Algebra 2 Guideline for Week 2 April,27 – May,1

There are 5 Review assignments to complete this week. You can write on binder paper. Make sure to

- write very neat
- show all the work
- write your name and period in pen

After you are done with each assignment take a photo and email me your assignments altogether. The first two weeks of assignments are all due on May 8th.

April,27

Assignment HMH 5.1 Practice A/B "Graphing Cubic Functions"

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 5.1**
- **HMH 5.1 Reteach page (attached)**

April,28

Assignment HMH 5.2 Practice A/B "Graphing Polynomials, Odd and Even, Leading coefficients and x-intercepts"

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 5.2**
- **HMH 5.2 Reteach page (attached)**

April,29

Assignment HMH 6.1 Practice A/B "Adding and Subtracting Polynomials"

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 6.1**
- **HMH 6.1 Reteach page (attached)**

April,30

Assignment HMH 6.2 Practice A/B "Multiplying Polynomials"

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 6.2**
- **HMH 6.2 Reteach page (attached)**

May,1

Assignment HMH 6.4 Practice A/B "Factoring Polynomials"

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 6.4**
- **HMH 6.4 Reteach page (attached)**

Name ______________________________ Date ______________ Class______________

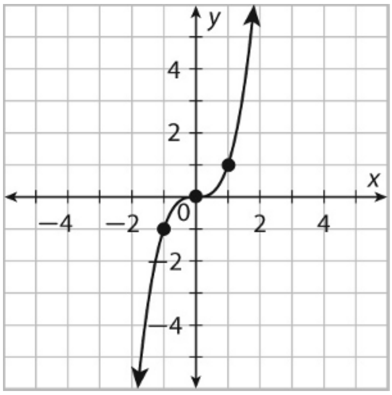
LESSON 5-1

Graphing Cubic Functions

Practice and Problem Solving: A/B

Calculate the reference points for each transformation of the parent function $f(x) = x^3$. Then graph the transformation. (The graph of the parent function is shown.)

1. $g(x) = (x-3)^3 + 2$



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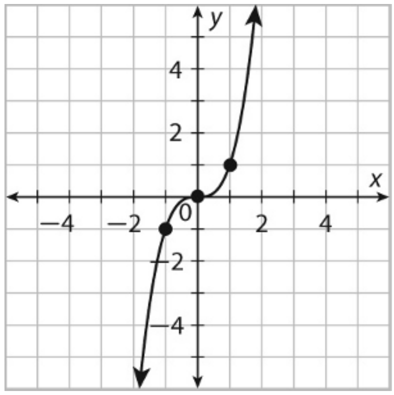
2. $g(x) = -3(x+2)^3 - 2$



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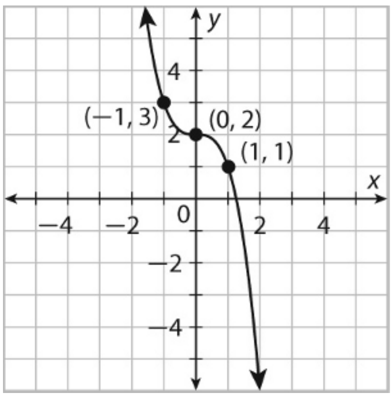
Write the equation of the cubic function whose graph is shown.

3.



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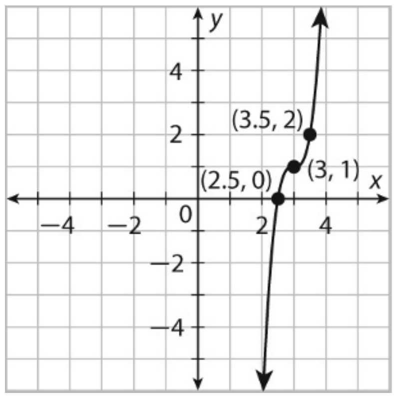
4.



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Solve.

