

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

$$\textcircled{a}) \quad x^4 + \underline{4}x^2 + 16 \quad \sqrt{16} = 4 \cdot 2 = \underline{8}$$

$$(x^4 + 8x^2 + 16) - 4x^2$$

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

$$\boxed{(x^2 + 4)^2} - \boxed{4x^2}$$

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

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

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

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

$$\boxed{(2x^2 + 5)^2} - \boxed{9x^2}$$

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

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

Factor Theorem

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

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

$x+1$ is a factor

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

$$= -2 - 5 + 4 + 3$$

$$= 0$$

$$\begin{array}{r}
 \underline{x+1} \overline{) 2x^3 - 5x^2 - 4x + 3} \\
 \underline{-(2x^3 + 2x^2)} \\
 -7x^2 - 4x \\
 \underline{-(-7x^2 - 7x)} \\
 3x + 3 \\
 \underline{-(3x + 3)} \\
 0
 \end{array}$$

Trinomial Decomp

$$\begin{aligned}
 & (x+1)(2x^2 - 7x + 3) \\
 & (x+1)(2x^2 - x)(-6x + 3) \\
 & (x+1)(x(2x-1))(-3(2x-1)) \\
 & \boxed{(x+1)(x-3)(2x-1)}
 \end{aligned}$$

Homework

1-3

* ③ b) $x^3 + 0x^2 - 7x + 6$