

5.6 #53

$$\begin{aligned} & 18x^4 + 21x^3 + 6x^2 \\ &= 3x^2(6x^2 + 7x + 2) \\ &= 3x^2(2x + 1)(3x + 2) \end{aligned}$$

## 5.7 Special Products *Impatica*

Perfect Square Trinomials

Difference of Two Squares

Sum & Difference of Two Cubes.

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

$\begin{array}{ccc} \uparrow & & \uparrow \\ x^2 & & 2^2 \\ & \swarrow & \\ & 2 \cdot 2x = 4x & \end{array}$

$$(x+3)^2 = (x+3)(x+3) = x^2 + 3x + 3x + 9 = x^2 + 6x + 9$$

$\begin{array}{ccc} \uparrow & & \uparrow \\ x^2 & & 3^2 \\ & \swarrow & \\ & 2 \cdot 3x & \end{array}$

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

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

$$(3x-7)^2 = (3x)^2 - 2 \cdot 3x \cdot 7 + 7^2$$

$$= 9x^2 - 42x + 49$$

$$\begin{array}{ccc} (3x)^2 & & (7)^2 \\ & \uparrow & \\ & 2 \cdot 3x \cdot 7 & \end{array}$$



Factor

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

Difference of Two Squares

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

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 Sum / Difference of two cubes.

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

$$\begin{array}{r} x^3 - 8 \\ \hline x^3 - 2^3 \end{array}$$

↑      ↑

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$$(x+3)(x^2-3x+9) = \dots = x^3+27$$

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

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

↓ Newer Factors.

$$27x^3 - 64$$

$$= 3^3x^3 - 4^3$$

$$= (3x)^3 - 4^3$$

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

$$= (3x-4)(9x^2 + 12x + 16)$$

Good Bonus Material.

$$\begin{array}{r} 2 \overline{)64} \\ \underline{2} \phantom{0} \\ 32 \\ \underline{2} \phantom{0} \\ 16 \\ \underline{2} \phantom{0} \\ 8 \\ \underline{2} \phantom{0} \\ 4 \\ \underline{2} \phantom{0} \\ 2 \end{array}$$

Zero Product Principle

$$AB = 0 \implies$$

$$A = 0 \quad \text{OR} \quad B = 0$$

$$3x = 0 \implies$$

$$\cancel{3=0} \quad \text{OR} \quad \boxed{x=0}$$

$$\frac{3}{0} = \infty$$

undefined

$$(x-2)(x+5) = 0$$

$$x-2 = 0$$

$$\underline{+2 = 2}$$

$$x = 2$$

OR

$$x+5 = 0$$

$$\underline{-5 = -5}$$

$$x = -5$$

$$3x = 0$$

$$\frac{3x}{3} = \frac{0}{3} = 0$$

$$x^2 - 7x + 12 = 0 \implies$$

$$(x-3)(x-4) = 0$$

$$\text{OR}$$

$$x-3 = 0 \implies x = 3$$

$$x-4 = 0 \implies x = 4$$

$$x \in \{3, 4\}$$

$$(37x-13)(42x+5) = 0$$

∴

$$x \in \left\{ \frac{13}{37}, -\frac{5}{42} \right\}$$

$$ax^2 + bx + c = 0 \implies$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



$$n(3+n) = n^2 + 4n$$

$$3n + \underline{n^2} = \underline{n^2} + 4n$$

$$3n = 4n$$

$$-4n = -4n$$

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$$-n = 0$$

$$n = 0$$

$$\left( \frac{y^2}{30} = \frac{y}{15} + \frac{1}{2} \right) (30)$$

$$y^2 = 2y + 15$$

$$y^2 - 2y - 15 = 0$$

$$\underline{(y-5)}(y+3) = 0$$

$$y \in \{-3, 5\}$$

Test Monday  
Q5 homework  
finish by Friday.