

## 5.1-5.3 Test Review

### Chapter 5

#### Lesson 5-1

Target: I can write each polynomial in standard form, classify it by degree, and classify it by number of terms.

1.  $a^2 + 4a - 5a^2 - a$

Standard form:  $-4a^2 + 3a$

Classification by degree: quadratic

Classification by terms: binomial

2.  $3x - \frac{1}{3} - 5x$

Standard form:  $-2x - \frac{1}{3}$

Classification by degree: linear

Classification by terms: binomial

3.  $3n^2 + n^3 - n - 3 - 3n^3$

Standard form:  $-2n^3 + 3n^2 - n - 3$

Classification by degree: cubic

Classification by terms: polynomial of 4 terms

6.  $3x^2 - 5x - x^2 + x + 4x + 4x^4 + 6$

Standard form:  $4x^4 + 2x^2 + 6$

Classification by degree: quartic

Classification by terms: trinomial

Target: I can determine the end behavior and intervals and increasing/decreasing of the graph of each polynomial function. Then State the relative max and min value.

Target: I can find the relative maximum and minimum of the graph and where each occurs.

7.  $y = x^2 - 2x + 3$

end behavior: up & up

increase:  $(1, \infty)$

decrease:  $(-\infty, 1)$

relative min:  $(1, 2)$

relative max: none

8.  $y = -x^3 - 2x$

end behavior: up & down

increase: none

decrease:  $(-\infty, \infty)$

relative min: none

relative max: none

9.  $y = 7x^5 + 3x^3 - 2x$

end behavior: down & up

increase:  $(-\infty, -0.38)$   $(0.38, \infty)$

decrease:  $(-0.38, 0.38)$

relative min:  $(-0.38, 0.54)$

relative max:  $(0.38, -0.54)$

11.  $y = -5x^4 + 12x^2$

end behavior: down & down

increase:  $(-\infty, -1.10)$   $(0, 1.10)$

decrease:  $(-1.10, 0)$   $(1.10, \infty)$

relative min:  $(0, 0)$

relative max:  $(-1.10, 7.2)$   $(1.10, 7.2)$

## Lesson 5-2

Target: I can write each polynomial in factored form and check by multiplication.

14.  $x^4 + x^2 - 72$

$$(x^2 + 9)(x^2 - 8)$$

$$x^4 - 8x^2 + 9x^2 - 72$$

$$x^4 + x^2 - 72 \checkmark$$

15.  $5x^3 + 3x^2 - 50x - 30$

$$x^2(5x+3) - 10(5x+3)$$

$$(x^2 - 10)(5x+3)$$

$$\text{OR } (x - \sqrt{10})(x + \sqrt{10})(5x+3)$$

$$5x^3 + 3x^2 - 50x - 30 \checkmark$$

Target: I can write a polynomial function in standard form with the given zeros or graph.

16.  $x = 3, 2, -1$

$$y = (x-3)(x-2)(x+1)$$

$$y = (x^2 - 5x + 6)(x+1)$$

$$y = x^3 - 5x^2 + 6x + x^2 - 5x + 6$$

$$y = x^3 - 4x^2 + x + 6$$

17.  $x = 1, 1, 2$

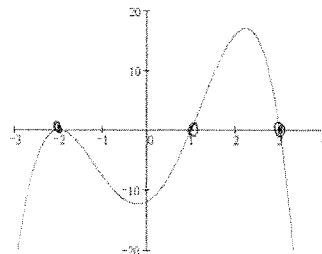
$$y = (x-1)^2(x-2)$$

$$y = (x^2 - 2x + 1)(x-2)$$

$$y = x^3 - 2x^2 + x - 2x^2 + 4x - 2$$

$$y = x^3 - 4x^2 + 5x - 2$$

18.



$$y = (x+2)(x-1)(x-3)$$

$$y = (x^2 + x - 2)(x-3)$$

$$y = x^3 + x^2 - 2x - 3x^2 - 3x + 6$$

$$y = x^3 - 2x^2 - 5x + 6$$

Target: I can graph a polynomial function by using the end behaviors, finding the zeros, using the multiplicity of each zero.

For behavior at the zero say "cross" or "bounce." (You may have to factor first!)

