

Algebra II  
Section 6-3 Review

Name Key

Use synthetic substitution to find  $f(?)$  for each function.

1)  $f(x) = 2x^3 + 10x^2 + 5x - 9$   
Find  $f(-4)$

$$\begin{array}{r|rrrr} -4 & 2 & 10 & 5 & -9 \\ & & -8 & -8 & 12 \\ \hline & 2 & 2 & -3 & 3 \end{array}$$

2)  $f(x) = x^3 - 8x + 14$   
Find  $f(2)$

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -8 & 14 \\ & & 2 & 4 & -8 \\ \hline & 1 & 2 & -4 & 6 \end{array}$$

3)  $f(x) = -x^4 - 3x^3 + 33$   
Find  $f(-5)$

$$\begin{array}{r|rrrrr} -5 & -1 & -3 & 0 & 0 & 33 \\ & & 5 & -10 & 50 & -250 \\ \hline & -1 & 2 & -10 & 50 & -217 \end{array}$$

Determine if the binomial given is a factor of the polynomial given (yes or no). Must include proof.

4)  $x^3 + 5x^2 + 42$ ;  $x + 6$

$$\begin{array}{r|rrrr} -6 & 1 & 5 & 0 & 42 \\ & & -6 & 6 & -36 \\ \hline & 1 & -1 & 6 & 6 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

5)  $x^5 - 2x^4 + 4x^3 - 8x^2 - 5x + 10$ ;  $x - 2$

$$\begin{array}{r|rrrrrr} 2 & 1 & -2 & 4 & -8 & -5 & 10 \\ & & 2 & 0 & 8 & 0 & -10 \\ \hline & 1 & 0 & 4 & 0 & -5 & 0 \\ & & & & & & \uparrow \\ & & & & & & \text{YES} \end{array}$$

Given a polynomial and one of its *factors*, find the remaining *factors* of the polynomial.

6)  $x^3 + 7x^2 + 7x - 15$ ;  $x - 1$

$$\begin{array}{r|rrrr} 1 & 1 & 7 & 7 & -15 \\ & & 1 & 8 & 15 \\ \hline & 1 & 8 & 15 & 0 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

$x^2 + 8x + 15$   
 $(x+5)(x+3)$

7)  $x^3 - 9x^2 + 27x - 27$ ;  $x - 3$

$$\begin{array}{r|rrrr} 3 & 1 & -9 & 27 & -27 \\ & & 3 & -18 & 27 \\ \hline & 1 & -6 & 9 & 0 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

$x^2 - 6x + 9$   
 $(x-3)(x-3)$   
or  $(x-3)^2$

8)  $x^3 - x^2 - 14x + 24$ ;  $x + 4$

$$\begin{array}{r|rrrr} -4 & 1 & -1 & -14 & 24 \\ & & -4 & 20 & -24 \\ \hline & 1 & -5 & 6 & 0 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

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

9)  $4x^3 - 12x^2 - x + 3$ ;  $x - 3$

$$\begin{array}{r|rrrr} 3 & 4 & -12 & -1 & 3 \\ & & 12 & 0 & -3 \\ \hline & 4 & 0 & -1 & 0 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

$4x^2 - 1$   
 $(2x+1)(2x-1)$

10)  $4x^3 + 3x^2 - 16x - 12$ ;  $x + 2$

$$\begin{array}{r|rrrr} -2 & 4 & 3 & -16 & -12 \\ & & -8 & 10 & 12 \\ \hline & 4 & -5 & -6 & 0 \\ & & & & \uparrow \\ & & & & \text{NO} \end{array}$$

$4x^2 - 5x - 6$   
 $(4x+3)(x-2)$

11)  $x^4 + 5x^3 + 8x + 40$ ;  $x + 5$

$$\begin{array}{r|rrrrr} -5 & 1 & 5 & 0 & 8 & 40 \\ & & -5 & 0 & 0 & -40 \\ \hline & 1 & 0 & 0 & 8 & 0 \\ & & & & & \uparrow \\ & & & & & \text{NO} \end{array}$$

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