

## Session 1

### Pre-Algebra Skills Checklist

#### 1. Reducing and comparing fractions

In which of the following are  $\frac{1}{2}$ ,  $\frac{5}{6}$ , and  $\frac{5}{8}$  arranged in ascending order?

F.  $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$

G.  $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$

H.  $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$

J.  $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$

K.  $\frac{5}{8} < \frac{5}{6} < \frac{1}{2}$

#### 2. Operations on fractions and mixed numbers

A container is  $\frac{1}{8}$  full of water. After 10 cups of water are added, the container is  $\frac{3}{4}$  full. What is the volume of the container, in cups?

F.  $13\frac{1}{3}$

G.  $13\frac{1}{2}$

H. 15

J. 16

K. 40

#### 3. Identify or compare types of numbers

Which of the following is a rational number?

A.  $\sqrt{2}$

B.  $\sqrt{\pi}$

C.  $\sqrt{7}$

D.  $\sqrt{\frac{5}{25}}$

E.  $\sqrt{\frac{64}{49}}$

#### 4. Prime factorization

Which of the following lists all the positive factors of 8?

A. 1, 8

B. 2, 4

C. 2, 4, 6

D. 8, 16, 32

E. 1, 2, 4, 8

#### 5. Exponent rules including scientific notation

Which of the following is equivalent to  $(4x^2)^3$ ?

F.  $64x^8$

G.  $64x^6$

H.  $12x^6$

J.  $12x^5$

K.  $4x^6$

#### 6. Absolute value

$$|7 - 3| - |3 - 7| = ?$$

A. -8

B. -6

C. -4

D. 0

E. 8

#### 7. Percent problems with numerical values

If 40% of a given number is 8, then what is 15% of the given number?

A. 1.2

B. 1.8

C. 3.0

D. 5.0

E. 6.5

#### 8. Greatest common factor and least common multiple

For all positive integers  $x$ , what is the greatest common factor of the 2 numbers  $216x$  and  $180x$ ?

F. 6

G. 72

H.  $x$

J.  $12x$

K.  $36x$

**9. Patterns of prime numbers**

If Set A consists of all prime numbers and Set B consists of all multiples of 3, which of the following represents the intersection of Set A and Set B?

- A. {3}
- B. {1, 3}
- C. {1, 3, 6, 9, 12, 15, ...}
- D. {1, 3, 9, 15, 21, 27, ...}
- E. {1, 2, 3, 4, 5, 6, 7, ...}

**10. Solve simple equations**

If  $7 + 3x = 22$ , then  $2x = ?$

- F. 5
- G. 10
- H. 12
- J. 14
- K.  $\frac{58}{3}$

**11. Evaluate expression by substituting values for variables**

What is the value of the expression  $(x - y)^2$  when  $x = 5$  and  $y = -1$  ?

- F. 4
- G. 6
- H. 16
- J. 24
- K. 36

**12. Combine like terms including distributing**

Which of the following is an equivalent simplified expression for  $2(4x + 7) - 3(2x - 4)$  ?

- F.  $x + 2$
- G.  $2x + 2$
- H.  $2x + 26$
- J.  $3x + 10$
- K.  $3x + 11$

**13. Solve ratio problems including rates of change**

Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?

- A. 25
- B. 28
- C. 44
- D. 50
- E. 72

## Answers

### Pre-Algebra Teaching Problem Answers

- |       |       |
|-------|-------|
| 1. F  | 2. J  |
| 3. E  | 4. E  |
| 5. G  | 6. D  |
| 7. C  | 8. K  |
| 9. A  | 10. G |
| 11. K | 12. H |
| 13. C |       |

### Pre-Algebra Practice Problems

1.

On a particular road map,  $\frac{1}{2}$  inch represents 18 miles. About how many miles apart are 2 towns that are  $2\frac{1}{2}$  inches apart on this map?

- A. 18
- B.  $22\frac{1}{2}$
- C. 36
- D. 45
- E. 90

2.

Given  $f = cd^3$ ,  $f = 450$ , and  $d = 10$ , what is  $c$ ?

- F. 0.45
- G. 4.5
- H. 15
- J. 45
- K. 150

3.

Jorge's current hourly wage for working at Denti Smiles is \$12.00. Jorge was told that at the beginning of next month, his new hourly wage will be an increase of 6% of his current hourly wage. What will be Jorge's new hourly wage?

- F. \$12.06
- G. \$12.60
- H. \$12.72
- J. \$18.00
- K. \$19.20

4.

In scientific notation,  $670,000,000 + 700,000,000 = ?$

- A.  $1.37 \times 10^{-9}$
- B.  $1.37 \times 10^7$
- C.  $1.37 \times 10^8$
- D.  $1.37 \times 10^9$
- E.  $137 \times 10^{15}$

5.

Which of the following expressions is equivalent to

$$\frac{1}{2}y^2(6x + 2y + 12x - 2y) ?$$

- A.  $9xy^2$
- B.  $18xy$
- C.  $3xy^2 + 12x$
- D.  $9xy^2 - 2y^3$
- E.  $3xy^2 + 12x - y^3 - 2y$

6.

What fraction lies exactly halfway between  $\frac{2}{3}$  and  $\frac{3}{4}$ ?

- F.  $\frac{3}{5}$
- G.  $\frac{5}{6}$
- H.  $\frac{7}{12}$
- J.  $\frac{9}{16}$
- K.  $\frac{17}{24}$

7.

A number is increased by 25% and the resulting number is then decreased by 20%. The final number is what percent of the original number?

- A. 90%
- B. 95%
- C. 100%
- D. 105%
- E. 120%

8.

What is the smallest integer greater than  $\sqrt{58}$ ?

- A. 4
- B. 7
- C. 8
- D. 10
- E. 30

9.

Sergio plans to paint the 4 walls of his room with 1 coat of paint. The walls are rectangular, and, according to his measurements, each wall is 10 feet by 15 feet. He will not need to paint the single 3-foot-by-5-foot rectangular window in his room and the  $3\frac{1}{2}$ -foot-by-7-foot rectangular door. Sergio knows that each gallon of paint covers between 300 and 350 square feet. If only 1-gallon cans of paint are available, which of the following is the minimum number of cans of paint Sergio needs to buy to paint his walls?

- F. 1
- G. 2
- H. 3
- J. 4
- K. 5

10.

For all  $a > 1$ , the expression  $\frac{3a^4}{3a^6}$  equals:

- F.  $\frac{1}{2}$
- G.  $-a^2$
- H.  $a^2$
- J.  $-\frac{1}{a^2}$
- K.  $\frac{1}{a^2}$

## Answers

### Pre-Algebra Practice Problem Answers

- |      |       |
|------|-------|
| 1. E | 2. F  |
| 3. H | 4. D  |
| 5. A | 6. K  |
| 7. C | 8. C  |
| 9. G | 10. K |