

ALGEBRA
COMPASS SAMPLE ITEMS

These sample items are designed to illustrate the form of the items in the COMPASS battery. They have not been pre-tested and have not been subjected to the content and fairness reviews required for all operational items.

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(Elementary Algebra: Linear Equations in One Variable)

1. A student has earned scores of 87, 81, and 88 on the first 3 of 4 tests. If the student wants an average (arithmetic mean of exactly 87, what score must she earn on the fourth test?
 - a. 85
 - b. 86
 - c. 87
 - d. 92
 - e. 93

(Elementary Algebra: Basic Operations with Polynomials)

2. Which of the following expressions represents the product of 3 less than twice x and 2 more than the quantity of 3 times x ?
 - a. $-6x^2+25x+6$
 - b. $6x^2+5x+6$
 - c. $6x^2-5x+6$
 - d. $6x^2-5x-6$
 - e. $6x^2-13x-6$

(Elementary Algebra: Substituting Values in Algebraic Expressions)

3. If $x=-1$, and $y=2$, what is the value of the expression $2x^3-3xy$?
 - a. 8
 - b. 4
 - c. -1
 - d. -4
 - e. -8

(Intermediate Algebra: Rational Expressions)

4. For all $r \neq \pm 2$, $\frac{r^2 - 5r + 6}{r^2 - 4} = ?$

a. $\frac{r-3}{r+2}$

b. $\frac{r-3}{r-2}$

c. $\frac{r-2}{r+3}$

d. $\frac{r+3}{r-2}$

e. $\frac{r+3}{r+2}$

(Coordinate Geometry: Linear Equations in 2 Variables)

5. What is the equation of the line that contains the points with (x,y) coordinates (-3,7) and (5,-1)?

a. $y=3x-2$

b. $y=x+10$

c. $y=-1/3x + 8$

d. $y=-3/4x + 11/4$

e. $y= -x+4$

Algebra Diagnostic Test – The Algebra Diagnostic Test can be customized to include assessment of any or all of the following content areas, each of which consists of a pool of at least 20 items.

Content Areas

Substituting values into algebraic expressions

Setting up equations for given situations

Basic operations with polynomials

Linear equations in one variable

Exponents

Rational expressions

Linear equations in two variables

(Linear Equations in One Variable)

1. A certain school's enrollment increased 5% this year over last year's enrollment. If the school now has 1,260 students enrolled, how many students were enrolled last year?
 - a. 1,020
 - b. 1,155
 - c. 1,200
 - d. 1,255
 - e. 1,323

(Setting Up Equations for Given Solutions)

2. A person travels x miles in y hours and then 10 miles in 2 hours. Which expression represents the person's average rate, in miles per hour, for the entire distance traveled?
 - a. $\frac{x + 10}{y + 2}$
 - b. $\frac{x + 10}{2y}$
 - c. $\frac{x + 10}{2}$
 - d. $\frac{x + y}{20}$
 - e. $\frac{10x}{2y}$

(Rational Expressions)

3. A rectangle has an area of $(21s^2 + 18st)$ square meters. If its width is $3s$ meters, what is the length in meters?
 - a. $7s + 6t$
 - b. $7s + 18st$
 - c. $18s + 15t$
 - d. $24s^3 + 21s^2t$
 - e. $36s^3 + 54s^2t$

Sample Test-Solving Linear Equations

Choose the correct answer for each of the following questions.

1. The solution of the equation $x + 7 = 19$ is:
a. 133 b. $\frac{19}{7}$ c. -12 d. 12 f. $\frac{7}{19}$

2. The solution of the equation $4x = 52$ is:
a. 56 b. 13 c. 208 d. 48 e. $\frac{1}{13}$

3. The solution of the equation $x - 15 = 3$ is:
a. -45 b. -12 c. -18 d. 12 e. 18

4. The solution of the equation $7x = -35$ is:
a. -5 b. 5 c. $-\frac{1}{5}$ d. $\frac{1}{5}$ e. -245

5. The solution of the equation $x + 20 = 8$ is:
a. 160 b. $\frac{20}{8}$ c. 12 d. -12 e. $\frac{8}{20}$

6. The solution of the equation $3x + 2 = 7$ is:
a. $\frac{14}{3}$ b. -5 c. $\frac{5}{3}$ d. $-\frac{5}{3}$ e. 5

7. The solution of the equation $\frac{4}{5}x - 1 = \frac{3}{5}$ is:
a. $\frac{3}{4}$ b. 1 c. $\frac{7}{4}$ d. 2 e. $\frac{1}{5}$

