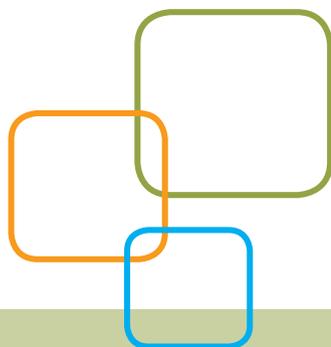# ACCUPLACER®

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Sample Questions for Students

College Algebra Study Guide

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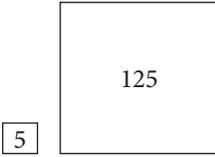
College-Level Mathematics

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 $x =$

   A. $\frac{1}{b} - \frac{1}{a}$

   B. $b - a$

   C. $\frac{1}{ab}$

   D. $\frac{a-b}{ab}$

   E. $\frac{ab}{a-b}$

3. If $3x^2 - 2x + 7 = 0$, then $\left(x - \frac{1}{3}\right)^2 =$

   A. $\frac{20}{9}$

   B. $\frac{7}{9}$

   C. $-\frac{7}{9}$

   D. $-\frac{8}{9}$

   E. $-\frac{20}{9}$

4. The graph of which of the following equations is a straight line parallel to the graph of $y = 2x$?

   A. $4x - y = 4$
   B. $2x - 2y = 2$
   C. $2x - y = 4$
   D. $2x + y = 2$
   E. $x - 2y = 4$

5. An equation of the line that contains the origin and the point (1, 2) is

   A. $y = 2x$

   B. $2y = x$

   C. $y = x - 1$

   D. $y = 2x + 1$

   E. $\frac{y}{2} = x - 1$

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?

   A. 3
   B. 4
   C. 5
   D. 6
   E. 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.)

   125

   5

   A. $4\sqrt{130}$
   B. $20\sqrt{10}$
   C. $24\sqrt{5}$
   D. 100
   E. $104\sqrt{5}$

8. If $\log_{10} x = 3$, then $x =$

   A. 3^{10}

   B. 1,000

   C. 30

   D. $\frac{10}{3}$

   E. $\frac{3}{10}$

9. If $f(x) = 2x + 1$ and $g(x) = \frac{x-1}{2}$, then $f(g(x)) =$

   A. x

   B. $\frac{x-1}{4x+2}$

   C. $\frac{4x+2}{x-1}$

   D. $\frac{5x+1}{2}$

   E. $\frac{(2x+1)(x-1)}{2}$

10. If θ is an acute angle and $\sin \theta = \frac{1}{2}$, then $\cos \theta =$

    A. -1

    B. 0

    C. $\frac{1}{2}$

    D. $\frac{\sqrt{3}}{2}$

    E. 2

11. $5y(2y - 3) + (2y - 3) =$

    A. $(5y + 1)(2y + 3)$
    B. $(5y + 1)(2y - 3)$
    C. $(5y - 1)(2y + 3)$
    D. $(5y - 1)(2y - 3)$
    E. $10y(2y - 3)$

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 $x = 3$
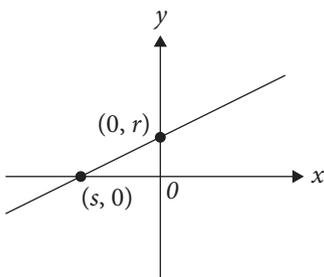   D. $0 < x < 6$
   E. For no real numbers x

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

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

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. $-\dfrac{r}{s}$
   B. $\dfrac{r}{s}$
   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 $f(x) = \dfrac{3x - 1}{2}$ and f^{-1} is the inverse of f, what is the value of $f^{-1}(3)$?

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

18. The sequence $\{a_n\}$ is defined by $a_0 = 1$ and $a_{n+1} = 2a_n + 2$ for $n = 0, 1, 2, \ldots$. 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 $f(x) = \left(\dfrac{1}{3}\right)^x$ and $a < b$, which of the following must be true?

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

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	B
16	E
17	E
18	E
19	D
20	E