## 2.2 Coefficients and Exponents

## **Difference Between Exponents and Coefficients**

A coefficient is a number that is multiplied to a variable. Remember, when expanding an expression that contains multiplication we use addition. Look at the following examples:

Example 1 – two numbers	Example 2 – coefficient and variable
$3 \times 5 = 5 + 5 + 5$	$3x = 3 \times x = x + x + x$

Expand the expressions so that it does not contain a coefficient.

LP#1	4 y	$5x^2$
6 <i>x</i>		

An exponent is a number that is represented by using a superscript at the end of a term or expression. Remember, when expanding an expression that contains an exponent we use multiplication. Look at the following examples:

Example 3	Example 4
$3^5 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$	$x^4 = x \cdot x \cdot x \cdot x$

Expand each expression so that it does not contain an exponent.

LP#2	<i>y</i> ′	$7x^3$
<i>x</i> <sup>+</sup>		

State some differences between a coefficient and an exponent based on the criteria given.

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enpressions.		
LP#3	$20y^2$	$1_{r^4}$
$5x^4$		$-\frac{1}{2}x$
	coefficient =	
coefficient =		coefficient =
	exponent =	
exponent =		exponent =
LP#4	$-m^8$	0.2g
$w^6$		
	coefficient =	coefficient =
coefficient =		
	exponent =	exponent =
exponent =		

**Class Notes –** State the coefficient and exponent to the variable to the following expressions.

**Class Notes –** Evaluate the following expressions. Let a = 5, b = -6, and c = 4.

LP#5	$a^3$	2b	$b^2$
3 <i>a</i>			
LP#6	$c^5$	2(a+b)	$(a+b)^2$
5 <i>c</i>			

**Review -** State the coefficient and exponent to the variable to the following expressions.

R#1	$4_{r^3}$	$11x^{7}$	$m^3$
$5y^8$	$\frac{1}{5}^{x}$		
		coefficient =	coefficient =
coefficient =	coefficient =		
		exponent =	exponent =
exponent =	exponent =		
R#2	$-7 y^{14}$	36	$10y^{9}$
$0.25x^4$		$-\frac{-x}{4}$	
	coefficient =		coefficient =
coefficient =		coefficient =	
	exponent =		exponent =
exponent =		exponent =	
R#3	У	$3n^{10}$	$16y^2$
$-12y^{8}$			
	coefficient =	coefficient =	coefficient =
coefficient =			
	exponent =	exponent =	exponent =
exponent =			

## Homework

State the coefficient and exponent to the variable to the following expressions.

1) $2y^5$	2) $\frac{3}{4}x^2$	<b>3</b> ) $7x^3$	4) $m^{10}$	5) $-\frac{1}{5}x^8$
<b>6</b> ) 0.5 <i>x</i>	7) $-y^7$	8) $-\frac{5}{6}x^{11}$	<b>9</b> ) 18y <sup>9</sup>	<b>10</b> ) $29g^4$
11) $-9y^{10}$	12) <i>x</i>	<b>13</b> ) 6 <i>n</i> <sup>13</sup>	<b>14</b> ) 8 <i>y</i> <sup>4</sup>	15) $-\frac{1}{10}p^2$
Evaluate the foll <b>16</b> ) $a^2$	owing expression <b>17</b> ) 4 <i>b</i>	ns. Let $a = 8, b = -18$	$a^{-3}$ , and $c = 9$ . 5(a+c)	<b>19</b> ) $(c+b)^3$
<b>20</b> ) $3(a+b)$	<b>21</b> ) ( <i>a</i> + <i>b</i>	$)^{3}$ 22) o	$c^3$	23) $5c + a^2$
<b>24</b> ) <i>b</i> <sup>2</sup>	<b>25</b> ) ( <i>a</i> + 3	$(b)^2$ <b>26</b> )	$(a+b+c)^2$	27) 3 <i>a</i> <sup>2</sup>
<b>28</b> ) $10b^2$	<b>29</b> ) 2 <i>c</i> <sup>2</sup>	30) 2	$2(a+b)^2$	<b>31</b> ) $4c^2$

## Synthesis

Condense each expression using exponents and/or coefficients. **32)** m + m + m + m + m **33)**  $k \cdot k \cdot k$  **34)**  $w \cdot w \cdot w \cdot w \cdot w \cdot w$  **35)** c + c + c + c

**36**)  $b^4 + b^4 + b^4$  **37**)  $h^{10} + h^{10}$  **38**)  $x \cdot x \cdot + x \cdot x + x \cdot x$  **39**)  $y \cdot y \cdot y \cdot y + y \cdot y \cdot y \cdot y$