ALBERT

Name _____ Date _____

Polynomial Division Worksheet

Algebra 2 · Common Core HSA-APR.D.6

> Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Practice

Builds the skill step by step.

1. Divide: $(x^2 + 5x + 6) \div (x + 2)$.

2. Divide: $(x^2 - 9) \div (x - 3)$.

3. Divide: $(6x^3 + 4x^2) \div 2x$.

4. What is the remainder when $x^2 + 3x + 5$ is divided by $x + 1$?

5. When a(x) ÷ b(x) is written as q(x) + r(x) ÷ b(x), what must be true of r(x)?

   A. Its degree equals the degree of a(x).

   B. Its degree is less than the degree of b(x).

   C. It is always 0.

   D. Its degree is greater than the degree of b(x).

6. Divide: $(x^2 + 7x + 10) \div (x + 5)$.

7. Divide: $(2x^2 + 5x - 3) \div (x + 3)$.

8. What is the remainder when $x^2 - 4x + 7$ is divided by $x - 2$?

9. Divide: $(x^3 - 1) \div (x - 1)$.

10. Divide: $(9x^2 - 3x) \div 3x$.

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On Level

Grade-level practice.

1. Divide: $(x^3 + 2x^2 - 5x - 6) \div (x + 1)$.

2. What is the quotient when $2x^3 - 3x^2 + 4x - 5$ is divided by $x - 2$?

3. What is the remainder when $2x^3 - 3x^2 + 4x - 5$ is divided by $x - 2$?

4. $(x^2 + 4x + 7) \div (x + 1) = x + 3 + r \div (x + 1)$. What is r?

5. Divide: $(x^4 - 16) \div (x - 2)$.

6. Which shows $(x^2 + 1) \div (x - 1)$ as $q(x) + r(x) \div (x - 1)$?

   A. $x - 1 + 2 \div (x - 1)$

   B. $x + 1 + 1 \div (x - 1)$

   C. $x + 1 + 2 \div (x - 1)$

   D. $x + 2 \div (x - 1)$

7. What is the quotient when $3x^3 - 2x + 4$ is divided by $x + 1$?

8. Explain how to divide $x^3 - 7x + 6$ by $x - 2$ using synthetic division.

9. Divide: $(x^2 + 6x + 9) \div (x + 3)$.

10. Divide: $(4x^2 - 1) \div (2x + 1)$.

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Challenge

Multi-step and word problems that stretch it.

1. Divide: $(2x^3 + 3x^2 - 8x + 3) \div (2x - 1)$.

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

3. What is the remainder when $x^3 + 4x^2 + 2$ is divided by $x^2 + 1$?

4. $x - 3$ divides $x^3 - 2x^2 + kx - 6$ with remainder 0. What is k?

5. Divide: $(6x^2 + x - 2) \div (2x - 1)$.

6. $(x^2 + 1) \div (x - 1) = x + 1 + 2 \div (x - 1)$. What does this show about the graph of $y = (x^2 + 1) \div (x - 1)$ for large x?

   A. It gets close to $y = 2$.

   B. It gets close to $y = 0$.

   C. It has no pattern.

   D. It gets close to the line $y = x + 1$.

7. Divide: $(x^5 - 32) \div (x - 2)$.

8. What is the quotient when $x^3 - 3x^2 + 5$ is divided by $x - 1$?

9. Dividing p(x) by $x - 4$ gives quotient $x^2 + 1$ and remainder 3. Find p(x) and explain.

10. What is the remainder when $x^{10} + 1$ is divided by $x^2 - 1$?