5. The graph of $f(x) = x^3$ is reflected across the x-axis. The graph is then translated 11 units up and 7 units to the left. Write the equation of the transformed function.

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6. The graph of $f(x) = x^3$ is stretched vertically by a factor of 6. The graph is then translated 9 units to the right and 3 units down. Write the equation of the transformed function.

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Name ________________________ Date ______________ Class______________

LESSON 5-1

Graphing Cubic Functions

Reteach

The graph of the parent function $f(x) = x^3$ can be transformed into $g(x) = a\left(\frac{1}{b}(x-h)\right)^3 + k$.

Each parameter (a, b, h, and k) affects the transformation of the function:

a	$\lvert a \rvert < 1$ Vertical Compression	$\lvert a \rvert > 1$ Vertical Stretch	$a < 0$ Reflection over x-axis
b	$\lvert b \rvert < 1$ Horizontal Compression	$\lvert b \rvert > 1$ Horizontal Stretch	$b < 0$ Reflection over y-axis
h	$h < 0$ Translate Left h		$h > 0$ Translate Right h
k	$k < 0$ Translate Down k		$k > 0$ Translate Up k

By using reference points, a graph of the transformed function can be created.

$f(x) = x^3$		$g(x) = a\left(\frac{1}{b}(x-h)\right)^3 + k$	
x	y	x	y
–1	–1	$-b+h$	$-a+k$
0	0	h	k
1	1	$b+h$	$a+k$

Example Identify the transformations that produce the graph of $g(x) = 2(x+1)^3 - 2$. Then, graph $g(x)$ by applying the transformations to the reference points $(-1, -1)$, $(0, 0)$, and $(1, 1)$.

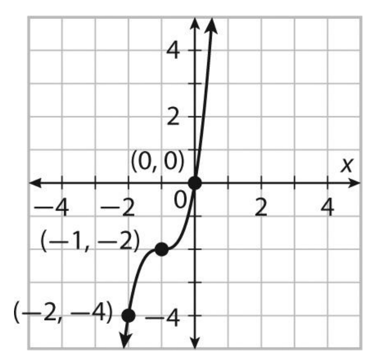
Transformations

$a = 2$	Vertical Stretch by 2
$b = 1$	No Horizontal Stretch or Compression
$h = -1$	Translate Left 1
$k = -2$	Translate Down 2

Reference Points

Original Points	x	y
$(-1, -1)$	$-1+(-1) = -2$	$-2+(-2) = -4$
$(0, 0)$	-1	-2
$(1, 1)$	$1+(-1) = 0$	$2+(-2) = 0$

Graph



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Name ______________________ Date ______________ Class ______________

LESSON 5-2

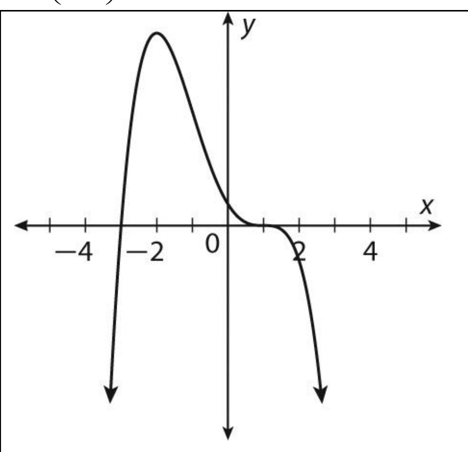
Graphing Polynomial Functions

Reteach

To sketch $f(x) = a(x - x_1)(x - x_2)...(x - x_n)$:

n = degree a = constant factor	End Behavior	Graph Description	x-intercepts
n odd $a > 0$	as $x \to -\infty$, $f(x) \to -\infty$ as $x \to +\infty$, $f(x) \to +\infty$	Uphill	$(x - x_1)^{odd}$ Crosses x-axis at x_1
n odd $a < 0$	as $x \to -\infty$, $f(x) \to +\infty$ as $x \to +\infty$, $f(x) \to -\infty$	Downhill	
n even $a > 0$	as $x \to -\infty$, $f(x) \to +\infty$ as $x \to +\infty$, $f(x) \to +\infty$	Opens up	$(x - x_2)^{even}$ Tangent to x-axis at x_2
n even $a < 0$	as $x \to -\infty$, $f(x) \to -\infty$ as $x \to +\infty$, $f(x) \to -\infty$	Opens down	

