

Additional OPTIONAL Summer Practice for Students Entering Algebra I

Central Tendencies (Mean, Median, Mode, and Range)

Mean is the sum of the values in a set of data divided by the number of values.

Median is the middle value of a set of data written in ascending order. If there are two middle values, the median is the mean of those values.

Mode is the most frequent value in a set of data.

Range is the difference between the greatest and least value in a set of data.

Exercises:

Find the mean, median, mode, and range of each set of data.

1. 108, 93, 426, 766, 518, 210
2. 21.5, 35.5, 49.5, 16.3, 35.5

GCF & LCM

Example:

Find the Greatest Common Factor (GCF) and Least Common Multiple (LCM) of 24 and 32.

$$\begin{array}{r|rr} & 24 & 32 \\ \hline 2 & 12 & 16 \\ 4 & 3 & 4 \\ \hline & 3 & 4 \end{array}$$

Common Factors →

$$\text{GCF} = 2 \times 4 = 8$$

$$\begin{array}{r|rr} & 24 & 32 \\ \hline 2 & 12 & 16 \\ 4 & 3 & 4 \\ \hline & 3 & 4 \end{array}$$
$$\text{LCM} = 2 \times 4 \times 3 \times 4 = 96$$

Exercises:

Find the GCF.

1. 42, 60

2. $24xy^2$, $42xy$

3. $27x^2y^2$, $45x^2$

4. 11, 21

Find the LCM

5. 27, 18

6. $15x$, $18xy$

7. $9x^2y$, $15xy^2$

8. 64, 48

Fractions

(Addition, Subtraction, Multiplication, and Division)

Miscellaneous

Write the fractions in lowest terms.

1. $\frac{8}{24}$

2. $\frac{18}{24}$

3. $\frac{15x^2y}{20xy}$

4. $\frac{36abc^4}{45a^3bc^2}$

Solve for x .

5. $\frac{16}{48} = \frac{x}{12}$

6. $\frac{12}{42} = \frac{4}{x}$

7. $\frac{20}{32} = \frac{x}{16}$

8. $\frac{6}{9} = \frac{12}{x}$

Write as improper fractions.

9. $2\frac{1}{3}$

10. $-4\frac{6}{7}$

Write as mixed numbers.

11. $-\frac{9}{4}$

12. $\frac{38}{3}$

Addition and Subtraction

Find each sum or difference. Write your answer in simplest form.

13. $-\frac{2}{3} + \frac{1}{4}$

14. $3\frac{5}{9} + 2\frac{1}{6}$

15. $\frac{3}{10} - \frac{4}{5}$

16. $6\frac{7}{10} + (-1\frac{1}{5})$

17. $5\frac{4}{11} - 2\frac{2}{3}$

18. $2\frac{7}{12} - 9\frac{2}{3}$

Multiplication and Division

Find each product or quotient. Write your answer in simplest form.

19. $-\frac{5}{6} \cdot \frac{6}{15}$

20. $-\frac{3}{4} \div (-\frac{9}{16})$

21. $2\frac{2}{5} \cdot (-3\frac{3}{4})$

22. $-3\frac{3}{4} \div 4\frac{2}{3}$

23. $\frac{2}{9} \cdot \frac{3}{16} \cdot \frac{3}{6}$

24. $6\frac{3}{4} \div 4$

Order of Operations

When several operations are indicated in a numerical expression, proceed in the following order: work within the parentheses, expand each power, multiply and divide (whichever comes first), and finally, add or subtract (whichever comes first).

PEMDAS (“**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally”) is an acronym that provides a good way to remember your order of operation.

P: Parentheses

E: Exponents

MD: Multiply or Divide, whichever comes first

AS: Add or Subtract, whichever comes first

Simplify.

1. $2^4 - 3(3^2 - 8)$

2. $(4^2 + 10)4 - 10(5^2 - 20)$

3. $4^2 - 4(5^2 - 32 \div 8 \cdot 4)$

4. $(8 \cdot 5 \div 10 + 2)(2^5 - 8^2 \div 2)$

5. $5^2 - 3[6 + (-2)(20 + (-15))]$

6. $[4^3 + (-10)(30 - 8 \cdot 5)]$

7. $[15 - 3(4^2 - 10) + 25 \div 5 \cdot 15]$

8. $\{10 - 5[20 - 2(3^2 + 1)]\}$

9. $|-32| + 32$

10. $\frac{48-24 \div 2^3}{3+2 \cdot 6}$

Working with Integers

Adding and Subtracting:

1st: Rewrite all subtraction as addition then...

