2.3 Factor Theorem Worksheet

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1) Determine if $x + 3$ is a factor of each polynomial:

a) $x^3 + x^2 - x + 6$

b) $2x^3 + 9x^2 + 10x + 3$

c) $x^3 + 27$

2) Find possible factors of the following polynomials using the integral zero theorem. Then, factor the polynomial.

a) $x^3 + 3x^2 - 6x - 8$

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b) $x^3 + 4x^2 - 15x - 18$

c) $x^3 - 3x^2 - 10x + 24$

3) Factor by grouping:

a) $x^3 + x^2 - 9x - 9$

b) $2x^3 - x^2 - 72x + 36$

4) Determine a value of k so that $x + 2$ is a factor of $x^3 - 2kx^2 + 6x - 4$.

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5) Find possible factors of the following polynomials using the integral zero theorem. Then, factor the polynomial.

a) $3x^3 + x^2 - 22x - 24$

b) $2x^3 - 9x^2 + 10x - 3$

c) $6x^3 - 11x^2 - 26x + 15$

d) $4x^3 + 3x^2 - 4x - 3$

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6) Factor each polynomial

a) $2x^3 + 5x^2 - x - 6$

b) $4x^3 - 7x - 3$

c) $x^4 - 15x^2 - 10x + 24$

Answer Key

1) a) Not a factor b) A factor c) A factor

2) a) $(x + 1)(x + 4)(x - 2)$ b) $(x + 1)(x + 6)(x - 3)$ c) $(x - 2)(x - 4)(x + 3)$

3) a) $(x + 1)(x - 3)(x + 3)$ b) $(2x - 1)(x - 6)(x + 6)$

4) $k = -3$

5) a) $(x + 2)(x - 3)(3x + 4)$ b) $(x - 1)(x - 3)(2x - 1)$ c) $(x - 3)(3x + 5)(2x - 1)$ d) $(x - 1)(x + 1)(4x + 3)$

6) a) $(x - 1)(x + 2)(2x + 3)$ b) $(x + 1)(2x - 3)(2x + 1)$ c) $(x - 1)(x + 2)(x - 4)(x + 3)$

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