

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

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

<p>1. <math>f(x) = x^3 + 2x^2 - 9x - 18</math> if <math>x-3</math> is a factor</p> $\begin{array}{r rrrr} +3 & 1 & 2 & -9 & -18 \\ & \downarrow & +3 & +15 & +18 \\ \hline & 1 & +5 & +6 &   \emptyset \end{array}$ <p><math>x^2 + 5x + 6 = 0</math> <math>(x+2)(x+3) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Factors</b></p> <ol style="list-style-type: none"> <li>1. <math>(x-3)</math></li> <li>2. <math>(x+2)</math></li> <li>3. <math>(x+3)</math></li> </ol> </div>	<p>2. <math>f(x) = x^3 + 6x^2 + 11x + 6</math> if <math>x+2</math> is a factor</p> $\begin{array}{r rrrr} -2 & 1 & 6 & 11 & 6 \\ & \downarrow & -2 & -8 & -6 \\ \hline & 1 & +4 & +3 &   \emptyset \end{array}$ <p><math>x^2 + 4x + 3 = 0</math> <math>(x+1)(x+3) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Factors</b></p> <ol style="list-style-type: none"> <li>1. <math>(x+2)</math></li> <li>2. <math>(x+1)</math></li> <li>3. <math>(x+3)</math></li> </ol> </div>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>3. <math>f(x) = x^4 + 3x^3 - 7x^2 - 27x - 18</math> if <math>x-3</math> &amp; <math>x+1</math> are factors</p> $\begin{array}{r rrrrr} +3 & 1 & 3 & -7 & -27 & -18 \\ & \downarrow & +3 & +18 & +33 & +18 \\ \hline & 1 & +6 & +11 & +6 &   \emptyset \\ -1 & \downarrow & -1 & -5 & -6 \\ \hline & 1 & +5 & +6 &   \emptyset \end{array}$ <p><math>x^2 + 5x + 6 = 0</math> <math>(x+2)(x+3) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Factors</b></p> <ol style="list-style-type: none"> <li>1. <math>(x-3)</math></li> <li>2. <math>(x+1)</math></li> <li>3. <math>(x+2)</math></li> <li>4. <math>(x+3)</math></li> </ol> </div>	<p>4. <math>f(x) = x^4 + 6x^3 + x^2 - 24x - 20</math> if <math>x-2</math> &amp; <math>x+5</math> are factors</p> $\begin{array}{r rrrrr} +2 & 1 & 6 & 1 & -24 & -20 \\ & \downarrow & +2 & +16 & +34 & +20 \\ \hline & 1 & +8 & +17 & +10 &   \emptyset \\ -5 & \downarrow & -5 & -15 & -10 \\ \hline & 1 & +3 & +2 &   \emptyset \end{array}$ <p><math>x^2 + 3x + 2 = 0</math> <math>(x+2)(x+1) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Factors</b></p> <ol style="list-style-type: none"> <li>1. <math>(x-2)</math></li> <li>2. <math>(x+5)</math></li> <li>3. <math>(x+2)</math></li> <li>4. <math>(x+1)</math></li> </ol> </div>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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

<p>5. <math>f(x) = x^3 - 4x^2 - 11x + 30</math> given <math>x-2</math> as a factor</p> $\begin{array}{r rrrr} +2 & 1 & -4 & -11 & +30 \\ & \downarrow & +2 & -4 & -30 \\ \hline & 1 & -2 & -15 &   \emptyset \end{array}$ <p><math>x^2 - 2x - 15 = 0</math> <math>(x+3)(x-5) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Fact / Roots</b></p> <ol style="list-style-type: none"> <li>1. <math>(x-2)</math> <math>x=2</math></li> <li>2. <math>(x+3)</math> <math>x=-3</math></li> <li>3. <math>(x-5)</math> <math>x=5</math></li> </ol> </div> <p>End Behavior <math>\swarrow x^3 \nearrow</math></p>	<p>6. <math>f(x) = x^4 - 27x^2 + 14x + 120</math> given <math>x-4</math> &amp; <math>x+2</math> as factors</p> $\begin{array}{r rrrrr} +4 & 1 & 0 & -27 & +14 & +120 \\ & \downarrow & +4 & +16 & -44 & -120 \\ \hline & 1 & +4 & -11 & -30 &   \emptyset \\ -2 & \downarrow & -2 & -4 & +30 \\ \hline & 1 & +2 & -15 &   \emptyset \end{array}$ <p><math>x^2 + 2x - 15 = 0</math> <math>(x+5)(x-3) = 0</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>Factors/Roots</b></p> <ol style="list-style-type: none"> <li>1. <math>(x-4)</math> <math>x=4</math></li> <li>2. <math>(x+2)</math> <math>x=-2</math></li> <li>3. <math>(x+5)</math> <math>x=-5</math></li> <li>4. <math>(x-3)</math> <math>x=3</math></li> </ol> </div> <p>End Behavior <math>\swarrow x^4 \nearrow</math></p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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

1.  $f(x) = 2x^3 - 11x^2 + 17x - 6$

$$\begin{array}{r} 2 \overline{) 2 - 11 + 17 - 6} \\ \underline{\downarrow 4 - 14 + 6} \\ 2 - 7 + 3 \quad | \quad \emptyset \end{array}$$

$$2x^2 - 7x + 3 = 0$$

$$(2x-1)(x-3) = 0$$

**Roots**

1.  $x = 2$
2.  $x = 3$
3.  $x = \frac{1}{2}$

End Behavior

$\swarrow 2x^3 \nearrow$

2.  $f(x) = 4x^3 + 4x^2 - 11x - 6$

$$\begin{array}{r} -2 \overline{) 4 + 4 - 11 - 6} \\ \underline{\downarrow -8 + 8 + 6} \\ 4 - 4 - 3 \quad | \quad \emptyset \end{array}$$

$$4x^2 - 4x - 3 = 0$$

$$(2x+1)(2x-3) = 0$$

**Roots**

1.  $x = -2$
2.  $x = -\frac{1}{2}$
3.  $x = \frac{3}{2}$

End Behavior

$\swarrow 4x^3 \nearrow$

3.  $f(x) = 6x^4 + 5x^3 - 20x^2 - 25x - 6$

$$\begin{array}{r} -1 \overline{) 6 + 5 - 20 - 25 - 6} \\ \underline{\downarrow -6 + 1 + 19 + 6} \\ 2 \overline{) 6 - 1 - 19 - 6 \quad | \quad \emptyset} \\ \underline{\downarrow +12 + 22 + 6} \\ 6 + 11 + 3 \quad | \quad \emptyset \end{array}$$

$$6x^2 + 11x + 3 = 0$$

$$(2x+3)(3x+1) = 0$$

**Roots**

1.  $x = -1$
2.  $x = 2$
3.  $x = -\frac{3}{2}$
4.  $x = -\frac{1}{3}$

End Behavior

$\swarrow 6x^4 \nearrow$

4.  $f(x) = 6x^3 - 31x^2 + 3x + 10$

$$\begin{array}{r} 5 \overline{) 6 - 31 + 3 + 10} \\ \underline{\downarrow +30 - 5 - 10} \\ 6 - 1 - 2 \quad | \quad \emptyset \end{array}$$

$$6x^2 - x - 2 = 0$$

$$(3x-2)(2x+1) = 0$$

**Roots**

1.  $x = 5$
2.  $x = -\frac{1}{2}$
3.  $x = \frac{2}{3}$

End Behavior

$\swarrow 6x^3 \nearrow$