Warm up

Sum of Cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$x^6 + 27$

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

Difference of Cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$8x^3 - 64y^3$

$8(x^3 - 8y^3)$

$8(x-2y)(x^2+2xy+4y^2)$

Questions From Homework

② b) $4x^4 + 11x^2 + 25$ $\qquad \sqrt{100} = 10 \cdot 2 = 20$

$(4x^4 + 20x^2 + 25) - 9x^2$

$(2x^2+5)^2 - 9x^2$

$(2x^2+5-3x)(2x^2+5+3x)$

$(2x^2-3x+5)(2x^2+3x+5)$

Factor Theorem

Factor Theorem

(x-b) is a factor of f(x) **if and only if** f(b) = 0.

Hint: Find a value of "x" that will make it = 0

$x^3 + 5x^2 - 2x - 24$

$(2)^3 + 5(2)^2 - 2(2) - 24$

$8 + 20 - 4 - 24$

$x = 2$

$(x - 2) = 0$

(x - 2) is a factor

Use long division to find another factor:

$$x - 2 \;\overline{)\; x^3 + 5x^2 - 2x - 24}$$

$x^2 + 7x + 12$

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

$7x^2 - 2x$

$-(7x^2 - 14x)$

$12x - 24$

$-(12x - 24)$

0

Factor further (if possible):

$(x-2)(x^2+7x+12)$

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

Factor Theorem

Factor Theorem

(x-b) is a factor of f(x) **if and only if** f(b) = 0.

$P(x) = f(x) = y$

$P(x) = 2x^3 - 5x^2 - 4x + 3$ $(x+1)$ is a factor

$P(-1) = 2(-1)^3 - 5(-1)^2 - 4(-1) + 3$

$= -2 - 5 + 4 + 3$

$= 0$

$$x+1 \overline{)\,2x^3 - 5x^2 - 4x + 3}$$

$2x^2 - 7x + 3$

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

$-7x^2 - 4x$

$-(-7x^2 - 7x)$

$3x + 3$

$-(3x + 3)$

0

$(x+1)(2x^2 - 7x + 3)$

$(x+1)(2x^2 - 6x - x + 3)$

$(x+1)[2x(x-3) - 1(x-3)]$

$(x+1)(2x-1)(x-3)$

Homework

1-3

③ b) $x^3 - 7x + 6$

$x^3 + 0x^2 - 7x + 6$