

Name \_\_\_\_\_

Date \_\_\_\_\_

# Homework Guide

Divide using Synthetic Division and determine if it is a factor.

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

Not a factor

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

$$\begin{array}{r|rrrrr} +1 & 1 & 2 & -5 & 3 & -1 \\ & \downarrow & +1 & +3 & -2 & +1 \\ \hline & 1 & 3 & -2 & 1 & 0 \end{array}$$

Remainder = 0  
so yes!

Yes a factor

3.  $(x^3 - 4x^2 - 9x + 36) \div (x - 3)$

Yes a factor

$(2x^3 + 0x^2 - 45x - 7)$

4.  $(2x^3 - 45x - 7) \div (x - 5)$

$$\begin{array}{r|rrrr} +5 & 2 & 0 & -45 & -7 \\ & \downarrow & +10 & +50 & +25 \\ \hline & 2 & 10 & 5 & 18 \end{array}$$

Remainder  $\neq 0$   
so no!

Not a factor

Find all the factors of the polynomial

5.  $x^3 + 3x^2 - 25x - 75; x - 5$

Factors

1.  $(x + 5)$
2.  $(x - 5)$
3.  $(x + 3)$

6.  $2x^3 + x^2 - 2x - 1; x + 1$

$$\begin{array}{r|rrrr} -1 & 2 & 1 & -2 & -1 \\ & \downarrow & -2 & +1 & +1 \\ \hline & 2 & -1 & -1 & 0 \end{array}$$

$2x^2 - x - 1 = 0$

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

Factors

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

7.  $x^4 - 2x^3 - 7x^2 + 8x + 12; x + 1$

Factors

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

8.  $x^4 - 16; x + 2$

$(x^2 - 4)(x^2 + 4) = 0$

DOTS SOTS

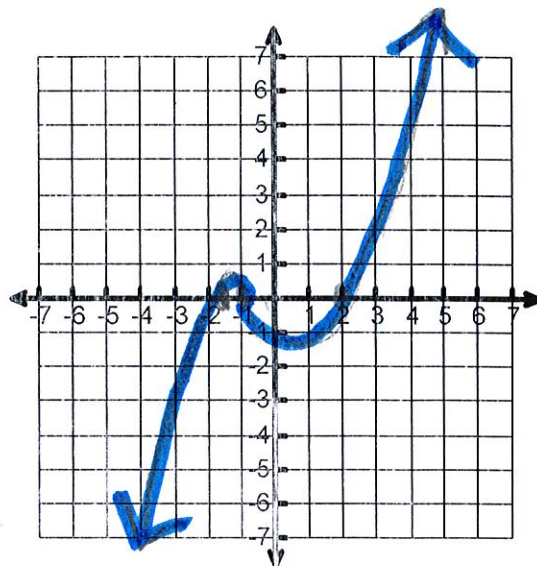
$(x - 2)(x + 2)(x + 2i)(x - 2i)$

Factors

1.  $(x + 2)$
2.  $(x - 2)$
3.  $(x + 2i)$
4.  $(x - 2i)$

Given one factor of the polynomial, find the all zeros. Draw a rough sketch.

9.  $f(x) = 2x^3 + x^2 - 7x - 6; x+1$



$$x = -1, 2, -3/2$$

$$\swarrow 2x^3 \nearrow$$

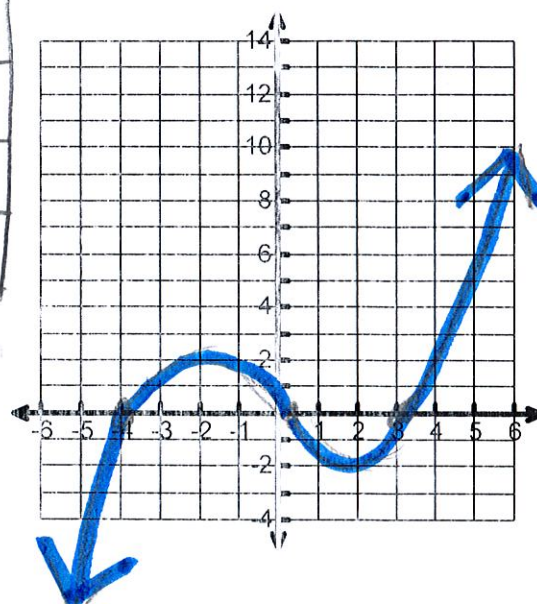
10.  $f(x) = 3x^3 + 2x^2 - 37x + 12; x+4$

$$\begin{array}{r} -4 \overline{) 3x^3 + 2x^2 - 37x + 12} \\ \underline{-12x^2 + 40x - 12} \phantom{+ 12} \\ 3x^2 - 10x + 3 \quad | \quad \emptyset \\ \underline{3x^2 - 10x + 3} \\ 0 \end{array}$$

$$3x^2 - 10x + 3 = 0$$

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

Factors	Roots
$1 \cdot (x+4)$	$x = -4$
$2 \cdot (3x-1)$	$x = 1/3$
$3 \cdot (x-3)$	$x = 3$



$$x = -4, 3, \frac{1}{3}$$

$$\swarrow 3x^3 \nearrow$$