

$$12/ \quad t_2 + t_3 = 24$$

$$ar^1 + ar^2 = 24$$

$$ar(1+r) = 24$$

$$t_7 + t_8 = 5832$$

$$ar^6 + ar^7 = 5832$$

$$ar^6(1+r) = 5832$$

$$\frac{\cancel{ar^6(1+r)}}{\cancel{ar(1+r)}} = \frac{5832}{24}$$
$$\sqrt[5]{r^5} = \sqrt[5]{243}$$

$$r = 3 \Rightarrow a(3) + a(3)^2 = 24$$

$$12a = 24$$

$$a = 2$$

$$2, 6, 18$$

$$12/ \quad t_1 + t_3 = 10 \quad t_2 + t_4 = 24$$

$$t_n = t_1 + (n-1)d$$

$$a + a + 2d = 10 \quad a + 1d + a + 3d = 24$$

$$\begin{array}{r} 2a + 2d = 10 \\ \hline a + d = 5 \end{array} \quad \begin{array}{r} 2a + 4d = 24 \\ \hline a + 2d = 12 \end{array}$$

Pg. 56

#18/ $a + b + c = 35$ $abc = 1000$

$a, b, c \leftarrow$ geometric

$$\frac{b}{a} = \frac{c}{b}$$

$$\boxed{b^2 = ac}$$

$$(ac)b = 1000$$

$$(b^2)b = 1000$$

$$b^3 = 1000$$

$$b = 10$$

$$a + c + 10 = 35$$

$$10ac = 1000$$

$$ac = 100$$

$$a = \frac{100}{c}$$

$$\frac{100}{c} + c + 10 = 35$$

$$100 + c^2 + 10c = 35c$$

$$c^2 - 25c + 100 = 0$$

$$(c-20)(c-5) = 0$$

$$c = \underline{\underline{20}} \text{ OR } \underline{\underline{5}} \Rightarrow \underline{\underline{b = 10}}$$

$$a = \frac{100}{c} \quad \text{OR} \quad a = \frac{100}{5}$$

$$a = \frac{100}{20} = 5 \quad a = 20$$

$$\underline{\underline{5, 10, 20}} \text{ OR } \underline{\underline{20, 10, 5}}$$

II. Simple Trinomials

→ Always look for a common factor first!

a) $x^2 + 12x + 27$
 $(x+9)(x+3)$

b) $x^2 + 4x - 12$
 $(x+6)(x-2)$

c) $x^2 - 10x - 24$
 $(x-12)(x+2)$

d) $x^2 + 13x + 30$
 $(x+10)(x+3)$

III. Decomposition

a) $2x^2 + 7x + 6$
 $2x^2 + 4x + 3x + 6$
 $2x(x+2) + 3(x+2)$
 $(x+2)(2x+3)$

$2x^2 + 7x + 6$
 $(2x+4)(2x+3)$
 $(x+2)(2x+3)$

b) $3x^2 - x - 10$
 $(3x-6)(3x+5)$
 $(x-2)(3x+5)$

c) $12x^2 - 17x + 6$
 $(\frac{12x-9}{3})(\frac{12x-8}{4})$
 $(4x-3)(3x-2)$

d) $4x^2 + 12x + 9$
 $(\frac{4x+6}{2})(\frac{4x+6}{2})$
 $= (2x+3)^2$

IV. Perfect Squares

a) $9x^2 - 24x + 16$
 $(3x - 4)^2$

b) $16x^2 - 16x + 4$

$$4(4x^2 - 4x + 1)$$
$$= 4(2x - 1)^2$$

$$= (4x - 2)^2 \Rightarrow 2^2(2x - 1)^2$$
$$= 4(2x - 1)^2$$

c) $49x^2 + 350x + 625$

$$(7x + 25)^2$$

d) $(x + 1)^2 + 32x + (x - 7)^2$

$$x^2 + 2x + 1 + 32x + x^2 - 14x + 49$$

$$2x^2 + 20x + 50$$

$$2(x^2 + 10x + 25)$$

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

V. Difference of Squares

a) $4x^2 - 25$

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

b) $36x^2 - 64$

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

c) $9x^6 - y^8$

$$(3x^3 - y^4)(3x^3 + y^4)$$

d) $x^4 - 81$

$$(x^2 - 9)(x^2 + 9)$$
$$(x-3)(x+3)(x^2 + 9)$$
$$(\sqrt{x-\sqrt{3}})(\sqrt{x+\sqrt{3}})(x+3)(x^2+9)$$
$$(\sqrt{\sqrt{x}-\sqrt{\sqrt{3}}})(\sqrt{\sqrt{x}+\sqrt{\sqrt{3}}})(\dots)$$

Factoring Methods Covered...

- Greatest Common Factor
- Simple Trinomials
- Hard Trinomials
- Perfect Square Trinomials
- Difference of Squares

Try This One!!

Factor Completely:

$$x^4 - 10x^2y + 25y^2 - 4x^2 - 4xy^2 - y^4$$

$$\begin{aligned} & (x^4 - 10x^2y + 25y^2) - (4x^2 + 4xy^2 + y^4) \\ & (x^2 - 5y)^2 - (2x + y^2)^2 \end{aligned}$$

$$\left[(x^2 - 5y) - (2x + y^2) \right] \left[(x^2 - 5y) + (2x + y^2) \right]$$

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

Review of Long Division

$$\begin{array}{r} \underline{261.6} \\ 3 \overline{) 785.0} \\ \underline{6} \\ 18 \\ \underline{18} \\ 5 \\ \underline{3} \\ \text{Rem} = 20 \end{array}$$

$3(261) + 2 = 785$

Long Division of Polynomials

Example... $(x^3 + x^2 - 3x - 1) \div (x + 2)$

Write As...

$$\begin{array}{r}
 x^2 - x - 1 \\
 \hline
 (x + 2) \overline{) x^3 + x^2 - 3x - 1} \\
 \underline{x^3 + 2x^2} \\
 -x^2 - 3x \\
 \underline{-x^2 - 2x} \\
 -x - 1 \\
 \underline{-x - 2} \\
 \hline
 R = 1
 \end{array}$$

● Quotient
● Remainder
● Dividend
● Divisor
descending order of power

Check... $\text{Divisor} \times \text{Quotient} + \text{Remainder} = \text{Dividend}$

Example #2...

$$x - 2 \overline{) x^3 - 4x^2 + x + 6}$$