

1. Perform the following operations.

$$1 + 2 \cdot 7 + 1 \cdot 1 - 1$$

Ans: 15

Difficulty Level: Easy Section Objectives: Order of operations

2. Perform the following operations.

$$5 + 6 \cdot 9 + 12 \cdot 2$$

Ans: 83

Difficulty Level: Easy Section Objectives: Order of operations

3. Expand the given expression.

$$(4x - 2y)(4z + 2w - t)$$

Ans: $16xz + 8xw - 4xt - 8yz - 4yw + 2yt$

Difficulty Level: Medium Section Objectives: Distributive property

4. Expand the given expression.

$$(x + 4y - r)(2z - w + 4t)$$

Ans: $2xz - xw + 4xt + 8yz - 4yw + 16yt - 2rz + rw - 4rt$

Difficulty Level: Hard Section Objectives: Distributive property

5. Expand the given expression.

$$(x - 2y + 3z)^2$$

Ans: $x^2 + 4y^2 + 9z^2 - 4xy + 6xz - 12yz$

Difficulty Level: Medium Section Objectives: Distributive property

6. Expand the given expression.

$$(2x + 9y + 4z)^2$$

Ans: $4x^2 + 81y^2 + 16z^2 + 36xy + 16xz + 72yz$

Difficulty Level: Medium Section Objectives: Distributive property

7. Evaluate: $6 \cdot 8 \cdot 4 + 3 \cdot 9$

A) 45 B) 219 C) 567 D) 165

Ans: B Difficulty Level: Easy

Section Objectives: Commutativity and associativity

8. Simplify the given expression as much as possible.

$$7(m + 7n) + 6m$$

Ans: $13m + 49n$

Difficulty Level: Easy Section Objectives: Distributive property

9. Simplify the given expression as much as possible.

$$2(5N + 3(M - 2N)) + 4N$$

Ans: $2N + 6M$

Difficulty Level: Medium Section Objectives: Order of operations

10. Which of the following is true?

$$\begin{array}{llll} \text{A)} & \frac{16}{8} = \frac{1}{2} & \text{B)} & 3x - x = 0 \\ \text{C)} & \frac{3}{8} - \frac{c}{16} = \frac{6-c}{16} & \text{D)} & \frac{3x+1}{x} = 3+1 \end{array}$$

Ans: C Difficulty Level: Hard

Section Objectives: Multiplicative inverses and division

11. Which of the following expressions equals 0? (Assume
- x
- is not zero.)

I $3x - x$

II $\frac{3}{x} - \frac{3x}{x^2}$

III $\frac{3x-b}{b} - 3x + 1$

A) I B) II C) III D) II and III

Ans: B Difficulty Level: Hard

Section Objectives: Multiplicative inverses and division

12. Which of the following expressions equals
- $7x - y$
- ?

I $7(x - 2y) + 2(7 - 1)y + y$

II $2y + 7(x - 1) + (7 - 3y)$

III $2(7x - y) + (y - 7x)$

A) I B) II C) III D) I, II, and III

Ans: D Difficulty Level: Hard

Section Objectives: Additive inverses and subtraction

13. Which alternative equals the fraction
- $\frac{b}{c}$
- ?

$$\begin{array}{llll} \text{A)} & \frac{b+5}{c+5} & \text{B)} & \frac{b-5}{c-5} \\ \text{C)} & \frac{5b}{5c} & \text{D)} & \frac{5b-1}{5c-1} \end{array}$$

Ans: C Difficulty Level: Medium

Section Objectives: Multiplicative inverses and division

14. Perform the indicated operation.

$$\frac{2}{5} + \frac{3}{10}$$

$$\text{Ans: } \frac{7}{10}$$

Difficulty Level: Medium Section Objectives: Order of operations

15. Perform the indicated operation.

$$\frac{3}{9} \cdot \frac{18}{9}$$

Ans: $\frac{2}{3}$

Difficulty Level: Easy Section Objectives: Order of operations

16. Simplify the given expression as much as possible.

$$\frac{N}{5} + \frac{3}{M-6}$$

Ans: $\frac{MN - 6N + 15}{5(M-6)}$

Difficulty Level: Hard Section Objectives: Order of operations

17. Simplify the given expression as much as possible.

$$\frac{x-5}{y+2} \div \frac{y-2}{x+5}$$

Ans: $\frac{x^2 - 25}{y^2 - 4}$

Difficulty Level: Hard Section Objectives: Multiplicative inverses and division

18. Simplify the given expression as much as possible.

$$\frac{(7x+b)^2 - 49x^2}{b}$$

Ans: $14x + b$

Difficulty Level: Medium Section Objectives: Additive inverses and subtraction

19. Simplify the given expression as much as possible.

$$\frac{x-7}{y} \div \frac{z}{x+7}$$

Ans: $\frac{x^2 - 49}{yz}$

Difficulty Level: Medium Section Objectives: Multiplicative inverses and division

20. Simplify the given expression as much as possible.

$$\frac{1}{81(x-y)} \cdot \left(\frac{9x}{y} - \frac{81y}{9x} \right)$$

Ans: $\frac{x+y}{9xy}$

Difficulty Level: Hard Section Objectives: Multiplicative inverses and division

21. Expand the given expression.

$$(6x - 5)(6x^3 + 7x^2 + 11x).$$

Ans: $36x^4 + 12x^3 + 31x^2 - 55x$

Difficulty Level: Medium Section Objectives: Distributive property

22. Simplify the given expression as much as possible.

$$\frac{w-2}{w^5} - \frac{2}{w(w-1)}$$

$$\frac{-2w^4 + w^2 - 3w + 2w}{w^5(w-1)}$$

Ans:

Difficulty Level: Hard Section Objectives: Multiplicative inverses and division

23. Simplify the given expression as much as possible.

$$\frac{\frac{x-3}{y+4}}{\frac{y-4}{x+3}}$$

Ans: $\frac{x^2 - 9}{y^2 - 16}$

Difficulty Level: Hard Section Objectives: Multiplicative inverses and division