

Bellwork Hon Alg 2 Wednesday, January 11, 2017

Use this equation. $x^5 - 4x^4 - 3x^3 + 12x^2 - 4x + 16 = 0$

Find all five Complex Solutions.

Graph to find real solutions then use these real solutions to find any remaining imaginary solutions.

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Hon Alg 2 Bellwork Answers

- Real zeros are $\pm 2, 4$
- Factors are: $x+2, x-2, x-4$

DIVIDE WITH $x+2$:

$$\begin{array}{r}
 x^4 - 6x^3 + 9x^2 - 6x + 8 \\
 x+2 \overline{) x^5 - 4x^4 - 3x^3 + 12x^2 - 4x + 16} \\
 \underline{-(x^5 + 2x^4)} \\
 -6x^4 - 3x^3 \\
 \underline{-(6x^4 + 12x^3)} \\
 9x^3 + 12x^2 \\
 \underline{-(9x^3 + 18x^2)} \\
 -6x^2 - 4x \\
 \underline{-(6x^2 + 12x)} \\
 8x + 16 \\
 \underline{-(8x + 16)} \\
 0
 \end{array}$$

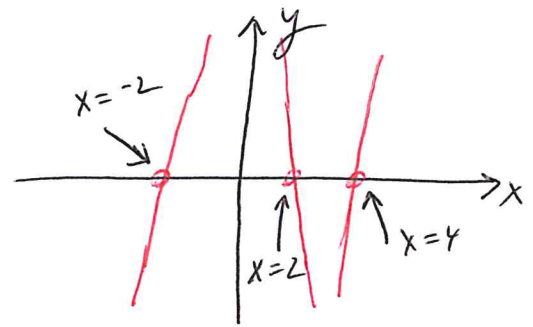
Then divide with $x-2$

$$\begin{array}{r}
 x-2 \overline{) x^4 - 6x^3 + 9x^2 - 6x + 8} \\
 \text{or} \\
 x^3 - 4x^2 + x - 4 \\
 \begin{array}{c|cccc|c}
 x & x^4 & -4x^3 & x^2 & -4x & 0 \\
 -2 & -2x^3 & 8x^2 & -2x & 8 &
 \end{array}
 \end{array}$$

finally divide with $x-4$

$$\begin{array}{r}
 x-4 \overline{) x^3 - 4x^2 + x - 4} \\
 \text{or} \\
 x^2 + 0x + 1 \\
 \begin{array}{c|ccc|c}
 x & x^3 & 0 & x & 0 \\
 -4 & -4x^2 & 0x & -4 &
 \end{array}
 \end{array}$$

Graph



THEREFORE,
THE 4 FACTORS ARE:

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

AND THE FIVE
SOLUTIONS ARE

$$x = \pm 2, 4, \pm i$$

or try factoring $x^3 - 4x^2 + x - 4$

$$\begin{array}{c|cc}
 x & -4 \\
 \hline
 x^2 & x^3 & -4x^2 \\
 +1 & +x & -4
 \end{array}$$