3.1 ALGEBRAIC EXPRESSIONS

ESSENTIAL QUESTION: How can you write and evaluate an expression that represents a real life situation,

$5 + 7 \rightarrow$ expression $\qquad 5x + 7 \rightarrow$ Algebraic Expression

Algebraic Expression-> An expression that may contain numbers, operations and one or more symbols (letters).

Parts of an algebraic expression separated by addition and subtraction signs are called terms.

$2x^2 + 5 - x$ → $2x^2$, 5, and x are called terms.

1 Variable -> A symbol that represents one or more numbers.

$5p + 4$

3 Coefficient -> Number in front of a variable.

2 Constant -> A term without a variable.

EXAMPLE 1

Identify the terms, coefficients, and constants in each expression.

1) $5x + 3$

Terms $5x, 3$

Coefficients 5

Constant 3

2) $2r^2 + y + 3$

Terms $2r^2, y, 3$

Coefficients 2

Constant 3

ON YOUR OWN

Identify the terms, coefficients, and constants in each expression.

1) $12 + 10c$

Terms $12, 10c$

Coefficients 10

Constant 12

2) $15 + 3w + \frac{1}{2}$

Terms $15, 3w, \frac{1}{2}$

Coefficients 3

Constant $\frac{1}{2}$

3) $z^2 + 9z$

Terms $z^2, 9z$

Coefficients 1, 9

Constant none

EXAMPLE 2

Write the expression using exponents

1) $d \cdot d \cdot d \cdot d$ d^4

2) $1.5 \cdot h \cdot h \cdot h$ $1.5h^3$

ON YOUR OWN

Write the expression using exponents.

1) $j \cdot j \cdot j \cdot j \cdot j \cdot j$ j^6

2) $9 \cdot k \cdot k \cdot k \cdot k \cdot k \cdot k$

$9k^6$

EXAMPLE 3

Evaluate the expression.

1) $k + 10$ *when* $k = 25$

$25 + 10$

35

2) $4 \cdot n$ *when* $n = 12$

$4 \cdot 12$

48

ON YOUR OWN

Evaluate the expression.

1) $24 + c$ *when* $c = 9$

$24 + 9$

33

2) $d - 17$ *when* $d = 30$

$30 - 17$

13

EXAMPLE 4

Evaluate the expression $a \div b$ *when* $a = 16$ *and* $b = \frac{2}{3}$

$16 \div \frac{2}{3}$

$\frac{\cancel{16}^{8} \cdot 3}{\cancel{2}_{1}} = 24$

ON YOUR OWN

Evaluate the expression.

1) $p \div q$ *when* $p = 24$ *and* $q = 8$

$24 \div 8$

3

2) $q + p$ *when* $p = 24$ *and* $q = 8$

$8 + 24$

32

3) $p - q$ *when* $p = 24$ *and* $q = 8$

$24 - 8$

16

4) pq *when* $p = 24$ *and* $q = 8$

$24 \cdot 8$

192

EXAMPLE 5

Evaluate the expression.

1) $3x - 14$ *when* $x = 5$

$3 \cdot 5 - 14$

$45 - 14$

31

2) $z^2 + 8.5$ *when* $z = 2$

2^2

$2 + 8.5$

$4 + 8.5$

12.5

ON YOUR OWN

Evaluate the expression.

1) $5y + 1$ *when* $y = 6$

$5(6) + 1$

$30 + 1$

31

2) $30 - 24 \div y$ *when* $y = 6$

$30 - 24 \div 6$

$30 - 4$

26

3) $y^2 - 7$ *when* $y = 6$

$6^2 - 7$

$36 - 7$

29

4) $1.5 + y^2$ *when* $y = 6$

$1.5 + 6^2$

$1.5 + 36$

37.5

EXAMPLE 6

You are saving money to buy a skateboard. You begin with $45 and you save $3 each week. The expression 45 + 3w gives the amount of money you save after w weeks.

a. How much will you have after 4 weeks, 10 weeks, and 20 weeks?

b. After 20 weeks, can you buy the skateboard? Explain

a)

# of weeks	Expression 45 + 3 w	Amount Saved
4	45+3(4)	45+12 = $57
10	45+3(10)	45+30 = $75
20	45+3(20)	45+60 = $105

b) After 20 weeks you will only have $105. That is not enough for the $125 skateboard