8. The solution of the equation $5x-2 = 9x + 4$ is:
- a. $\frac{9}{7}$ b. $\frac{-2}{3}$ c. $\frac{2}{3}$ d. $-\frac{3}{2}$ e. $\frac{3}{2}$
9. The solution of the equation $6(3x+5) = 5x-9$ is:
- a. $\frac{-21}{13}$ b. -3 c. -1 d. $\frac{-39}{7}$ e. $\frac{-14}{13}$
10. The solution of the equation $5-3(2x-6) = 4(x-6)$ is:
- a. $\frac{47}{10}$ b. $\frac{-3}{2}$ c. $\frac{1}{2}$ d. $\frac{23}{10}$ e. $\frac{11}{10}$

SAMPLE TEST-Factoring Polynomials

1. The correct factorization of $x^2 - x - 12$ is:
- a. $(x-3)(x-4)$
b. $(x-3)(x+4)$
c. $(x+3)(x-4)$
d. $(x+2)(x-6)$
e. $(x-2)(x+6)$
2. The correct factorization of $5x^2 + 11x + 6$ is:
- a. $(5x + 4)(5x + 2)$
b. $(5x - 2)(5x - 3)$
c. $(5x + 2)(5x + 3)$
d. $(5x - 6)(x - 1)$
e. $(5x + 6)(x + 1)$
3. A factor of $x^2-7x+10$ is:
- a. $x+10$
b. $x-7$
c. $x+5$
d. $x-2$
e. $x+2$

4. A factor of $x^2 - 4x - 12$ is:
- a. $x - 6$
 - b. $x + 6$
 - c. $x - 2$
 - d. $x - 3$
 - e. $x + 3$
5. A factor of $3x^2 + 27x + 60$ is:
- a. $x - 4$
 - b. $x + 4$
 - c. $x - 6$
 - d. $3x - 5$
 - e. $x + 10$
6. A factor of $8x^2 + 22x + 15$ is:
- a. $8x + 5$
 - b. $8x + 1$
 - c. $2x - 3$
 - d. $4x - 5$
 - e. $2x + 3$
7. A factor of $12x^2 - 41x + 15$ is:
- a. $3x - 5$
 - b. $3x + 5$
 - c. $12x + 5$
 - d. $12x - 5$
 - e. $x + 3$
8. A factor of $2x^3 - 26x^2 + 72x$ is:
- a. $x + 9$
 - b. $x - 9$
 - c. $x - 6$
 - d. $x + 4$
 - e. $x + 2$

9. A factor of $9x^3 - 24x^2 - 20x$ is:

- a. $3x - 10$
- b. $3x + 10$
- c. $3x - 2$
- d. $9x + 1$
- e. $x - 20$

10. A factor of $8x^2 - x - 7$ is:

- a. $x + 1$
- b. $x - 1$
- c. $8x - 7$
- d. $4x - 7$
- e. $4x + 7$

Sample Algebra Test – Extra Questions

1. If $5 \times 10^n = 0.005$, then $n =$

- a. -5
- b. -3
- c. -2
- d. 2
- e. 3

2. If $x = -3$, then $x^2 - 2x + 1 =$

- a. 16
- b. 4
- c. 1
- d. -11
- e. -14

3. Which of the following gives $6a^2b^3 - 3a^2b$ in factored form?

- a. $3a^2b(2b^2)$
- b. $3a^2(2b^2 - 1)$
- c. $3ab(2ab^2 - 1)$
- d. $3a^2b(2b^2 - 1)$
- e. $a^2b(6b^2 - 1)$

4. For all $x \neq 0$ and $y \neq 0$,

$$\frac{(3x^{-2}y^3)^2}{xy} =$$

- a. $9x^3y^8$
- b. $\frac{9y^4}{x}$
- c. $\frac{9y^4}{x^2}$
- d. $\frac{9y^5}{x^5}$
- e. $\frac{9y^7}{x^5}$
5. What are all the real values of x that are solutions for the inequality of $|x-2| \leq 6$?
- a. $-8 \leq x \leq -4$
- b. $-8 \leq x \leq 4$
- c. $-8 \leq x \leq 8$
- d. $-4 \leq x \leq 4$
- e. $-4 \leq x \leq 8$
6. If $3x-2 = 2y$ and $y = 3z+5$, which of the following is equal to x ?
- a. $z+2$
- b. $z+\frac{7}{3}$
- c. $z+5$
- d. $2z+4$
- e. $3z+7$
7. What is the distance between the points with (x,y) coordinates $(3,-2)$ and $(-3,-1)$?
- a. $\sqrt{7}$
- b. $\sqrt{37}$
- c. $\sqrt{11}$
- d. 3
- e. 7

Algebra Placement Test

- 1) d 2) d 3) b 4) a 5) e

Algebra Diagnostic Test

- 1) c 2) a 3) a

Sample Test – Solving Linear Equations

- 1) d 2) b 3) e 4) a 5) d
6) c 7) d 8) d 9) b 10) a

Sample Test – Solving Factoring Polynomials

- 1) c 2) e 3) d 4) a 5) b
6) e 7) d 8) b 9) a 10) b

Sample Algebra Test – Extra Questions

- 1) b 2) a 3) d 4) d
5) e 6) d 7) b