{3}, \frac{3}{5}$
- B. $-\frac{3}{5}, -\frac{1}{3}, \frac{3}{5}, \frac{2}{3}$
- C. $-\frac{1}{3}, -\frac{3}{5}, \frac{3}{5}, \frac{2}{3}$
- D. $-\frac{3}{5}, -\frac{1}{3}, \frac{2}{3}, \frac{3}{5}$

12. If $5t + 2 = 6$, then $t =$

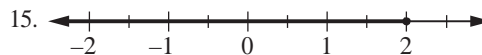
- A. 8
- B. $\frac{5}{4}$
- C. $\frac{4}{5}$
- D. -8

13. For which of the following equations are $x = 5$ and $x = -5$ both solutions?

- A. $x^2 + 25 = 0$
- B. $x^2 - 25 = 0$
- C. $x^2 + 10x - 25 = 0$
- D. $x^2 - 5x - 25 = 0$

14. If $x \neq 0$, then $\frac{u}{x} + \frac{5u}{x} - \frac{u}{5x} =$

- A. $\frac{7x}{5u}$
- B. $\frac{5u}{7x}$
- C. $\frac{29u}{5x}$
- D. $\frac{31u}{5x}$



The solution set of which of the following inequalities is graphed on the number line above?

- A. $2x - 4 \geq -3$
- B. $2x + 5 \leq 6$
- C. $3x - 1 \leq 5$
- D. $4x - 1 \geq 7$

16. $2x + 6y = 5$
 $x + 3y = 2$

How many solutions (x, y) are there to the system of equations above?

- A. None
- B. One
- C. Two
- D. More than two

17. Which of the following is a factor of both $x^2 - x - 6$ and $x^2 - 5x + 6$?

- A. $x - 3$
- B. $x - 2$
- C. $x + 2$
- D. $x + 3$

18. $\frac{10x^6 + 8x^4}{2x^2} =$

- A. $9x^{12}$
- B. $14x^4$
- C. $5x^4 + 4x^2$
- D. $5x^3 + 2x^2$

19. A rectangular yard has area 96 square feet. If the width of the yard is 4 feet less than the length, what is the perimeter, in feet, of the yard?

- A. 40
- B. 44
- C. 48
- D. 52

20. On Monday, it took Helen 3 hours to do a page of science homework exercises. The next day she did the same number of exercises in 2 hours. If her average rate on Monday was p exercises per hour, what was her average rate the next day, in terms of p ?

- A. $2(p + 1)$ exercises per hour
- B. $3(p - 1)$ exercises per hour
- C. $\frac{2}{3}p$ exercises per hour
- D. $\frac{3}{2}p$ exercises per hour

College-Level Mathematics

There are 20 questions administered on the College-Level Mathematics test, divided into the following content areas:

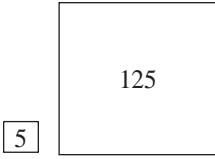
- Algebraic operations. Topics include simplifying rational algebraic expressions, factoring and expanding polynomials, and manipulating roots and exponents.
- Solutions of equations and inequalities. Topics include solving linear and quadratic equations and inequalities, systems of equations and other algebraic equations.
- Coordinate geometry. Topics include plane geometry, the coordinate plane, straight lines, conics, sets of points in the plane, and algebraic function graphs.
- Functions. Topics include polynomial, algebraic, exponential, and logarithmic functions.
- Trigonometry. Topics include trigonometric functions.
- Applications and other topics. Topics include complex numbers, series and sequences, determinants, permutations and combinations, factorials, and word problems.

College-Level Mathematics Sample Questions

For each of the questions below, choose the best answer from the five choices given. You may use the paper you received as scratch paper.

1. $2^{\frac{5}{2}} - 2^{\frac{3}{2}} =$

- A. $2^{\frac{1}{2}}$
- B. 2
- C. $2^{\frac{3}{2}}$
- D. $2^{\frac{5}{3}}$
- E. 2^2

