

MATH PLACEMENT EXAM - COMPASS
Sample Problems

NUMERICAL SKILLS

1. $8 - (5 - 11) =$

- a. 24 b. 2 c. 14 d. -8 e. 5

2. $5.2 - 3.6 =$

- a. 5.56 b. 5.236 c. 5.04 d. 5.164 e. 1.6

3. $\frac{3}{5} + \frac{1}{4} =$

- a. $\frac{4}{9}$ b. $\frac{17}{20}$ c. $\frac{7}{20}$ d. $\frac{7}{10}$ e. $\frac{1}{2}$

4. $\frac{|-6| + |8|}{|-2|} =$

- a. -1 b. 1 c. 2 d. 7 e. 10

5. $6 - \frac{2}{3} =$

- a. $\frac{20}{3}$ b. $5\frac{2}{3}$ c. $\frac{16}{3}$ d. $\frac{31}{6}$ e. $4\frac{2}{3}$

6. At noon the temperature was 60°F . A cold front passed and the temperature dropped 17° in two hours. The temperature at 2 P.M. was

- a. 53° b. 37° c. 43° d. 26° e. 77°

7. $(-2) \times 5 + (-8 \div 4) + 15 =$

- a. 17 b. -27 c. 23 d. 3 e. 1

8. If the fractions $\frac{10}{4}$, $\frac{16}{32}$, $\frac{4}{5}$, and $\frac{28}{7}$ are all changed to decimal equivalents, and the sum of the first two numbers is then subtracted from the sum of the last 2 numbers, what is the result?

- a. 0.45 b. 1.8 c. 2.7 d. 4.05 e. 7.8

9. $1.1 + 5.3 - 4.8 =$

- a. 1.8 b. 9.0 c. 1.6 d. 11.2 e. -9

10. What is 10% of 30% of 20,000?

- a. 400 b. 600 c. 2,000 d. 4,000 e. 6,000

11. A product that was originally priced at \$2,000 had its price increased on June 1 by 5%. On December 1 the price was increased by 5% of the new June price. By how many dollars did the price increase on December 1?

- a. \$5.00 b. \$10.05 c. \$100.00 d. \$105.00 e. \$200.00

12. A jar filled with water weighs 10 pounds. After $\frac{1}{2}$ of the water is poured out, the jar and the remaining water together weigh 5.5 pounds. What is the weight, in pounds, of the jar?

- a. 0.5 b. 1.0 c. 2.0 d. 2.25 e. 2.75

ELEMENTARY ALGEBRA

1. $\frac{73.5 - 4.2}{.3} =$

- a. 25.9 b. 23.1 c. 259 d. 59.5 e. 231

2. $(2 + \sqrt{3})(1 - \sqrt{3}) =$

- a. $\sqrt{3} - 1$ b. $1 - \sqrt{3}$ c. $-1 - \sqrt{3}$ d. $2 + 5\sqrt{3}$ e. $5 + 3\sqrt{3}$

3. $\sqrt[3]{\frac{27}{125}} =$

a. $\frac{9}{41}$

b. $\frac{3}{5}$

c. $\frac{3}{7}$

d. $\frac{9}{5}$

e. $\frac{3}{25}$

4. $2\sqrt{72} - 4\sqrt{2} + \sqrt{18} =$

a. $8\sqrt{2} - 2\sqrt{3}$

b. $9\sqrt{2} - \sqrt{32}$

c. $5\sqrt{2}$

d. $8\sqrt{2} + 4\sqrt{3}$

e. $11\sqrt{2}$

5. $\frac{10x^2 + 5x}{5x} =$

a. $2x + 5x$

b. $10x^2 + 1$

c. $2x + 1$

d. $2x^2 + 5$

e. $10x + 1$

6. $2x^2 - 11x + 15 =$

a. $(2x - 3)(x - 5)$ b. $(x - 5)(x - 3)$ c. $(x + 3)(2x + 5)$

d. $(2x - 5)(x + 3)$ e. $(2x - 5)(x - 3)$

7. If $4 \times 10^K = .0004$ then $K =$

a. -2

b. 5

c. 3

d. -5

e. -4

8. If $x = -4$, then $2x^2 - 3x - 5 =$

a. -25

b. 39

c. 49

d. 13

e. -15

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

a. $\frac{9y}{x^4}$

b. $\frac{3y}{x^2}$

c. $\frac{9x^5}{y}$

d. $9x^2y$

e. $\frac{9y}{x^7}$

10. If $x = -1$ and $y = -3$ then $y + xy + 4 =$
- a. 10 b. 4 c. -1 d. -2 e. -3
11. Which of the following expressions represents the result of decreasing a number x by 9 and then multiplying that new number by 5?
- a. $5(9) - x$ b. $5x - 9$ c. $9 - 5x$ d. $5(9 - x)$ e. $5(x - 9)$
12. If $2x - 3 = 5$, then $x = ?$
- a. $\frac{5 - 3}{2}$ b. $\frac{5 + 3}{2}$ c. $\frac{5}{2} - 3$ d. $\frac{5}{2} + 3$ e. $2(5 + 3)$

