Chapter 7 Study Guide Name: Key 2017-2018

This test covers the following success criteria. Before completing the study guide, go through and rate each sentence below using an arrow (↑ - if you know you can do it, → if you feel like you get the general idea but need more work to understand it well and ↓ if you are still feeling confused and need to do a substantial amount of work to understand the concept). After completing the study guide and going through it in class, repeat this task. Then this weekend go back and study in depth the areas with arrows that aren't pointing up.

I can write a polynomial in standard form. Before _____ After _____

I can classify polynomials by degree and number of terms. Before _____ After _____

I can add, subtract, and multiply polynomials. Before _____ After _____

I can factor polynomials. Before _____ After _____

I can solve polynomial equations. Before _____ After _____

I can use my understanding of polynomials to create mathematical models.

Before _____ After _____

Write the polynomial in standard form. Identify the degree and leading coefficient of the polynomial. Then classify the polynomial by the number of terms.

1. $5 + x^2 - 7x$

$x^2 - 7x + 5$ Trinomial in standard form

Deg: 2

Leading coef.: 1

2. $-7v^4$ Monomial

Deg: 4

Leading coef.: -7

3. $5z^6 - 1.5z^7 + z$ Trinomial

$-1.5z^7 + 5z^6 + z$

Deg: 7

Leading Coef.: -1.5

4. $-\frac{1}{2}a^4 + \frac{2}{3}a^5$ Binomial

$\frac{2}{3}a^5 - \frac{1}{2}a^4$

Deg.: 5

Leading coef.: $\frac{2}{3}$

Find the sum or difference. Make sure your answer is in standard form.

5. $(2b^3 - 5b) - (7b + 3b^2)$

$2b^3 + 0b^2 - 5b$

$+ \quad 0b^3 - 3b^2 - 7b$

$2b^3 - 3b^2 - 12b$

Find the sum or difference. Make sure your answer is in standard form.

6. $(-5x^2 - 2) + (3x^2 + 7)$

$$\begin{array}{r} -5x^2 - 2 \\ +\ 3x^2 + 7 \\ \hline -2x^2 + 5 \end{array}$$

7. $(-x + 3) + (-11x^2 - 8 + 12x)$

$$\begin{array}{r} 0x^2 - x + 3 \\ +\ -11x^2 + 12x - 8 \\ \hline -11x^2 + 11x - 5 \end{array}$$

8. $(y^2 + 4 - 2y^3) - (3y^2 - 7y + 4y^3)$

$$\begin{array}{r} -2y^3 + y^2 + 0y + 4 \\ +\ -4y^3 - 3y^2 + 7y + 0 \\ \hline -6y^3 - 2y^2 + 7y + 4 \end{array}$$

Find the product.

9. $(x-6)(x+3) = x^2 + 3x - 6x - 18 = x^2 - 3x - 18$

10. $(2x-3)(3x+5) = 6x^2 + 10x - 9x - 15$

$= 6x^2 + x - 15$

11. $(7x+1)^2 = (7x+1)(7x+1) = 49x^2 + 7x + 7x + 1$

$= 49x^2 + 14x + 1$

12. $(x-2)(x+2) = x^2 + 2x - 2x - 4$

$= x^2 - 4$

13. $(4x^2 - x - 9)(3x + 1)$

	$4x^2$	$-x$	-9
$3x$	$12x^3$	$-3x^2$	$-27x$
1	$4x^2$	$-x$	-9

$= 12x^3 + x^2 - 28x - 9$

Factor the polynomial completely.

14. $a^2 + 10a + 16$

$(a+2)(a+8)$

$a = 1 \quad b = 10 \quad c = 16$

$2 \cdot 8 = 16$

$2 + 8 = 10$

15. $5y^2 - 20$

$5(y^2 - 4)$

$5(y-2)(y+2)$

Special pattern

$\sqrt{y^2} = y \qquad \sqrt{4} = 2$

or $y^2 - 4$

$a = 1 \quad b = 0 \quad c = -4$

$-2 \cdot 2 = -4$

$-2 + 2 = 0$

16. $4s^2 - 1$

$(2s-1)(2s+1)$

Special pattern

$\sqrt{4s^2} = 2s \qquad \sqrt{1} = 1$

or $a = 4 \quad b = 0 \quad c = -1$

$2 \cdot -2 = -4$

$2 + -2 = 0$

	$2s$	1
$2s$	$4s^2$	$2s$
-1	$-2s$	-1

17. $3b^3 - 13b^2 + 10b$

$b(3b^2 - 13b + 10)$

$b(b-1)(3b-10)$

$a = 3 \quad b = -13 \quad c = 10$

$-10 \cdot -3 = 30$

$-10 + -3 = -13$

	$3b$	-10
b	$3b^2$	$-10b$
-1	$-3b$	$+10$

18. $10x^3 - 12x^2 + 5x - 6$

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

	$5x$	-6
$2x^2$	$10x^3$	$-12x^2$
1	$5x$	-6

Check: $2x^2 + 1$

$a = 2 \quad b = 0 \quad c = 1$

$\_ \cdot \_ = 2$

$\_ + \_ = 0$

Nothing works.

19. $16t^2 - 24t + 9$

$(4t-3)^2$

Special pattern?