2. If $a \neq b$ and $\frac{1}{x} + \frac{1}{a} = \frac{1}{b}$, then $x =$
- $\frac{1}{b} - \frac{1}{a}$
 - $b - a$
 - $\frac{1}{ab}$
 - $\frac{a-b}{ab}$
 - $\frac{ab}{a-b}$
3. If $3x^2 - 2x + 7 = 0$, then $\left(x - \frac{1}{3}\right)^2 =$
- $\frac{20}{9}$
 - $\frac{7}{9}$
 - $-\frac{7}{9}$
 - $-\frac{8}{9}$
 - $-\frac{20}{9}$
4. The graph of which of the following equations is a straight line parallel to the graph of $y = 2x$?
- $4x - y = 4$
 - $2x - 2y = 2$
 - $2x - y = 4$
 - $2x + y = 2$
 - $x - 2y = 4$
5. An equation of the line that contains the origin and the point $(1, 2)$ is
- $y = 2x$
 - $2y = x$
 - $y = x - 1$
 - $y = 2x + 1$
 - $\frac{y}{2} = x - 1$
6. An apartment building contains 12 units consisting of one- and two-bedroom apartments that rent for \$360 and \$450 per month, respectively. When all units are rented, the total monthly rental is \$4,950. What is the number of two-bedroom apartments?
- 3
 - 4
 - 5
 - 6
 - 7
7. If the two square regions in the figures below have the respective areas indicated in square yards, how many yards of fencing are needed to enclose the two regions? (Assume the regions are fenced separately.)
- 
- $4\sqrt{130}$
 - $20\sqrt{10}$
 - $24\sqrt{5}$
 - 100
 - $104\sqrt{5}$
8. If $\log_{10} x = 3$, then $x =$
- 3^{10}
 - 1,000
 - 30
 - $\frac{10}{3}$
 - $\frac{3}{10}$
9. If $f(x) = 2x + 1$ and $g(x) = \frac{x-1}{2}$, then $f(g(x)) =$
- x
 - $\frac{x-1}{4x+2}$
 - $\frac{4x+2}{x-1}$
 - $\frac{5x+1}{2}$
 - $\frac{(2x+1)(x-1)}{2}$
10. If θ is an acute angle and $\sin \theta = \frac{1}{2}$, then $\cos \theta =$
- 1
 - 0
 - $\frac{1}{2}$
 - $\frac{\sqrt{3}}{2}$
 - 2
11. $5y(2y - 3) + (2y - 3) =$
- $(5y + 1)(2y + 3)$
 - $(5y + 1)(2y - 3)$
 - $(5y - 1)(2y + 3)$
 - $(5y - 1)(2y - 3)$
 - $10y(2y - 3)$

12. For what real numbers x is the value of $x^2 - 6x + 9$ negative?

- A. $-3 < x < 3$
- B. $x < -3$ or $x > 3$
- C. $x = -3$ or $x = 3$
- D. $0 < x < 6$
- E. For no real numbers x

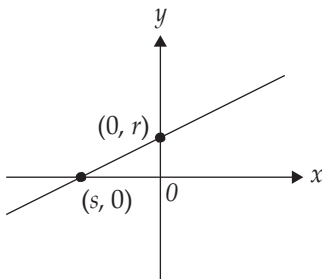
13. A root of $x^2 - 5x - 1 = 0$ is

- A. $\frac{1 - \sqrt{29}}{2}$
- B. $\frac{5 - \sqrt{7}}{2}$
- C. $\frac{1 + \sqrt{29}}{2}$
- D. $\frac{5 + \sqrt{17}}{2}$
- E. $\frac{5 + \sqrt{29}}{2}$

14. In the xy -plane, the graph of $y = x^2$ and the circle with center $(0, 1)$ and radius 3 have how many points of intersection?

- A. None
- B. One
- C. Two
- D. Three
- E. More than three

15.



If an equation of the linear function in the figure above is $y = mx + b$, then $m =$

- A. $-\frac{r}{s}$
- B. $\frac{r}{s}$
- C. rs
- D. r
- E. $-s$

16. One ordering of the letters $T, U, V,$ and W from left to right is $UTVW$. What is the total number of orderings of these letters from left to right, including $UTVW$?

- A. 8
- B. 12
- C. 16
- D. 20
- E. 24

17. If $f(x) = \frac{3x-1}{2}$ and f^{-1} is the inverse of f , what is the value of $f^{-1}(3)$?

- A. $\frac{1}{3}$
- B. $\frac{2}{3}$
- C. 1
- D. 2
- E. $\frac{7}{3}$

18. The sequence $\{a_n\}$ is defined by $a_0 = 1$ and $a_{n+1} = 2a_n + 2$ for $n = 0, 1, 2, \dots$. What is the value of a_3 ?

- A. 8
- B. 10
- C. 16
- D. 20
- E. 22

19. From 5 employees at a company, a group of 3 employees will be chosen to work on a project. How many different groups of 3 employees can be chosen?

- A. 3
- B. 5
- C. 6
- D. 10
- E. 15

20. If $f(x) = \left(\frac{1}{3}\right)^x$ and $a < b$, which of the following must be true?

- A. $f(a) + f(b) = 3$
- B. $f(a) + \frac{1}{3} = f(b)$
- C. $f(a) = f(b)$
- D. $f(a) < f(b)$
- E. $f(a) > f(b)$

Answer Key

ARITHMETIC	
QUESTION NUMBER	CORRECT ANSWER
1	B
2	A
3	B
4	C
5	D
6	A
7	B
8	B
9	C
10	B
11	C
12	C
13	D
14	B
15	C
16	B
17	B
18	B
19	C
20	D

ELEMENTARY ALGEBRA	
QUESTION NUMBER	CORRECT ANSWER
1	D
2	B
3	A
4	D
5	D
6	B
7	A
8	B
9	D
10	A
11	B
12	C
13	B
14	C
15	C
16	A
17	A
18	C
19	A
20	D

Answer Key

COLLEGE-LEVEL MATHEMATICS	
QUESTION NUMBER	CORRECT ANSWER
1	C
2	E
3	E
4	C
5	A
6	E
7	C
8	B
9	A
10	D
11	B
12	E
13	E
14	C
15	A
16	E
17	E
18	E
19	D
20	E