2.3 The Remainder and Factor Theorems (cont.)

Objectives:

- Divide polynomials using long division and synthetic division
- Use the remainder and factor theorems

Synthetic Division

Divide using synthetic division:

ex. 1 $(2x^4 - 5x^2 + 5x - 2) \div (x + 2)$

ex. 2 $(4x^3 + 3x^2 - x + 8) \div (x - 3)$

ex. 3 $(10x^3 - 13x^2 + 5x - 14) \div (2x - 3)$

ex. 4 $(6x^4 + 11x^3 - 15x^2 - 12x + 7) \div (3x + 1)$

KeyConcept Remainder Theorem

If a polynomial $f(x)$ is divided by $x - c$, the remainder is $r = f(c)$.

ex. 1 If $f(x) = x^2 - 5x + 6$ is divided by $x - 2$ the remainder, r, will be $r = f(2)$

ex. 2 The number of tickets sold at a high school football game can be modeled by the function

$$f(x) = x^3 - 12x^2 + 48x + 74$$

Use the Remainder Theorem to find the number of tickets sold during the 13th game of the season

KeyConcept Factor Theorem

A polynomial $f(x)$ has a factor $(x - c)$ if and only if $f(c) = 0$.

Use the Factor Theorem to determine if the given binomials are factors of $f(x)$. Use the binomials that are factors to write $f(x)$ in factored form.

ex. 1 $f(x) = 2x^3 - x^2 - 41x - 20$; $(x + 4)$, $(x - 5)$

ex. 2 $f(x) = 3x^3 - x^2 - 22x + 24; (x - 2), (x + 5)$

ex. 3 $f(x) = 4x^3 - 34x^2 + 54x + 36; (x - 6), (x - 3)$

Assignment:

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