- If the integers have the same signs, add their absolute values. The sum will have the same sign of the addends.
- If the integers have different signs, subtract their absolute values. The sum has the sign of the addend with the greater absolute value.

Multiplying and Dividing:

- The product or quotient of two integers having the same sign is positive.
- The product or quotient of two integers having different signs is negative.

Find each sum, difference, product, or quotient.

1. $-13 + 19$

2. $37 + (-13)$

3. $-18 + (-29)$

4. $-27 - 93$

5. $-46 - (-32)$

6. $9 - 83$

7. $-45 \div 9$

8. $-84 \div -12$

9. $\frac{132}{-11}$

10. $8(-17)$

11. $-24 \cdot -6$

12. $-62(8)$

13. There is a 6° drop in temperature over the past hour. If it is 55° now, what was the temperature an hour ago?
14. It is -9° now. The temperature will drop 5° in two hours. What will the temperature be in two hours?

Evaluating Expressions and Formulas

To evaluate an expression, first replace the variable by a given value. Then simplify the resulting numerical expression.

Evaluate the expression when $x = -2$ and $y = 5$.

1. $x + y$

2. $x^2 + y^3$

3. $2x - y$

4. $-2(y - 2x)$

Solving Multi-Step Equations

Procedure: To solve multi-step equations...

1. Fully simplify both sides of the equation
2. Get all variables to one side of the equation.
3. Use inverse operations to isolate the variable
undo addition and subtraction first

Ex.
$$\begin{array}{r} 2x + 3 = 7 \\ \cancel{3} \quad \cancel{-3} \\ \hline 2x = 4 \\ \cancel{2} \quad \cancel{2} \\ \hline \boxed{x = 2} \end{array}$$

Ex.
$$\begin{array}{r} 2(x + 5) = 3x - 5 \\ 2x + 10 = 3x - 5 \\ \cancel{-2x} \quad \quad \cancel{-2x} \\ \hline 10 = x - 5 \\ \quad \quad \quad \cancel{+5} \quad \quad \cancel{+5} \\ \hline \boxed{x = 15} \end{array}$$

Exercises

Solve and check each equation.

1. $-2x + 7 = 25$

2. $3 - 8x = -141$

3. $15 - 2(w + 5) = 11$

4. $12 - 4r = 6r + 2$

5. $-4(n + 5) = -32$

6. $12 - 2x + 5 = -1$

7. $3 - 2x = 15$

8. $\frac{z}{2} - 7 = 12$

9. $17 + 3x = 4x - 9$

10. $-3(6f - 12) = 36 - 18f$

Answers

Central Tendencies

- Mean: 353.5
Median: 318
Mode: none
Range: 673
- Mean: 31.66
Median: 35.5
Mode: 35.5
Range: 33.2

GCF & LCM

- 6
- $6xy$
- $9x^2$
- 1
- 54
- $90xy$
- $45x^2y^2$
- 192

Fractions

- $\frac{1}{3}$
- $\frac{3}{4}$
- $\frac{3x}{4}$
- $\frac{4c^2}{5a^2}$
- 4
- 14
- 10
- 18
- $\frac{7}{3}$
- $-\frac{34}{7}$
- $-2\frac{1}{4}$
- $12\frac{2}{3}$
- $-\frac{5}{12}$
- $5\frac{13}{18}$
- $-\frac{1}{2}$
- $5\frac{1}{2}$
- $2\frac{23}{33}$

- $-7\frac{1}{12}$
- $-\frac{1}{3}$
- $\frac{4}{3}$ or $1\frac{1}{3}$
- 9
- $-\frac{45}{56}$
- $\frac{1}{48}$
- $\frac{27}{16}$ or $1\frac{11}{16}$

Order of Operations

- 13
- 54
- 20
- 0
- 37
- 164
- 72
- 10
- 64
- 3

Working with Integers

- 6
- 24
- 47
- 120
- 14
- 74
- 5
- 7
- 12
- 136
- 144
- 496
- 61°
- -14°

Evaluating Expressions and Formulas

- 3
- 129
- 9
- 18
- 1
- 1

Solving Multi-Step Equations

- $x = -9$
- $x = 18$
- $w = -3$
- $r = 1$
- $n = 3$
- $x = 9$
- $x = -6$
- $z = 38$
- $x = 26$
- All real numbers