Example Sketch the graph of the polynomial function $f(x) = \left(-\frac{1}{5}\right)(x + 3)(x - 1)^3$.

$n = 4$ (even), $a = -\frac{1}{5}$ $(a < 0) \to$ Opens down	
$(x + 3)$ raised to an odd power $\to$ crosses at $x = -3$	
$(x - 1)$ raised to an odd power $\to$ crosses at $x = 1$	

Name ____ Date __________________ Class__________________

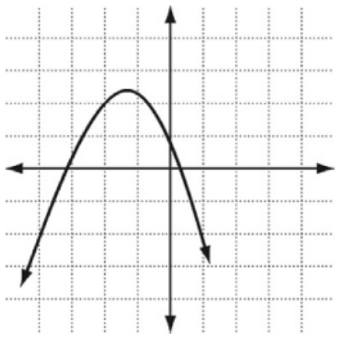
LESSON 5-2

Graphing Polynomial Functions

Practice and Problem Solving: A/B

Identify whether the function graphed has an odd or even degree and a positive or negative leading coefficient.

1\.



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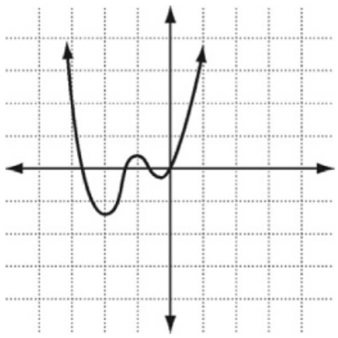
2\.



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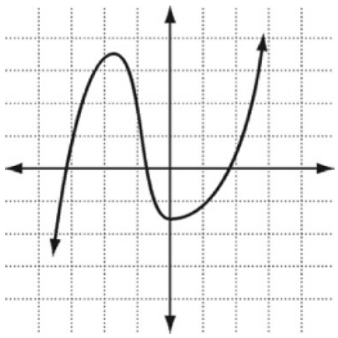
3\.



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Use a graphing calculator to determine the number of turning points and the number and type (global or local) of any maximum or minimum values.

4\. $f(x) = x(x-4)^2$

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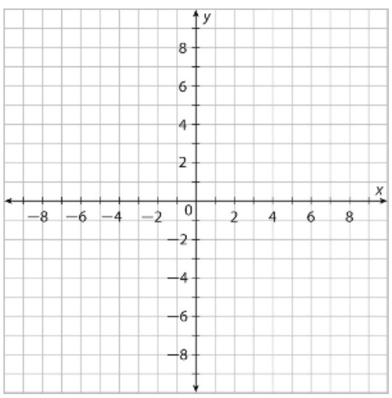
5\. $f(x) = -x^2(x-2)(x+1)$

____

Graph the function. State the end behavior, *x*-intercepts, and intervals where the function is above or below the *x*-axis.

