

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Score: \_\_\_\_\_

## The Remainder and Factor Theorem Worksheet

Use the Remainder Theorem to find the remainder for each division. State whether the binomial is a factor of the polynomial.

①  $(x^3 + x^2 - 10) \div (x + 3)$

\_\_\_\_\_

②  $(2x^3 - 3x^2 - 10x + 3) \div (x - 3)$

\_\_\_\_\_

③  $(x^4 + 5x^3 - 14x^2) \div (x - 2)$

\_\_\_\_\_

④  $(2x^4 + 4x^3 - x^2 + 9) \div (x + 1)$

\_\_\_\_\_

Factor completely using synthetic division. One zero is given.

⑤  $f(x) = x^3 - 8x^2 + 19x - 12; 3$

\_\_\_\_\_

⑥  $f(x) = x^4 + 2x^3 - 13x^2 + 10x; -5$

\_\_\_\_\_

⑦  $f(x) = x^3 + 6x^2 + 11x + 6; -2$

\_\_\_\_\_

⑧  $f(x) = x^4 - 2x^3 - 5x^2 + 6x; -2$

\_\_\_\_\_

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## Answers

①  $(x^3 + x^2 - 10) \div (x + 3)$

-28, No

②  $(2x^3 - 3x^2 - 10x + 3) \div (x - 3)$

0, Yes

③  $(x^4 + 5x^3 - 14x^2) \div (x - 2)$

0, Yes

④  $(2x^4 + 4x^3 - x^2 + 9) \div (x + 1)$

6, No

Factor completely using synthetic division. One zero is given.

⑤  $f(x) = x^3 - 8x^2 + 19x - 12; 3$

$(x - 1)(x - 4)(x - 3)$

⑥  $f(x) = x^4 + 2x^3 - 13x^2 + 10x; -5$

$x(x - 1)(x - 2)(x + 5)$

⑦  $f(x) = x^3 + 6x^2 + 11x + 6; -2$

$(x + 1)(x + 3)(x + 2)$

⑧  $f(x) = x^4 - 2x^3 - 5x^2 + 6x; -2$

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