

Algebra 2 Unit D Review

Perform the indicated operation

1. $(5x^3 - x + 3) + (x^3 - 9x^2 + 4x)$

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

3. $(x - 6)(5x^2 + x - 8)$

$$5x^3 + x^2 - 8x - 30x^2 - 6x + 48$$

$$= \boxed{5x^3 - 29x^2 - 14x + 48}$$

Solve the following polynomial equations.

5. $x^3 + 5x^2 - 9x - 45 = 0$

$$x^2(x+5) - 9(x+5)$$

$$(x+5)(x^2-9)$$

$$(x+5)(x+3)(x-3) = 0$$

$$\boxed{x = -5, -3, 3}$$

7. $-28x^4 + 7x^2 = 0$

$$-7x^2(4x^2 - 1) = 0$$

$$-7x^2(2x+1)(2x-1) = 0$$

$$\boxed{x = 0}$$

$$\boxed{x = -\frac{1}{2}, \frac{1}{2}}$$

9. $3x^3 - 5x^2 - 3x + 5 = 0$

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

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

$$(x+1)(x-1)(3x-5) = 0$$

$$\boxed{x = -1, 1, \frac{5}{3}}$$

Name: Key

Date: _____

2. $(x^3 + 4x^2 - 5x) - (4x^3 + x^2 - 7)$

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

4. $(x - 4)(x + 7)(5x - 1)$

$$(x^2 + 3x - 28)(5x - 1)$$

$$= 5x^3 + 15x^2 - 140x - x^2 - 3x + 28$$

$$= \boxed{5x^3 + 14x^2 - 143x + 28}$$

6. $3x^4 + 12x^2 = 96$

$$3(x^4 + 4x^2 - 32) = 0$$

$$3(x^2 + 8)(x^2 - 4) = 0$$

$$x^2 + 8 = 0$$

$$x = \pm i\sqrt{8}$$

$$= \pm 2i\sqrt{2}$$

$$(x+2)(x-2)$$

$$\boxed{x = -2, 2}$$

8. $12x^2 = 108$

$$x^2 = 9$$

$$\boxed{x = \pm 3}$$

10. $x^3 - 3x^2 - 4x + 12 = 0$

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

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

$$(x+2)(x-2)(x-3) = 0$$

$$\boxed{x = -2, 2, 3}$$

Divide the following polynomials.

11. $(2x^3 - 11x^2 + 13x - 44) \div (x - 5)$

$$\begin{array}{r|rrrr} 5 & 2 & -11 & 13 & -44 \\ & & 10 & -5 & 40 \\ \hline & 2 & -1 & 8 & -4 \end{array}$$

$$2x^2 - x + 8 - \frac{4}{x-5}$$

12. $(5x^4 + 2x^2 - 15x + 10) \div (x + 2)$

$$\begin{array}{r|rrrrr} -2 & 5 & 0 & 2 & -15 & 10 \\ & & -10 & 20 & -44 & 118 \\ \hline & 5 & -10 & 22 & -59 & 128 \end{array}$$

$$5x^3 - 10x^2 + 22x - 59 + \frac{128}{x+2}$$

13. Given that $x = -2$ is a solution to the polynomial, find all remaining solutions of $f(x) = x^3 - 5x^2 - 2x + 24$

$$\begin{array}{r|rrrr} -2 & 1 & -5 & -2 & 24 \\ & & -2 & 14 & -24 \\ \hline & 1 & -7 & 12 & 0 \end{array}$$

$$x = 3, 4$$

$$x^2 - 7x + 12$$

$$(x-3)(x-4) = 0$$

14. Given $f(8) = 0$, find all remaining real solutions of $f(x) = x^3 - 11x^2 + 14x + 80$

$$\begin{array}{r|rrrr} 8 & 1 & -11 & 14 & 80 \\ & & 8 & -24 & -80 \\ \hline & 1 & -3 & -10 & 0 \end{array}$$

$$x = -2, 5$$

$$x^2 - 3x - 10$$

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

15. For parts (a) and (b), use the figure to the right.

a. write an expression for the perimeter of the figure.

$$2(4x-7) + 3x + (2x-1) + (x+1)$$

$$8x - 14 + 3x + 3x$$

$$14x - 14$$

b. Write an expression for the area of the figure.

$$3x(3x+7) = (9x^2 + 21x)$$

$$(x-14)(x+1) = (x^2 - 13x - 14)$$

$$10x^2 + 8x - 14$$