6\. $f(x) = -(x-1)^2(x+3)$



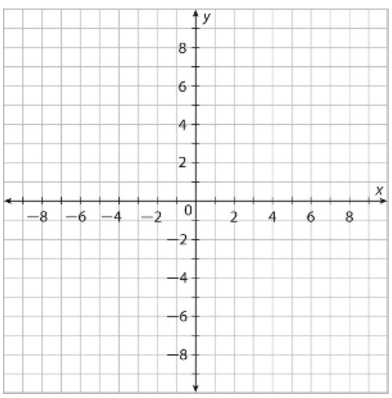
End behavior: _________________________

x-intercepts: _________________________

Above *x*-axis: _________________________

Below *x* axis: _________________________

7\. $f(x) = (x+2)(x-3)(x-1)$



End behavior: _________________________

x-intercepts: _________________________

Above *x*-axis: _________________________

Below *x*-axis: _________________________

Name ______________________ Date ______________ Class______________

LESSON 6-1

Adding and Subtracting Polynomials

Reteach

Example $(-3x^4+2x-x^3-12)+(4+2x^4-x^2+9x)$

1. Write in standard form.	$-3x^4 \quad -x^3 \qquad\quad +2x \quad -12$
2. Align like terms.	$+\ 2x^4 \qquad\quad -x^2 \quad +9x \quad +4$
3. Add.	$-x^4 \quad -x^3 \quad -x^2 \quad +11x \quad -8$

$$(-3x^4+2x-x^3-12)+(4+2x^4-x^2+9x)=-x^4-x^3-x^2+11x-8$$

____

Example $(-x+5x^3+2x^4-10x)-(4x^2-2x-x^4+1)$

1. Write in standard form.	$2x^4 \quad +5x^3 \quad -x^2 \quad -10x$
2. Align like terms and add the opposite.	$+\ x^4 \qquad\quad -4x^2 \quad +2x \quad -1$
3. Add.	$3x^4 \quad +5x^3 \quad -5x^2 \quad -8x \quad -1$

$$(-x+5x^3+2x^4-10x)-(4x^2-2x-x^4+1)=3x^4+5x^3-5x^2-8x-1$$

Name ______________________________ Date _______________ Class_______________

LESSON 6-1

Adding and Subtracting Polynomials

Practice and Problem Solving: A/B

Identify the degree of each monomial.

1. $6x^2$ ________
2. $3p^3m^4$ ________
3. $2x^8y^3$ ________

Rewrite each polynomial in standard form. Then identify the leading coefficient, degree, and number of terms.

4. $6 + 7x - 4x^3 + x^2$

____

5. $x^2 - 3 + 2x^5 + 7x^4 - 12x$

____

Add or subtract. Write your answer in standard form.

6. $(2x^2 - 2x + 6) + (11x^3 - x^2 - 2 + 5x)$ ________
7. $(x^2 - 8) - (3x^3 - 6x - 4 + 9x^2)$ ________
8. $(5x^4 + x^2) + (7 + 9x^2 - 2x^4 + x^3)$ ________
9. $(12x^2 + x) - (6 - 9x^2 + x^7 - 8x)$ ________

Solve.

10. An accountant finds that the gross income, in thousands of dollars, of a small business can be modeled by the polynomial $-0.3t^2 + 8t + 198$, where t is the number of years after 2010. The yearly expenses of the business, in thousands of dollars, can be modeled by the polynomial $-0.2t^2 + 2t + 131$.
    a. Find a polynomial that predicts the net profit of the business after t years.

    ____

    b. Assuming that the models continue to hold, how much net profit can the business expect to make in the year 2016?

    ____

Name ________________________ Date ______________ Class______________

LESSON 6-2

Multiplying Polynomials

Reteach

You can multiply polynomials horizontally or vertically.

Example Find the product by multiplying horizontally. $(x-5)(3x+x^2-7)$

Multiply each term of the first polynomial by each term of the second polynomial, then simplify.

1. Write polynomials in standard form. $(x-5)(x^2+3x-7)$
2. Distribute x and –5. $x(x^2)+x(3x)+x(-7)+(-5)(x^2)+(-5)(3x)+(-5)(-7)$
3. Simplify. $x^3+3x^2-7x-5x^2-15x+35$
4. Combine like terms. $x^3-2x^2-22x+35$

____

Example Find the product by multiplying vertically. $(x-5)(3x+x^2-7)$

1. Write each polynomial in standard form.
2. Multiply –5 and $(3x+x^2-7)$.
3. Multiply x and $(3x+x^2-7)$.
4. Combine like terms.

$$\begin{array}{rrrr} & x^2 & +3x & -7 \\ & & x & -5 \\ \hline & -5x^2 & -15x & +35 \\ x^3 & +3x^2 & -7x & \\ \hline x^3 & -2x^2 & -22x & +35 \end{array}$$

Name ______________________ Date ____________ Class____________

LESSON 6-2

Multiplying Polynomials

Practice and Problem Solving: A/B

Find each product.

