Algebra: Dividing Polynomials

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Name: _____ Date: _____ Score: / 10

DIRECTIONS *Divide the polynomial using long division or synthetic division. Include remainder if any.*

1 Divide using synthetic division:

$$(x^3 - 3x^2 + 4) \div (x + 1)$$

Answer: _____

2 Divide using long division:

$$(x^3 + 8) \div (x - 1)$$

Answer: _____

3 Divide using synthetic division:

$$(x^3 + 2x^2 - 4x - 8) \div (x - 2)$$

Answer: _____

4 Divide using long division:

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

Answer: _____

5 Divide using synthetic division:

$$(x^3 - 5x^2 + 8x - 4) \div (x - 1)$$

Answer: _____

6 Divide using synthetic division:

$$(x^3 + 4x^2 + 5x + 2) \div (x + 2)$$

Answer: _____

7 Divide using long division:

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

Answer: _____

8 Divide using long division:

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

Answer: _____

9 Divide using synthetic division:

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

Answer: _____

10 Divide using long division:

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

Answer: _____

Answer Key & Solutions

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TEACHER NOTES *Synthetic division only works when the divisor is (x–c). Bring down, multiply, add — repeat.*

1 Divide using synthetic division:

$(x^3 - 3x^2 + 4) \div (x + 1)$

= $x^2 - 4x + 4$

2 Divide using long division:

$(x^3 + 8) \div (x - 1)$

= $x^2 + x + 1 + \frac{9}{x-1}$

3 Divide using synthetic division:

$(x^3 + 2x^2 - 4x - 8) \div (x - 2)$

= $x^2 + 4x + 4$

4 Divide using long division:

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

= $x^2 + 2x + 2$

5 Divide using synthetic division:

$(x^3 - 5x^2 + 8x - 4) \div (x - 1)$

= $x^2 - 4x + 4$

6 Divide using synthetic division:

$(x^3 + 4x^2 + 5x + 2) \div (x + 2)$

= $x^2 + 2x + 1$

7 Divide using long division:

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

= $x^2 - 2x + 4 + \frac{-9}{x+2}$

8 Divide using long division:

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

= $x^2 + 3x + 6 + \frac{20}{x-3}$

9 Divide using synthetic division:

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

= $x^2 + 3x + 2$

10 Divide using long division:

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

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