INTERMEDIATE ALGEBRA

1. $(3.5) \times 10^{-3} \times 2 \times 10^4 =$
- a. 4×10^{-12} b. 7×10^{-12} c. 6×10 d. 7×10^{-1} e. 7×10
2. If $|2x - 3| \leq 5$ then
- a. $-2 \leq x \leq 8$ b. $1 \leq x \leq 4$ c. $-2 \leq x \leq 4$
- d. $-1 \leq x \leq 4$ e. $-2 \leq x \leq 2$
3. Given $3x - 5 = 2y$ and $y = 1 - z$, then $x =$
- a. $2 - \frac{z}{3}$ b. $\frac{7}{3} - \frac{z}{3}$ c. $2 + \frac{z}{3}$ d. $\frac{7}{3} - \frac{2}{3}z$ e. $7 + \frac{2}{3}z$
4. $32x^3 - 8x^2 - 40x =$
- a. $8x^2(4x + 4)$ b. $8x(4x^2 - x + 5)$ c. $8(x^3 - x^2 - 5)$
- d. $8x(4x^2 - x - 5)$ e. $8x(4x^2 + x - 5)$
5. What is the distance between $(2, -3)$ and $(1, 2)$?
- a. $\sqrt{24}$ b. $\sqrt{26}$ c. $\sqrt{34}$ d. $\sqrt{2}$ e. $\sqrt{10}$

6. If $\frac{10}{\sqrt{x^2 + 25}} = 2$ then $x =$
- a. 0 b. 5 c. -5 d. 3 e. 4
7. In a group of 40,000 people chosen for a survey, 25% were from the northeast and 15% of those were from Vermont. How many were from Vermont?
- a. 6,000 b. 150 c. 10,000 d. 1500 e. 600
8. Given $a = 2$ and $b = -3$, $2a + 3ab - b^2 =$
- a. 31 b. 5 c. -23 d. 13 e. -6
9. If $3x - 2y = 12$, the slope of the line is
- a. $\frac{2}{3}$ b. 4 c. 6 d. $\frac{3}{2}$ e. $-\frac{3}{2}$
10. If $3^x = \frac{1}{9}$, $x =$
- a. 2 b. -1 c. 1.5 d. .5 e. -2
11. If for all a and k , $x + a - k = 0$, then $x = ?$
- a. 0 b. $-a - k$ c. $a - k$ d. $a + k$ e. $k - a$
12. In the standard coordinate plane, what is the distance between the points with (x, y) coordinates $(5, 0)$ and $(0, \sqrt{5})$?
- a. $\sqrt{5}$ b. $5 - \sqrt{5}$ c. $\sqrt{30}$ d. $5 + \sqrt{5}$ e. $5\sqrt{5}$

COLLEGE ALGEBRA

1. If $i = \sqrt{-1}$, $(3 - 2i)(5 + i) =$
- a. $13 - 7i$ b. $13 - 13i$ c. $17 + 7i$ d. $15 + 2i$ e. $17 - 7i$

2. $\log_5 125 =$
- a. 25 b. 2 c. 4 d. 3 e. -3
3. If the point $(2, 4)$ lies on the graph of f then the graph of f^{-1} must contain
- a. $(-2, -4)$ b. $(2, \frac{1}{4})$ c. $(\frac{1}{2}, \frac{1}{4})$ d. $(4, 2)$ e. $(4, \frac{1}{2})$
4. If $f(x) = kx^2 - 3$ and $f(2) = 5$ then $f(-1) =$
- a. $\frac{1}{2}$ b. -5 c. -1 d. -4 e. -2
5. If $9! = N \cdot 6!$, then $N =$
- a. 7 b. 504 c. 56 d. 72 e. 8
6. If $a \circ b$ is defined to be $2a - 3b$ and $5 \circ x = 1$, then $x =$
- a. 2 b. -1 c. 3 d. 6 e. -2
7. If $f(x) = 5 - 2x$ and $g(x) = x + 1$ then $f(g(3)) =$
- a. -1 b. 4 c. 1 d. -3 e. 2
8. The first three terms of an arithmetic sequence are 3, 4.5, 6. The next term should be
- a. 9 b. 8 c. 7.5 d. 12 e. 10
9. Given $A = \begin{bmatrix} 1 & 0 \\ 2 & -4 \end{bmatrix}$ and $\begin{bmatrix} -2 & 1 \\ 1 & 1 \end{bmatrix}$ then $3A + 2B =$
- a. $\begin{bmatrix} -1 & 0 \\ 8 & 10 \end{bmatrix}$ b. $\begin{bmatrix} -12 & 0 \\ 12 & -24 \end{bmatrix}$ c. $\begin{bmatrix} -1 & 2 \\ 8 & -10 \end{bmatrix}$ d. $\begin{bmatrix} 5 & 2 \\ 4 & -10 \end{bmatrix}$ e. $\begin{bmatrix} -1 & 0 \\ 12 & -24 \end{bmatrix}$

