

WHAT WOULD BEARS BE WITHOUT BEES?



Friday, September 16, 2016

2.3 - Graded Assignment (do with partner and turn in)

2.4 Dividing and Factoring Polynomials

2.4 Real zeros of polynomials

$$f(x) = 2x^4 - 7x^3 - 8x^2 + 14x + 8$$

From Calculator, "good" zeros are $x = -\frac{1}{2}, 4$
rational

* 2 irrational zeros

factors are
 $(x + \frac{1}{2})(x - 4)$
OR
 $(2x + 1)(x - 4)$

Find other 2 zeros:

$$\begin{array}{r}
 4 \overline{) 2 \quad -7 \quad -8 \quad 14 \quad 8} \\
 + \quad 8 \quad 4 \quad -16 \quad -8 \\
 \hline
 2 \quad 1 \quad -4 \quad -2 \quad 0
 \end{array}$$

Remainder = 0 bc $x=4$ is a zero of $f(x)$

$$(x-4)(2x^3+x^2-4x-2)$$

$$\begin{array}{r}
 -\frac{1}{2} \overline{) 2 \quad 1 \quad -4 \quad -2} \\
 + \quad -1 \quad 0 \quad 2 \\
 \hline
 2 \quad 0 \quad -4 \quad 0
 \end{array}$$

← cubic
← use cubic coeffs

$$\begin{array}{r}
 + \quad -1 \quad 0 \quad 2 \\
 \hline
 2 \quad 0 \quad -4 \quad 0
 \end{array}$$

Rem = 0 bc $x = -\frac{1}{2}$ is a zero

$$\begin{array}{r}
 1 \quad 0 \quad -2 \quad \text{coefficients} \\
 \hline
 1 \quad 0 \quad -2
 \end{array}$$

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

$$\begin{aligned} \hookrightarrow \text{zeros } x^2 - 2 &= 0 \\ x^2 &= 2 \\ x &= \pm\sqrt{2} \end{aligned}$$

Factored form:

$$f(x) = (x-4)(2x+1)(x+\sqrt{2})(x-\sqrt{2})$$

$$\text{Zeros: } x = 4, -\frac{1}{2}, \pm\sqrt{2}$$

Factor Theorem

$x-k$ is a factor of $f(x)$ if $f(k) = 0$ [Remainder = 0]

Remainder Theorem

If $f(x)$ is divided by $x-k$, remainder is $f(k)$.

Ex: $f(x) = x^3 + 2x - 8$ find $f(2)$

$$\begin{array}{r|rrrr} 2 & 1 & 0 & 2 & -8 \\ & & 2 & 4 & 12 \\ + & & & & \\ \hline & 1 & 2 & 6 & 4 = R \end{array}$$

$$f(2) = 4$$