

## Review Unit 7

**Simplify. Your answer should contain only positive exponents.**

$$1) (-3m^3)^5 = (-3)^5 m^{15} \\ = -243m^{15}$$

$$2) \frac{5a^{-8}b^{-1}}{ab^3} = 5a^{-9}b^{-4} \\ = \frac{5}{a^9b^4}$$

**Evaluate each function at the given value using synthetic substitution.**

$$3) f(a) = -2a^3 - 3a^2 + 20a + 2 \text{ at } a = -4$$

$$\begin{array}{r|rrrr} -4 & -2 & -3 & 20 & 2 \\ & & 8 & -20 & 0 \\ \hline & -2 & 5 & 0 & 2 \end{array}$$

$f(-4) = 2$

$$4) f(m) = m^3 + 4m^2 - 8m - 5 \text{ at } m = 2$$

$$\begin{array}{r|rrrr} 2 & 1 & 4 & -8 & -5 \\ & & 8 & 8 & 8 \\ \hline & 1 & 12 & 0 & 3 \end{array}$$

$f(2) = 3$

**Describe the end behavior of each function.**

$$5) f(x) = -x^5 + 3x^3 - 2$$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$

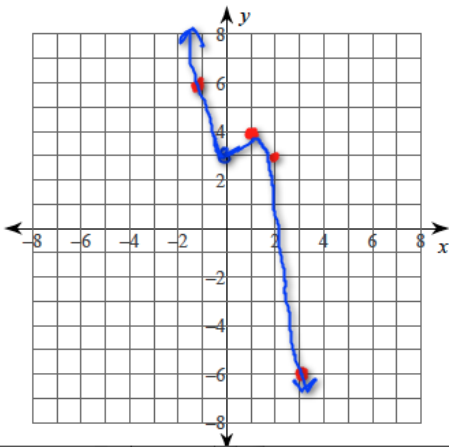
$$6) f(x) = -2x^2 - 16x - 29$$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$

**Sketch the graph of each function by making a table of values.**

$$7) f(x) = -x^3 + 2x^2 + 3$$



x	f(x)
-3	48
-2	19
-1	6
0	3
1	4
2	3
3	-6

**Simplify each expression.**

$$8) (4v^3 - 2v + 7) + (v^3 + 5v - 7) \\ = 5v^3 + 3v$$

**Find each product.**

$$9) (6p + 1)^2$$

$$10) (x - 2)^3$$

**Factor completely by factoring out a GCF, then factoring the remaining polynomial.**

11)  $2x^3 + 12x^2 + 10x$

**Factor each difference of cubes.**

12)  $27x^3 - 1$

**Factor each completely by grouping.**

13)  $16m^3 - 6m^2 + 24m - 9$

14)  $20b^3 + 16b^2 - 5b - 4$

**Solve for x by factoring using the most appropriate method.**

15)  $12x^4 - 13x^2 + 3 = 0$

16)  $x^3 + 3x^2 - x - 3 = 0$

**Divide using polynomial long division.**

17)  $(k^4 + 7k^3 - 17k^2 + 2k - 63) \div (k + 9)$

18)  $(r^3 + 20r^2 + 101r + 2) \div (r + 10)$

**Divide using synthetic division.**

19)  $(x^4 - 101x^2 - 18x - 80) \div (x + 10)$

20)  $(k^4 - 12k^3 + 41k^2 - 18k - 72) \div (k - 6)$

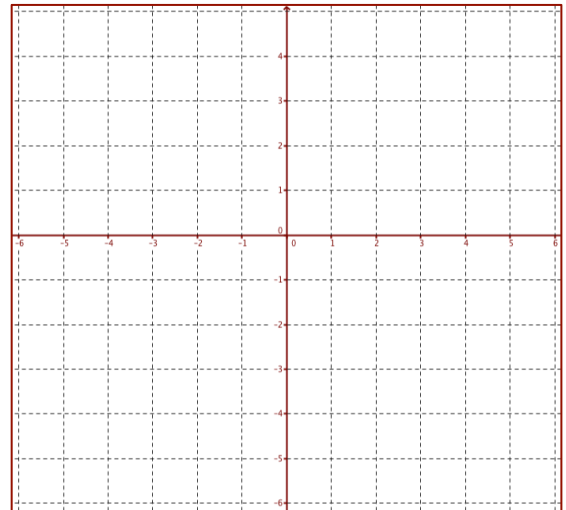
**Given a polynomial  $f(x)$  and a factor of  $f(x)$ , factor  $f(x)$  completely.**

21)  $f(x) = 5x^3 + 21x^2 + 19x + 3; x + 3$

22. Graph the function. Label all extrema, zeros and intercepts. Round to the nearest hundredth, if necessary.

$$f(x) = 0.02x^2(x - 4)^2$$

x	f(x)
-3	
-2	
-1	
0	
1	
2	
3	



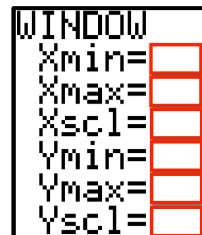
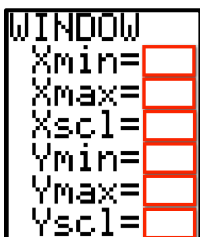
23. The side of a cube is represented by the binomial  $(x + 3)$ . Find, in terms of  $x$ , the volume of the cube. Use the formula  $V = s^3$ .

24. A storage company needs to design a new storage box that has twice the volume of its largest box. Its largest box is 5 ft long, 4 ft wide, and 3 ft high. The new box must be formed by increasing each dimension by the same amount. Find the increase in each dimension.

Graph each polynomial below and give an appropriate window. Then, sketch the graph in the window.

a.  $f(x) = -x^3 - 17x - 60$

b.  $f(x) = x^6 - 20x^4$



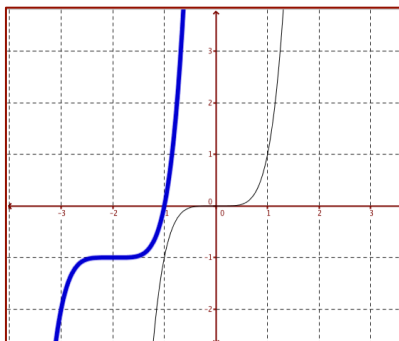
## Algebra Skillz

### GRAPH

Below, the graph of  $f(x) = (x + 2)^5 - 1$  is sketched in bold. Its parent function  $f(x) = x^5$  is represented by the thin curve.

1. Describe the translation of the parent graph.

2. How does the translation relate to the equation?



### SIMPLIFY

3.  $\sqrt{32} + 2\sqrt{200} - \sqrt{98}$

4.  $2\sqrt{5}(20 - 3\sqrt{5})$

### SOLVE

5. Solve:  
 $-2(3x - 1)(-2x + 1) = 0$

6. Factor and solve.  
 $4x^2 + 15x - 4 = 0$

## SAT Review

### MUTIPLE CHOICE

Determine the number of zeros that are positive integers for the function:

$$f(x) = 6x^3 + x^2 - x$$

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) Cannot be determined

### Free Response

Suppose  $(3x + \frac{1}{2})^2 = 9x^2 + bx + \frac{1}{4}$ .  
Find the value of b.

	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

#### Difference of Perfect Squares

$$(a + b)(a - b) = a^2 - b^2$$

#### Square of a Binomial

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

#### Cube of a Binomial

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

#### Sum of Two Cubes

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

#### Difference of Two Cubes

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$