3-4 Additional Practice

Dividing Polynomials

Divide using long division.

1. $(x^2 - 13x - 48) \div (x + 3)$

$x - 16$

2. $(x^3 + 5x^2 - 3x - 1) \div (x - 1)$

$x^2 + 6x + 3$, R 2

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

$3x^2 - 7x + 7$, R -8

Divide using synthetic division.

4. $(x^3 - 8x^2 + 17x - 10) \div (x - 5)$

$x^2 - 3x + 2$

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

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

6. $(2x^4 + 7x^3 - 11x^2 + 21x + 5) \div (x + 5)$

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

7. Verify the Remainder Theorem if $P(x) = x^3 - 5x^2 - 7x + 25$ is divided by $(x - 5)$. Explain.

Sample Answer:

$P(5) = (5)^3 - 5(5)^2 - 7(5) + 25$

$= 125 - 125 - 35 + 25$

$= -10$

5 |	1	−5	−7	25
		5	0	−35
	1	0	−7	−10

The remainder is -10, and since $f(5) = -10$, the Remainder Theorem is verified.

Determine whether each binomial is a factor of $x^3 + 3x^2 - 10x - 24$.

8. $x + 4$

yes

9. $x - 3$

yes

10. $x + 6$

no

11. The volume, in cubic inches, of a rectangular box can be expressed as the product of its three dimensions: $V(x) = x^3 - 16x^2 + 79x - 120$. The length is $x - 8$. Find linear expressions with integer coefficients for the width and height. The width is greater than the height.

width: $x - 3$; height: $x - 5$

12. What does it mean if $P(-4)$ for the polynomial function $P(x) = x^3 + 11x^2 + 34x + 24$ equals zero?

Sample answer: It means that $(x + 4)$ is a factor of the polynomial.