

Name: \_\_\_\_\_  
Date: Key  
Period: \_\_\_\_\_

**Polynomials and Quadratics Study Guide**

Rewrite each polynomial in Standard form. Then name each polynomial by degree and number of terms

1.  ~~$5x^3 + 2x^2 - 3x^2 + 4x + 5x^3 - 16$~~

$$10x^3 - 1x^2 + 4x - 16$$

Cubic

4 terms

2.  ~~$3x - 6 + 5x^2 + 2x - 12 - 2x^2$~~

$$3x^2 + 5x - 18$$

Quadratic

Trinomial

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

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

Quartic

4 terms

4.  ~~$3x - 5 + 2x + 3 - 10x + 12$~~

$$-5x + 10$$

Linear

Binomial

Perform the indicated operation and write the result in Standard Form.

5.  $(3x^2 + 2x - 5) + (2x^2 - 7x + 9)$

$$5x^2 - 5x + 4$$

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

$$\cancel{2x^3} + \underline{3x} - 6 - \cancel{2x^3} - \cancel{3x^2} + \underline{6x} - 7$$

$$-3x^2 + 9x - 13$$

7.  $(2x + 3x^4 - 4x^3 + 6x^2 - 10) + (2x^2 - 4x + 6)$

$$3x^4 - 4x^3 + 8x^2 - 2x - 4$$

8.  $(4x^3 - 2x + 4) - (3x^3 - 4x^2 + 6x - 2)$

$$\underline{4x^3} - \underline{2x} + 4 - \underline{3x^3} + \underline{4x^2} - \underline{6x} + 2$$

$$x^3 + 4x^2 - 8x + 6$$

Perform the indicated operation and write the result in Standard Form.

9.  $(x+4)(x-1)$

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

10.  $(x-5)^2$

$$(x-5)(x-5)$$

$$x^2 - 5x - 5x + 25 = x^2 - 10x + 25$$

11.  $2x(3x^2 - 2x)(2x - 3)$

$$(6x^3 - 4x^2)(2x - 3)$$

$$12x^4 - 18x^3 - 8x^3 + 12x^2$$

$$12x^4 - 26x^3 + 12x^2$$

12.  $(x^2 - 3x + 2)(3x^2 + 2x - 2)$

$$3x^4 + 2x^3 - 2x^2 - 9x^3 - 6x^2 + 6x + 6x^2 + 4x - 4$$

$$3x^4 - 7x^3 - 2x^2 + 10x - 4$$

13.  $(3x^2 - x + 2)(2x^2 + 5x - 6)$

$$6x^4 + 15x^3 - 18x^2 - 2x^3 - 5x^2 + 6x + 4x^2 + 10x - 12$$

$$6x^4 + 13x^3 - 14x^2 + 16x - 12$$

Solve each equation using the zero product property

14.  $(x-2)(x-6)=0$

$$\begin{array}{r} x-2=0 \\ +2 \quad +2 \\ \hline x=2 \end{array} \qquad \begin{array}{r} x-6=0 \\ +6 \quad +6 \\ \hline x=6 \end{array}$$

15.  $(y+2)(y-5)=0$

$$\begin{array}{r} y+2=0 \\ -2 \quad -2 \\ \hline y=-2 \end{array} \qquad \begin{array}{r} y-5=0 \\ +5 \quad +5 \\ \hline y=5 \end{array}$$

16.  $a(a+5)=0$

$$\boxed{a=0} \qquad \begin{array}{r} a+5=0 \\ -5 \quad -5 \\ \hline a=-5 \end{array}$$

Solve each equation using square roots

17.  $x^2=36$

$$\boxed{x = \pm 6}$$

$$\sqrt{(x-12)^2} = \sqrt{225}$$

$$\begin{array}{r} x-12 = \pm 15 \\ +12 \quad +12 \\ \hline x = 12 \pm 15 \end{array}$$

