

Find all of the Factor in #1 - #4 of the Function

Find all of the Zeros in #5 & #6 and Sketch

1. $f(x) = x^3 + 2x^2 - 9x - 18$
if $x-3$ is a factor

$$\begin{array}{r} +3 \\ \hline 1+2-9-18 \\ \downarrow +3+15+18 \\ 1+5+6+\emptyset \\ X^2+5x+6=0 \\ (x+2)(x+3)=0 \end{array}$$

Factors

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

2. $f(x) = x^3 + 6x^2 + 11x + 6$
if $x+2$ is a factor

$$\begin{array}{r} -2 \\ \hline 1+6+11+6 \\ \downarrow -2-8-\emptyset \\ 1+4+3+\emptyset \\ X^2+4x+3=0 \\ (x+1)(x+3)=0 \end{array}$$

Factors

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

3. $f(x) = x^4 + 3x^3 - 7x^2 - 27x - 18$
if $x-3$ & $x+1$ are factors

$$\begin{array}{r} +3 \\ \hline 1+3-7-27-18 \\ \downarrow +3+18+33+18 \\ 1+6+11+6+\emptyset \\ \downarrow -1-5-6 \\ 1+5+6+\emptyset \\ X^2+5x+6=0 \\ (x+2)(x+3)=0 \end{array}$$

Factors

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

4. $f(x) = x^4 + 6x^3 + x^2 - 24x - 20$
if $x-2$ & $x+5$ are factors

$$\begin{array}{r} +2 \\ \hline 1+6+1-24-20 \\ \downarrow +2+16+34+20 \\ 1+8+17+10+\emptyset \\ \downarrow -5-15-10 \\ 1+3+2+\emptyset \\ X^2+3x+2=0 \\ (x+2)(x+1)=0 \end{array}$$

Factors

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

Find all of the Zeros in #5 & #6 and Sketch

5. $f(x) = x^3 - 4x^2 - 11x + 30$
given $x-2$ as a factor

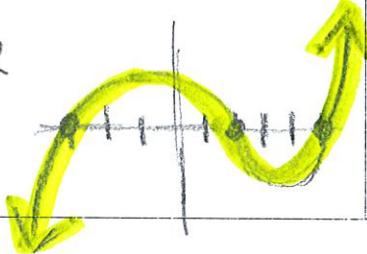
$$\begin{array}{r} +2 \\ \hline 1-4-11+30 \\ \downarrow +2-4-30 \\ 1-2-15+\emptyset \\ X^2-2x-15=0 \\ (x+3)(x-5)=0 \end{array}$$

Fact / Roots

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

End Behavior

x^3



6. $f(x) = x^4 - 27x^2 + 14x + 120$
given $x-4$ & $x+2$ as factors

$$\begin{array}{r} +4 \\ \hline 1+0-27+14+120 \\ \downarrow 4+16-44-120 \\ -2 \quad 1+4-11-30+\emptyset \\ \downarrow -2-4+30 \\ 1+2-15+\emptyset \\ X^2+2x-15=0 \\ (x+5)(x-3)=0 \end{array}$$

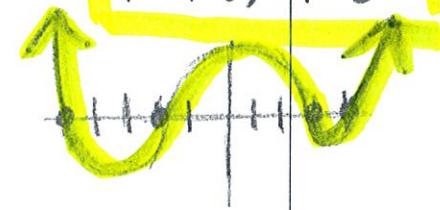
Factors/Roots

- 1. $(x-4)$ $x=4$
- 2. $(x+2)$ $x=-2$
- 3. $(x+5)$ $x=-5$
- 4. $(x-3)$ $x=3$

$X^2+2x-15=0$

$(x+5)(x-3)=0$

End Behavior
 x^4



Find all of the Zeros in #1 - #4 and Sketch

$1. \quad f(x) = 2x^3 - 11x^2 + 17x - 6$ $\begin{array}{r} 2 \\[-1ex] 2 \overline{)2 - 11 + 17 - 6} \\[-1ex] \downarrow 4 - 14 + 6 \\[-1ex] 2 - 7 + 3 \end{array} \quad \boxed{\text{Roots}}$ $1. \quad x = 2$ $2. \quad x = 3$ $3. \quad x = \frac{1}{2}$ $2x^2 - 7x + 3 = 0$ $(2x-1)(x-3) = 0$ <p>End Behavior</p>	$2. \quad f(x) = 4x^3 + 4x^2 - 11x - 6$ $\begin{array}{r} -2 \\[-1ex] 4 \overline{)4 + 4 - 11 - 6} \\[-1ex] \downarrow -8 + 8 + 6 \\[-1ex] 4 - 4 - 3 \end{array} \quad \boxed{\text{Roots}}$ $1. \quad x = -2$ $2. \quad x = -\frac{1}{2}$ $3. \quad x = \frac{3}{2}$ $4x^2 - 4x - 3 = 0$ $(2x+1)(2x-3) = 0$ <p>End Behavior</p>
$3. \quad f(x) = 6x^4 + 5x^3 - 20x^2 - 25x - 6$ $\begin{array}{r} -1 \\[-1ex] 6 \overline{)6 + 5 - 20 - 25 - 6} \\[-1ex] \downarrow -6 + 1 + 19 + 6 \\[-1ex] 6 - 1 - 19 - 6 \end{array} \quad \boxed{\text{Roots}}$ $1. \quad x = -1$ $2. \quad x = 2$ $3. \quad x = -\frac{3}{2}$ $4. \quad x = -\frac{1}{3}$ $6x^2 + 11x + 3 = 0$ $(2x+3)(3x+1) = 0$ <p>End Behavior</p>	$4. \quad f(x) = 6x^3 - 31x^2 + 3x + 10$ $\begin{array}{r} 5 \\[-1ex] 6 \overline{)6 - 31 + 3 + 10} \\[-1ex] \downarrow +30 - 5 - 10 \\[-1ex] 6 - 1 - 2 \end{array} \quad \boxed{\text{Roots}}$ $1. \quad x = 5$ $2. \quad x = -\frac{1}{2}$ $3. \quad x = \frac{2}{3}$ $6x^2 - x - 2 = 0$ $(3x-2)(2x+1) = 0$ <p>End Behavior</p>