1. $4x^2(3x^2+1)$

____

2. $-9x(x^2+2x+4)$

____

3. $-6x^2(x^3+7x^2-4x+3)$

____

4. $x^3(-4x^3+10x^2-7x+2)$

____

5. $-5m^3(7n^4-2mn^3+6)$

____

6. $(x+2)(y^2+2y-12)$

____

7. $(p+q)(4p^2-p-8q^2-q)$

____

8. $(2x^2+xy-y)(y^2+3x)$

____

Expand each expression.

9. $(3x-1)^3$

____

10. $(x-4)^4$

____

11. $3(a-4b)^2$

____

12. $5(x^2-2y)^3$

____

Solve.

13. A biologist has found that the number of branches on a certain rare tree in its first few years of life can be modeled by the polynomial $b(y)=4y^2+y$. The number of leaves on each branch can be modeled by the polynomial $l(y)=2y^3+3y^2+y$, where y is the number of years after the tree reaches a height of 6 feet. Write a polynomial describing the total number of leaves on the tree.

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Name ________________________ Date ______________ Class ______________

LESSON 6-4

Factoring Polynomials

Reteach

Factoring a sum of two cubes: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

Example Factor $125a^3 + 8$.

$125x^3 + 8$

Recognize the sum of two cubes. $(5x)^3 + (2)^3$

Factor using factoring pattern. $(5x + 2)\left((5x)^2 - (5x)(2) + (2)^2\right)$

Simplify. $(5x + 2)(25x^2 - 10x + 4)$

Factoring a difference of two cubes: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

Example Factor $27a^3 - 64$.

$27a^3 - 64$

Recognize the difference of two cubes. $(3a)^3 - (4)^3$

Factor using factoring pattern. $(3a - 4)\left((3a)^2 + (3a)(4) + (4)^2\right)$

Simplify. $(3a - 4)(9a^2 + 12a + 16)$

Name ______________________ Date ______________ Class ______________

LESSON 6-4

Factoring Polynomials

Practice and Problem Solving: A/B

Simplify each polynomial, if possible. Then factor it.

1. $3n^2 - 48$ ________________________

2. $3x^3 - 75x$ ________________________

3. $9m^4 - 16$ ________________________

4. $16r^4 - 9$ ________________________

5. $3n^6 - 12$ ________________________

6. $x^6 - 9$ ________________________

7. $3b^7 + 12b^4 + 12b$ ________________________

8. $50v^6 + 60v^3 + 18$ ________________________

9. $x^3 - 64$ ________________________

10. $x^3 - 125$ ________________________

11. $x^6 - 64$ ________________________

12. $x^6 - 1$ ________________________

Factor each polynomial by grouping.

13. $8n^3 - 7n^2 + 56n - 49$ ________________________

14. $5x^3 - 6x^2 - 15x + 18$ ________________________

15. $9r^3 + 3r^2 - 21r - 7$ ________________________

16. $25v^3 + 25v^2 - 15v - 15$ ________________________

17. $120b^3 + 105b^2 + 200b + 175$ ________________________

18. $120x^3 - 80x^2 - 168x + 112$ ________________________

Solve.

19. A square concert stage in the center of a fairground has an area of $4x^2 + 12x + 9$ ft^2. The dimensions of the stage have the form $cx + d$, where c and d are whole numbers. Find an expression for the perimeter of the stage. What is the perimeter when $x = 2$ ft?

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