Mid-Chapter Quiz

Write a verbal expression for each algebraic expression.

1. $21 - x^3$

SOLUTION:

The expression shows the difference of the terms 21 and x^3. The term x^3 represents a number raised to the third power. So, the verbal expression *twenty-one minus x to the third power* can be used to describe the algebraic expression $21 - x^3$.

2. $3m^5 + 9$

SOLUTION:

The expression shows the sum of two terms, $3m^5$ and 9. The term $3m^5$ represents the number 3 being multiplied by m^5, or a number raised to the fifth power. So, the verbal expression *the sum of three times m to the fifth power and nine* can be used to describe the algebraic expression $3m^5 + 9$.

Write the algebraic expression for each verbal expression.

3. five more than *s* squared

SOLUTION:

The word *more* suggests addition. So, the verbal expression *five more than* s^2 can be represented by $s^2 + 5$.

4. four times *y* to the fourth power

SOLUTION:

The word *times* suggests multiplication. So, the verbal expression *four times y to the fourth power* can be represented by $4y^4$.

5. **CAR RENTAL** The XYZ Car Rental Agency charges a flat rate of $39 per day plus $0.47 per mile driven. Write an algebraic expression for the rental cost of a car for *x* days that is driven *y* miles.

SOLUTION:

To write the expression, multiply the rental cost per day $39 by the number of days *x*, 39*x*. Then, multiply the cost per mile driven $0.47 by the number of miles driven *y*, 0.47*y*. Last, add the two expressions to represent the total rental cost of a car.

$39x + 0.47y$

Evaluate each expression.

6. $24 \div 3 - 2 \cdot 3$

SOLUTION:

$$24 \div 3 - 2 \cdot 3 = 8 - 6$$
$$= 2$$

8. $4(3 + 9)$

SOLUTION:

$$4(3+9) = 4(12)$$
$$= 48$$

10. $\dfrac{40 - 2^3}{4 + 3(2^2)}$

SOLUTION:

$$\frac{40-2^3}{4+3(2^2)} = \frac{40-8}{4+3(2^2)} \quad \text{Evaluate powers.}$$
$$= \frac{40-8}{4+3(4)} \quad \text{Evaluate powers.}$$
$$= \frac{40-8}{4+12} \quad \text{Multiply 3 by 4.}$$
$$= \frac{32}{4+12} \quad \text{Subtract 8 from 40.}$$
$$= \frac{32}{16} \quad \text{Add 4 and 12.}$$
$$= 2 \quad \text{Simplify.}$$

11. **AMUSEMENT PARK** The costs tickets to a local amusement park are shown. Write and evaluate an expression to find the total cost for 5 adults and 8 children.

SOLUTION:

To write the expression, multiply the number of adults by the cost per adult. Then, multiply the number of children by the cost per child. Last, add the two to find the total cost for the group.

$$5(45) + 8(25) = 225 + 200$$
$$= 425$$

12. **MULTIPLE CHOICE** Write an algebraic expression to represent the perimeter of the rectangle shown below. Then evaluate it to find the perimeter when $w = 8$ cm.

A 37 cm
B 232 cm
C 74 cm
D 45 cm

SOLUTION:

To write the expression, use the formula for the perimeter of a rectangle $P = 2l + 2w$. Substitute the length of the rectangle for l and simplify.

$P = 2\ell + 2w$	Perimeter formula
$= 2(4w - 3) + 2w$	$\ell = (4w - 3)$
$= 2(4w) - 2(3) + 2w$	Distributive Property
$= 8w - 6 + 2w$	Multiply.
$= 8w + 2w - 6$	Commutative Property
$= (8 + 2)w - 6$	Distributive Property
$= 10w - 6$	Add 8 and 2.

To find the perimeter, evaluate $10w - 6$ when $w = 8$.

$$\begin{aligned} 10w - 6 &= 10(8) - 6 \\ &= 80 - 6 \\ &= 74 \end{aligned}$$

The correct answer is C.

Evaluate each expression. Name the property used in each step.

14. $3(1 \div 3) \cdot 9$

SOLUTION:

$3(1 \div 3) \cdot 9$

$= 3 \cdot \frac{1}{3} \cdot 9$	Substitution
$= 1 \cdot 9$	Multiplicative Inverse
$= 9$	Multiplicative Identity

16. $18 + 35 + 32 + 15$

SOLUTION:

$18 + 35 + 32 + 15$

$= 18 + 35 + 32 + 15$	Commutative Prop. (+)
$= (18 + 32) + (35 + 15)$	Associative Prop. (+)
$= 50 + 50$	Substitution
$= 100$	Additive Identity

Use the Distributive Property to rewrite each expression. Then evaluate.

20. $8(7 - 4)$

SOLUTION:

$$\begin{aligned} 8(7 - 4) &= 8(7) - 8(4) \\ &= 56 - 32 \\ &= 24 \end{aligned}$$

Use the Distributive Property to rewrite each expression. Then simplify.

23. $-5(3m - 2)$

SOLUTION:

$$\begin{aligned} -5(3m - 2) &= -5(3m) - (-5)(2) \\ &= -5(3m) - (-10) \\ &= -15m + 10 \end{aligned}$$

24. **CAR WASH** A car wash chain has three locations. Use the information in the table below to write and evaluate an expression to estimate the total number of car washes sold over a 4-day period.

Location	Daily Car Washes
Location 1	145
Location 2	211
Location 3	184

SOLUTION:

To write an expression to estimate the total number of car washes sold in 4 days, add the number of car washes for each location to find the total sold in one day. Then, multiply the daily total by 4.
So, the expression is 4(145 + 211 + 184).

$$\begin{aligned} 4(145+211+184) &= 4(540) \\ &= 2160 \end{aligned}$$

So, about 2160 car washes were sold over a 4-day period.