

Name \_\_\_\_\_

**Add or Subtract. Write the polynomial in standard form. Identify the leading coefficient, degree, and number of terms. Name the polynomial**

1)  $(2x^4 - 6x^2 + 8) - (-5x^4 + 2x^2 - 12)$

Standard Form:  $7x^4 - 8x^2 + 20$

Leading Coefficient: 7

Degree: 4

Number of Terms: 3

Name: quartic trinomial

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

Standard Form:  $5x^2 - 3$

Leading Coefficient: 5

Degree: 2

Number of Terms: 2

Name: quadratic binomial

**Identify the degree of the following monomials:**

3)  $2x^4y^2$  6

4) 9 0

5)  $x^8$  8

**Multiply the following polynomials.**

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

$(-2x^4 + 6x^3)(4x+1)$

$-8x^5 - 2x^4 + 24x^4 + 6x^3$

$-8x^5 + 22x^4 + 6x^3$

**Expand the expressions.**

7)  $2(x-1)^5$

1	$x^5$	$x^0 = x^5$
5	$x^4$	$1^1 = 5x^4$
10	$x^3$	$1^2 = 10x^3$
10	$x^2$	$1^3 = -10x^2$
5	$x^1$	$1^4 = 5x$
1	$x^0$	$1^5 = -1$

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

$2x^5 - 10x^4 + 20x^3 - 20x^2 + 10x - 2$

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

$x^2 + 3x + 4$

$x^2$	$x^4$	$3x^3$	$4x^2$
$x$	$x^3$	$3x^2$	$4x$
$-6$	$-6x^2$	$-18x$	$-24$

$x^4 + 4x^3 + x^2 - 14x - 24$

8)  $(x+y)^3$

1	$x^3$	$y^0 = x^3$
3	$x^2$	$y^1 = 3x^2y$
3	$x^1$	$y^2 = 3xy^2$
1	$x^0$	$y^3 = y^3$

$x^3 + 3x^2y + 3xy^2 + y^3$

Name \_\_\_\_\_

Advanced Algebra  
Complex Numbers & 3.1-3.4 Review

Divide the following polynomials by long division.

9)  $(3x^3 + 9x^2 - 14) \div (x + 2)$

$$\begin{array}{r} 3x^2 + 3x - 6 \\ x+2 \overline{) 3x^3 + 9x^2 + 0x - 14} \\ \underline{-3x^3 + 6x^2} \phantom{-14} \\ 3x^2 + 0x \phantom{-14} \\ \underline{-3x^2 + 6x} \phantom{-14} \\ -6x - 14 \\ \underline{+6x + 12} \\ -2 \end{array}$$

$$3x^2 + 3x - 6 + \frac{-2}{x+2}$$

10)  $(15x^3 - 16x^2 + x - 2) \div (x - 2)$

$$\begin{array}{r} 15x^2 + 14x + 29 \\ x-2 \overline{) 15x^3 - 16x^2 + x - 2} \\ \underline{-15x^3 + 30x^2} \phantom{-2} \\ 14x^2 + x \phantom{-2} \\ \underline{-14x^2 + 28x} \\ 29x - 2 \\ \underline{-29x + 48} \\ 46 \end{array}$$

$$15x^2 + 14x + 29 + \frac{46}{x-2}$$

Simplify Each of the Following:

11)  $-\sqrt{-45} < 9 < \left(\frac{3}{3}\right)$

$$-3i\sqrt{5}$$

12)  $\frac{8+2i}{5+i} \cdot \frac{5-i}{5-i}$

$$\frac{40 - 8i + 10i + 2i^2}{25 - 5i + 5i - i^2} = \frac{42 + 2i}{26} = \frac{21+i}{13}$$

13)  $4i(2 - 6i)^2$   
 $4i(2 - 6i)(2 - 6i)$   
 $4i(4 - 12i - 12i + 36i^2)$   
 $4i(-32 - 24i)$   
 $-128i + 96i^2$   
 $96 - 128i$

14)  $6i^{65} + 9i^9 - 10i^{19}$   
 $6(i) + 9(i) - 10(-i)$   
 $6i + 9i + 10i$   
 $25i$

15)  $4(8 + 6i) - 2(12 + i)$   
 $32 + 24i - 24 - 2i$   
 $8 + 22i$

16)  $\frac{3+4i}{2i} \cdot \frac{-2i}{-2i}$   
 $\frac{-6i + 8i^2}{\pm 4i}$   
 $\frac{8 - 6i}{4} = \frac{4 - 3i}{2}$

17)  $\sqrt{\frac{-24}{36}} < \frac{2}{3}$   
 $\frac{2i\sqrt{6}}{6} = \frac{i\sqrt{6}}{3}$

18)  $i^{100} + 8i^{42}$   
 $1 + 8(-1)$   
 $1 - 8 = -7$