18.  $9x^2=81$

$$\begin{array}{r} \sqrt{9x^2} = \sqrt{81} \\ \hline \sqrt{x^2} = \sqrt{9} \end{array} \qquad \boxed{x = \pm 3}$$

$$x = 12 \pm 15$$

19.  $25x^2 - 125 = 0$

$$\begin{array}{r} +125 \quad +125 \\ \hline 25x^2 = 125 \\ \hline \sqrt{25x^2} = \sqrt{125} \\ \hline \sqrt{x^2} = \sqrt{5} \end{array}$$

$$\boxed{x = \pm \sqrt{5}}$$

$$x = 12 + 15 \quad x = 12 - 15$$

$$\boxed{x = 27 \quad x = -3}$$

Solve each equation by factoring

20.  $x^2 - 10x + 21 = 0$

$$(x - 7)(x - 3) = 0$$

$$\begin{array}{r} x - 7 = 0 \\ +7 \quad +7 \end{array}$$

$$\begin{array}{r} x - 3 = 0 \\ +3 \quad +3 \end{array}$$

$$\boxed{x = 7 \quad x = 3}$$

21.  $\frac{2g^2}{2} - \frac{8g}{2} - \frac{10}{2} = 0$

$$g^2 - 4g - 5 = 0$$

$$(g + 1)(g - 5) = 0$$

$$\begin{array}{r} g + 1 = 0 \\ -1 \quad -1 \end{array}$$

$$\begin{array}{r} g - 5 = 0 \\ +5 \quad +5 \end{array}$$

$$\boxed{g = -1 \quad g = 5}$$

22.  $a^2 + 6a = 16$

$$\begin{array}{r} -16 \quad -16 \end{array}$$

$$a^2 + 6a - 16 = 0$$

$$(a + 8)(a - 2) = 0$$

$$\begin{array}{r} a + 8 = 0 \\ -8 \quad -8 \end{array}$$

$$\begin{array}{r} a - 2 = 0 \\ +2 \quad +2 \end{array}$$

$$\boxed{a = -8 \quad a = 2}$$

23.  $2y^2 = 6y + 56$

$$\begin{array}{r} -6y \quad -6y \quad -56 \\ -56 \end{array}$$

$$\frac{2y^2}{2} - \frac{6y}{2} - \frac{56}{2} = 0$$

$$y^2 - 3y - 28 = 0$$

$$(y - 7)(y + 4) = 0$$

$$\begin{array}{r} y - 7 = 0 \\ +7 \quad +7 \end{array} \quad \begin{array}{r} y + 4 = 0 \\ -4 \quad -4 \end{array}$$

$$\boxed{y = 7 \quad y = -4}$$

Solve each equation using the quadratic formula

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

24.  $2x^2 + 3x - 20 = 0$

$a = 2$     $b = 3$     $c = -20$

$$\begin{aligned} X &= \frac{-3 \pm \sqrt{3^2 - 4(2)(-20)}}{2(2)} \\ &= \frac{-3 \pm \sqrt{9 + 160}}{4} \\ &= \frac{-3 \pm \sqrt{169}}{4} = \frac{-3 \pm 13}{4} \end{aligned}$$

$$X = \frac{-3 + 13}{4} = \frac{10}{4} \quad X = \frac{-3 - 13}{4} = \frac{-16}{4}$$

$X = \frac{5}{2}$     $X = -4$

25.  $4x^2 + 10x + 2 = 0$

$a = 4$     $b = 10$     $c = 2$

$$X = \frac{-10 \pm \sqrt{10^2 - 4(4)(2)}}{2(4)}$$

$$= \frac{-10 \pm \sqrt{100 - 32}}{8}$$

$$= \frac{-10 \pm \sqrt{68}}{8}$$

$$= \frac{-10 \pm 2\sqrt{17}}{8} = \frac{-5 \pm \sqrt{17}}{4}$$