10. If $V = \pi r^2 h$ and $r = 5$, $V = 75\pi$, then $h =$
- a. 1 b. 3 c. 2 d. 5 e. 4
11. If the operation \textcircled{a} is defined by $x\textcircled{a}y = (x + y)(x - y)$, what is the value of $5\textcircled{a}3$?
- a. -16 b. 2 c. 8 d. 15 e. 16
12. If $f(x) = x^2 + 3$ and $g(x) = x^3 - 1$, then $f[g(2)] = ?$
- a. 7 b. 14 c. 52 d. 84 e. 342

TRIGONOMETRY

1. A right triangle has one leg of length 5 and the hypotenuse of length 13. The other leg has length
- a. 17 b. 8 c. 18 d. 12 e. 10
2. If $\cos x = 1/2$ and $0 < x < \pi/2$, then $\sin x =$
- a. $\frac{1}{3}$ b. $\frac{2}{3}$ c. 2 d. $\frac{3}{4}$ e. $\frac{\sqrt{3}}{2}$
3. The period of $\sin(\pi x)$ is
- a. 2π b. $\frac{1}{2}$ c. $\frac{\pi}{2}$ d. 2 e. 4
4. Given $\cos \theta = \frac{4}{5}$ and $\sin \theta = \frac{3}{5}$, $\cos(2\theta) =$
- a. $\frac{1}{5}$ b. $\frac{3}{25}$ c. $\frac{7}{25}$ d. $\frac{8}{5}$ e. $\frac{2}{3}$
5. The ratio of the length of a diagonal of a square to the perimeter of the square is
- a. $\frac{1}{4}$ b. $\frac{1}{2}$ c. $\frac{\sqrt{2}}{4}$ d. $\frac{\sqrt{2}}{2}$ e. $\frac{\sqrt{2}}{3}$

6. If the angle of inclination of a line is $\frac{\pi}{3}$, the slope of the line is
- a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{2}{\sqrt{3}}$ d. $\sqrt{3}$ e. $\frac{1}{\sqrt{3}}$
7. If $\tan \theta = 0$ and $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$ then $\sec \theta =$
- a. 1 b. $\frac{1}{2}$ c. $\sqrt{3}$ d. $\frac{3}{4}$ e. $\frac{\sqrt{3}}{2}$
8. The ratio of the circumference of a circle to the radius is
- a. $\frac{\pi}{2}$ b. π c. $\frac{\pi}{4}$ d. 2π e. $\frac{3\pi}{4}$
9. What are the rectangular coordinates of the point with polar coordinates $(2, -60^\circ)$
- a. $(1, -\sqrt{3})$ b. $\left(2, -\frac{\sqrt{3}}{2}\right)$ c. $\left(2, -\frac{1}{2}\right)$ d. $(\sqrt{3}, -1)$ e. $\left(\sqrt{3}, -\frac{1}{2}\right)$
10. Nadine places a 16-foot ladder against the side of her house so that the ladder makes a 60° angle with the ground. How high on the house, in feet, does the top of the ladder reach?
- a. 8 b. $8\sqrt{2}$ c. $8\sqrt{3}$ d. 16 e. $16\sqrt{3}$

ANSWER KEY

NUMERICAL SKILLS

1. **C** 14 2. **E** 1.6 3. **B** $\frac{17}{20}$ 4. **D** 7 5. **C** $\frac{16}{3}$
6. **C** 43° 7. **D** 3 8. **B** 1.8 9. **C** 1.6 10. **B** 600
11. **D** \$105.00 12. **B** 1.0

ELEMENTARY ALGEBRA

1. **E** 231 2. **C** $-1 - \sqrt{3}$ 3. **B** $\frac{3}{5}$ 4. **E** $11\sqrt{2}$ 5. **C** $2x + 1$
6. **E** $(2x - 5)(x - 3)$ 7. **E** -4 8. **B** 39 9. **E** $\frac{9y}{x^7}$ 10. **B** 4
11. **E** $5(x - 9)$ 12. **B** $\frac{5 + 3}{2}$

INTERMEDIATE ALGEBRA

1. **E** 7×10 2. **D** $-1 \leq x \leq 4$ 3. **D** $\frac{7}{3} - \frac{2}{3}z$ 4. **D** $8x(4x^2 - x - 5)$ 5. **B** $\sqrt{26}$
6. **A** 0 7. **D** 1500 8. **C** -23 9. **D** $\frac{3}{2}$ 10. **E** -2
11. **E** $k - a$ 12. **C** $\sqrt{30}$

COLLEGE ALGEBRA

1. **E** $17 - 7i$ 2. **D** 3 3. **D** $(4, 2)$ 4. **C** -1 5. **B** 504
6. **C** 3 7. **D** -3 8. **C** 7.5 9. **C** $\begin{bmatrix} -1 & 2 \\ 8 & -10 \end{bmatrix}$ 10. **B** 3
11. **E** 16 12. **C** 52

TRIGONOMETRY

1. **D** 12 2. **E** $\frac{\sqrt{3}}{2}$ 3. **D** 2 4. **C** $\frac{7}{25}$ 5. **C** $\frac{\sqrt{2}}{4}$
6. **D** $\sqrt{3}$ 7. **A** 1 8. **B** $h \cot x$ 9. **A** $(1, -\sqrt{3})$ 10. **C** $8\sqrt{3}$