Hwk pg 177

#9 $12x^3 + kx^2 - x - 6$ has $(2x-1)$ as a factor

find k.

Let $f(x) = 12x^3 + kx^2 - x - 6$

$\therefore (2x-1)$ is a factor of $f(x)$

$\Rightarrow f(\frac{1}{2}) = 0$

$\Rightarrow 12(\frac{1}{2})^3 + k(\frac{1}{2})^2 - (\frac{1}{2}) - 6 = 0$

$\frac{12}{8} + \frac{k}{4} - \frac{1}{2} - 6 = 0$

$\Rightarrow \frac{6}{4} + \frac{k}{4} - \frac{2}{4} - \frac{24}{4} = 0$

$\Rightarrow \boxed{k = 20}$

2.6 Factoring Sums and Differences of Cubes

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Knowing how to factor a sum or difference of cubes is a simple matter of remembering patterns.

Example 2.6.1 (*Recalling the pattern for factoring a Difference of Squares*)

Factor $4x^2 - 25$

$= (root_1 - root_2)(root_1 + root_2)$

$= (2x - 5)(2x + 5)$

Note: Sums of Squares DO NOT factor!!

e.g. Simplify $x^2 + 4$

d.n.f.

Differences of Cubes

Pattern

$$(cube_1 - cube_2) = (cuberoot_1 - cuberoot_2)(cuberoot_1^2 + cuberoot_1 \times cuberoot_2 + cuberoot_2^2)$$

TWO POSITIVES and ONE NEGATIVE

Sums of Cubes (These DO factor!!)

Pattern

$$(cube_1 + cube_2) = (cuberoot_1 + cuberoot_2)(cuberoot_1^2 - cuberoot_1 \times cuberoot_2 + cuberoot_2^2)$$

Example 2.6.2

Factor $x^3 - 8$ $= (x-2)(x^2+2x+4)$ will not factor further

Example 2.6.3

Factor $27x^3 + 125y^3$ $= (3x+5y)((3x)^2 - (3x)(5y) + (5y)^2)$

$= (3x+5y)(9x^2 - 15xy + 25y^2)$

Example 2.6.4

Factor $1 - 64z^3$ $= (1-4z)(1+4z+16z^2)$

Example 2.6.5

Factor $1000x^3 + 27$ $= (10x+3)(100x^2 - 30x + 9)$

Example 2.6.6

Factor $x^6 - 729$ $= (x^2-9)(x^4+9x^2+81)$

$= (x-3)(x+3)(x^4+9x^2+81)$

Class/Homework for Section 2.6

Pg 182 #2aei, 3, 4
If you finish early, begin the review
Pgs. 184 – 185 (skip #8, 9)