

Do Now: #3

Name: _____
PCH: More polynomial practice

Date: _____
Ms. Loughran

1. Show that $(x+2)$ is not a factor of $x^3 - 3x^2 + 1$.
2. A rectangular room has a volume of $3x^3 - 2x^2 - 11x + 10$ cubic feet. The height of the room is $x - 1$. Find the algebraic expression for the number of square feet of floor space in the room.
3. Solve the equation $x^3 - 7x^2 + 25x - 39 = 0$, given that $2 - 3i$ is one root.
4. Find c and d such that 1 and 2 are roots of the equation $x^3 - 4x^2 + cx + d = 0$.
5. Determine the value(s) of a such that one root of the equation $x^2 + ax + 12 = 0$ is three times the other.
6. When $x^2 + 5x - 2$ is divided by $x + n$, the remainder is -8 . Find n .
7. Find a polynomial of degree 4 having integer coefficients and zeros $2i$ and 3 with 3 a double zero.

3. Solve the equation $x^3 - 7x^2 + 25x - 39 = 0$, given that $2 - 3i$ is one root.

Since the coefficients of the poly are real, $2 + 3i$ is another root.

x^2 - sum of roots x + product of the roots

$$\text{sum} = 2 - 3i + 2 + 3i = 4$$

$$\text{product} = (2 - 3i)(2 + 3i) = 4 - 9i^2 = 4 + 9 = 13$$

$$x^2 - 4x + 13$$

$$\begin{array}{r}
 x-3 \\
 \hline
 x^2-4x+13 \) \ x^3-7x^2+25x-39 \\
 \underline{-x^3+4x^2+13x} \\
 -3x^2+12x-39 \\
 \underline{+3x^2+12x+39} \\
 0
 \end{array}$$

$$x-3=0$$

$$x=3$$

$$\{3, 2 \pm 3i\}$$

$$\begin{array}{r}
 \begin{array}{l}
 b \swarrow \\
 c \swarrow
 \end{array}
 \left. \begin{array}{l}
 4 \\
 -13
 \end{array} \right\}
 \begin{array}{r}
 | \quad -7 \quad 25 \quad -39 \\
 \quad \quad 4 \quad -12 \\
 \quad \quad \quad -13 \quad 39 \\
 \hline
 1 \quad -3 \quad 0 \quad 0
 \end{array}
 \end{array}$$

$$x-3=0$$

$$x=3$$

$$\begin{array}{r|rrrr}
 & 1 & -7 & 25 & -39 \\
 \hline
 2-3i & & 2-3i & -19+9i & 39 \\
 \hline
 2+3i & 1 & -5-3i & 6+9i & 0 \\
 & & 2+3i & -6-9i & \\
 \hline
 & 1 & -3 & 0 &
 \end{array}$$

$(x-3)$ quotient

$$\begin{array}{l}
 \text{+15i} \\
 \overbrace{(-5-3i)(2-3i)} \\
 \quad \quad \quad \underbrace{-6i} \\
 -10 + 9i + 9i^2 \\
 \quad \quad \quad -19 + 9i \\
 \quad \quad \quad \quad \quad \quad \underbrace{-18i} \\
 \overbrace{(6+9i)(2-3i)} \\
 \quad \quad \quad \underbrace{18} \\
 12 - 27i^2 \\
 12 + 27 = 39
 \end{array}$$