19.  $y = x(x-8)(x-9)^{x^3}$

\* end behavior: down & up

Zeros: 0 8 9

Multiplicity: 1 1 1

Behavior @ zeros CROSS CROSS CROSS

21.  $y = x^4 - 25x^2$

$$x^2(x^2 - 25)$$

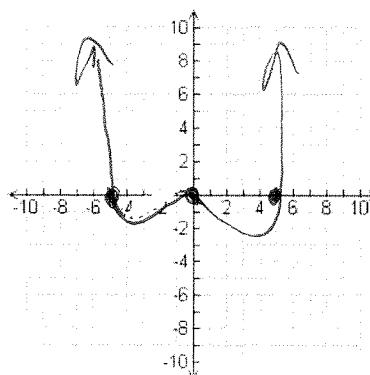
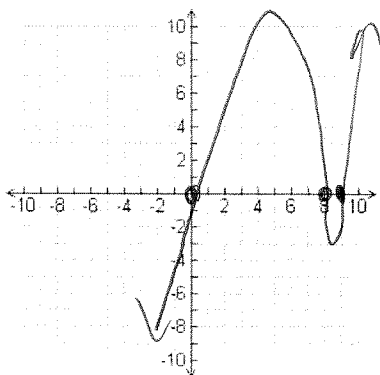
$$x^2(x-5)(x+5)$$

end behavior: up & up

Zeros: 0 5 -5

Multiplicity: 2 1 1

Behavior @ zeros bounce CROSS CROSS



23. The volume in cubic feet of a storage box can be expressed as  $y = 6x^3 - 47x^2 + 77x$ , where  $x$  is the height of the box in feet. A.) Factor the polynomial for all three dimensions. B.) What are the zeros of the volume function? C.) What do these zeros represent? D.) What is the maximum volume of the storage box?

A.)  $x(6x^2 - 47x + 77)$   
 $x(3x - 7)(2x - 11)$   
 height      length      width

B)  $0, 7/3, 11/2$

C) When the volume is 0

D)  $36 \text{ ft}^3$

### Lesson 5-3

Target: I can find the real or imaginary solutions of each equation by factoring and using formulas.

24.  $t^3 - 3t^2 - 10t = 0$

$t(t^2 - 3t - 10) = 0$

$t(t - 5)(t + 2) = 0$

0	5	-2
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25.  $t^3 - 6t^2 + 2t = 12$

$(t^3 - 6t^2) + (2t - 12) = 0$

$t^2(t - 6) + 2(t - 6) = 0$

$(t^2 + 2)(t - 6) = 0$

$t^2 = -2$   
 $t = \pm\sqrt{-2}$   
 $t = \pm i\sqrt{2}$

6

$\pm i\sqrt{2}, 6$

26.  $9 = 4x^2 - 16$

$4x^2 - 25 = 0$

$(2x - 5)(2x + 5) = 0$

$5/2$	$-5/2$
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27.  $x^4 - 36 + 5x^2 = 0$

$x^4 + 5x^2 - 36 = 0$

$(x^2 + 9)(x^2 - 4) = 0$

$(x^2 + 9)(x - 2)(x + 2) = 0$

$\sqrt{x^2 - 9}$		
$x = \pm 3i$	2	-2

28.  $8x^3 = 125$

$8x^3 - 125 = 0$

$(2x - 5)(4x^2 + 10x + 25) = 0$

$5/2$   
 $\pm 5 \pm 5i\sqrt{3}$   
 4

$a = 4$   $b = 10$   $c = 25$

$x = \frac{-10 \pm \sqrt{100 - 4(4)(25)}}{2(4)}$

$x = \frac{-10 \pm \sqrt{-300}}{8} = \frac{-10 \pm 10i\sqrt{3}}{8}$

29.  $-x^4 = -64$

$x^4 - 64 = 0$

$(x^2 - 8)(x^2 + 8) = 0$

$\sqrt{x^2 - 8}$	$\sqrt{x^2 + 8}$
$x = \pm 2\sqrt{2}$	$x = \pm 2i\sqrt{2}$

Target: I can find the real solutions to each equation by graphing

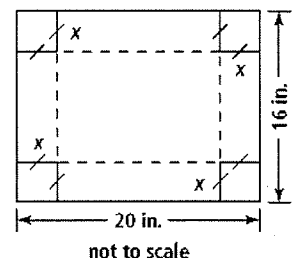
30.  $4m^3 + m^2 - m + 5 = 0$

$-1.25$

31. Tonya wants to make a metal tray by cutting four identical square corner pieces from a rectangular metal sheet. Then she will bend the sides up to make an open tray.

- a. Let the length of each side of the removed squares be  $x$  in. Express the volume of the box as a polynomial function of  $x$  (in factored form).

$y = x(20 - 2x)(16 - 2x)$



- b. Find the dimensions of a tray that would have a  $384\text{-in.}^3$  capacity.

$(2, 384)$   
 $(4, 384)$

$384 = x(20 - 2x)(16 - 2x)$   
 $2 \text{ in} \times 16 \text{ in} \times 12 \text{ in} \quad \& \quad 4 \text{ in} \times 12 \text{ in} \times 8 \text{ in}$

