

$$x^4 + 3x^3 + x^2 + 15x - 20 = 0$$

Find all four Complex Solutions by doing the following:

1. Find all EXACT real zeros by graphing.

Real Zeros: -4, 1

2. Use these zeros to find the remaining zeros using division/factoring.

$$\begin{array}{r|rrrrrr} 1 & 1 & 3 & 1 & 15 & -20 \\ & & 1 & 4 & 5 & 20 \\ \hline -4 & 1 & 4 & 5 & 20 & 0 \\ & & -4 & 0 & -20 & \\ \hline & 1 & 0 & 5 & 0 & \end{array}$$

do Synthetic Division using one of the zeros.

Use the results of the first division and do Synthetic Division using the other zero

Turn this last quotient into the Quadratic it represents and find the other zeros.

$$x^2 + 5 = 0$$

$$\sqrt{x^2} = \sqrt{-5}$$

$$x = \pm i\sqrt{5}$$

Find all EXACT Complex Solutions

$$x^4 + 2x^3 - 33x^2 - 60x + 90 = 0$$

1. Graph to find all EXACT REAL solutions.

$x = 1, -3$ are the only two EXACT real solutions.

2. Then use division to help find the remaining zeros.

$$\begin{array}{r|rrrrrr} 1 & 1 & 2 & -33 & -60 & 90 \\ & & 1 & 3 & -30 & -90 \\ \hline -3 & 1 & 3 & -30 & -90 & 0 \\ & & -3 & 0 & 90 & \\ \hline & 1 & 0 & -30 & 0 & \end{array}$$

do Synthetic Division using one of the zeros.

Use the results of the first division and do Synthetic Division using the other zero

Turn this last quotient into the Quadratic it represents and find the other zeros.

$$x^2 - 30 = 0$$

$$\sqrt{x^2} = \sqrt{30}$$

$$x = \pm \sqrt{30}$$

Find all EXACT Complex Zeros

$$y = 54x^4 - 129x^3 - 1081x^2 - 564x + 180$$

1. Graph to find all EXACT REAL zeros.

$x = 6, -3$ are the only two EXACT real zeros.

2. Then use division to help find the remaining zeros.

$$\begin{array}{r|rrrrrr} 6 & 54 & -129 & -1081 & -564 & 180 \\ & & 324 & 1170 & 534 & -180 \\ \hline -3 & 54 & 195 & 89 & -30 & 0 \\ & & -162 & -99 & 30 & \\ \hline & 54 & 33 & -10 & 0 & \end{array}$$

do Synthetic Division using one of the zeros.

Use the results of the first division and do Synthetic Division using the other zero

Turn this last quotient into the Quadratic it represents and find the other zeros.

$$54x^2 + 33x - 10$$

$$\begin{array}{c} -540 \\ +45 \\ 33 \end{array} \begin{array}{c} -12 \\ -2 \end{array} \Rightarrow \begin{array}{|c|c|} \hline 9x & 54x^2 + 45x \\ \hline -2 & -12x - 10 \\ \hline \end{array}$$

$$6x + 5 = 0$$

$$6x = -5$$

$$x = -5/6$$

$$9x - 2 = 0$$

$$9x = 2$$

$$x = 2/9$$

You can now finish Hwk #28

Practice Sheet: Sec 6-4

Due
Monday

Solving by graphing, division, and factoring.

You MUST show your work to get credit.