$\sqrt{16t^2} = 4t \qquad \sqrt{9} = 3$

$2(4t \cdot 3) = 2(12t)$

$= 24t$ ✓

or $a = 16 \quad b = -24 \quad c = 9$

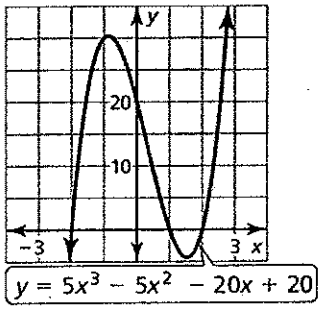
$-12 \cdot -12 = 144$

$-12 + -12 = -24$

	$4t$	-3
$4t$	$16t^2$	$-12t$
-3	$-12t$	9

Find the x-coordinates of the points where the graph crosses the x-axis

20.



$0 = 5x^3 - 5x^2 - 20x + 20$

$0 = 5(x^3 - x^2 - 4x + 4)$

$0 = 5(x-1)(x^2-4)$

$0 = 5(x-1)(x-2)(x+2)$

$x-1=0 \quad x-2=0 \quad x+2=0$

$x=1$ or $x=2$ or $x=-2$

	x	-1
x^2	x^3	$-x^2$
-4	$-4x$	4

x^2-4

$a=1 \quad b=0 \quad c=-4$

$2 \cdot -2 = -4$

$2 + -2 = 0$

Solve the equation.

21. $(x-2)(3x-1)=0$

$x-2=0$ or $3x-1=0$

$x=2$ or $3x=1$

$x=\frac{1}{3}$

22. $20m^2 - 40m = 0$

$20m(m-2)=0$

$20m=0 \quad m-2=0$

$m=0 \quad m=2$

23. $4r^2 + 13r + 3 = 0$ $\quad a=4 \quad b=13 \quad c=3$

$(4r+1)(r+3)=0$ $\quad 1 \cdot 12 = 12$

$4r+1=0 \quad r+3=0$ $\quad 1 + 12 = 13$

$4r=-1 \quad r=-3$

$r=-\frac{1}{4}$

	$4r$	1
r	$4r^2$	r
3	$12r$	3

24. $b^3 + 20 = 5b^2 + 4b$

$b^3 - 5b^2 - 4b + 20 = 0$

$(b-5)(b^2-4)=0$

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

$b-5=0 \quad b-2=0 \quad b+2=0$

$b=5$ or $b=2$ or $b=-2$

	b	-5
b^2	b^3	$-5b^2$
-4	$-4b$	20

Check b^2-4

$a=1 \quad b=0 \quad c=-4$

$2 \cdot -2 = -4$

$2 + -2 = 0$

25. Write a polynomial that has two negative roots and one positive root. Many, many answers possible.

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

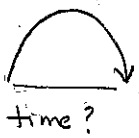
$= (x^2+3x+2)(x-3)$

$= x^3 + 3x^2 + 2x - 3x^2 - 9x - 6$

$= x^3 - 7x - 6$ ← one example

26. You are jumping on a trampoline. For one jump, your height y (in feet) above the trampoline after t seconds can be represented by $y = -16t^2 + 24t$.

How many seconds are you in the air? Show how you determined your answer and give your solution in a sentence.



$y = 0$ when on the trampoline

$0 = -16t^2 + 24t$

$0 = -8t(2t - 3)$

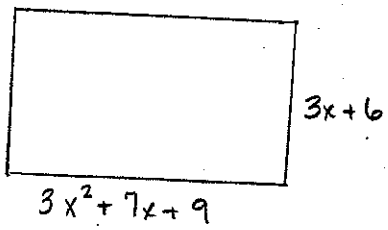
$-8t = 0$ $\quad$ $2t - 3 = 0$

$t = 0$ $\quad$ $2t = 3$

when you jump $\quad$ $t = \frac{3}{2} = 1.5$ when you land

You are in the air for $1\frac{1}{2}$ seconds.

27. The length of a rectangle in terms of x is $3x^2 + 7x + 9$ and its width is $3x + 6$. Draw a picture to represent this situation.



a. Write a polynomial that represents the perimeter of the rectangle.

$P = 2(l) + 2(w)$

$P = 2(3x^2 + 7x + 9) + 2(3x + 6)$

$P = 6x^2 + 14x + 18 + 6x + 12$

$P = 6x^2 + 20x + 30$

b. What is the perimeter when $x = 5$ feet? (Sentence needed)

$P(5) = 6(5)^2 + 20(5) + 30$

$= 150 + 100 + 30$

$= 280$

The perimeter of the rectangle is 280 feet when $x = 5$ feet.

c. Wrtie a polynomial that represents the area of the rectangle.

$A = lw$

$A = (3x^2 + 7x + 9)(3x + 6)$

$A = 9x^3 + 21x^2 + 27x + 18x^2 + 42x + 54$

$A = 9x^3 + 39x^2 + 69x + 54$

d. What is the area if $x = 2$ ft? (Sentence needed)

$A(2) = 9(2)^3 + 39(2)^2 + 69(2) + 54$

$A(2) = 72 + 156 + 138 + 54$

$A(2) = 420$

The area of the rectangle is $420\ ft^2$ if $x = 2$.