

3/18

Factoring Polynomials Review

$$1) 4a^4 - 12a^3 + 10a^2 = 2a^2(2a^2 - 6a + 5)$$

$$2) 3a(2a+3) - 5(2a+3) = (2a+3)(3a-5)$$

$$3) 15x^3 - 3x^2 = 3x^2(5x-1)$$

$$4) 12a^3b^2 - 40a^2b^3 + 24ab^4 = 4ab^2(3a^2 - 10ab + 6b^2)$$

$$5) x^2 - 49 = (x+7)(x-7)$$

$$6) 4x^2 - 25 = (2x-5)(2x+5)$$

$$7) 9x^2 - 100 = (3x-10)(3x+10)$$

$$8) 16x^2 + 49 = \text{Prime since this is a sum of squares.}$$

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

○ cube roots (x) (3)

$$10) 8x^3 + 125 = (2x + 5)(4x^2 - 10x + 25)$$

cube roots (2x) (5)

$$11) 32x^3 - 242x = 2x(16x^2 - 121) = 2x(4x - 11)(4x + 11)$$

$$\begin{array}{c} 16 \\ / \quad \backslash \\ 4 \quad 8 \\ / \quad \backslash \quad / \quad \backslash \\ 2 \quad 2 \quad 2 \quad 4 \\ / \quad \backslash \quad / \quad \backslash \\ 2^5 = 32 \quad 2 \quad 2 \end{array}$$

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

factoring by grouping since 4 terms $= x^2(x - 2) + 3(x - 2)$

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

$$13) 6x^3 + 10x^2 - 21x - 35 = (6x^3 + 10x^2) + (-21x - 35)$$

$$= 2x^2(3x + 5) + -7(3x + 5)$$

$$= (3x + 5)(2x^2 - 7)$$

$$\begin{aligned}
 14) \quad 10x^3 + 12x^2 - 15x - 18 &= (10x^3 + 12x^2) + (-15x - 18) \\
 &= 2x^2(5x + 6) + -3(5x + 6) \\
 &= (5x + 6)(2x^2 - 3)
 \end{aligned}$$

$$15) \quad x^2 + 12x + 35 = (x + 7)(x + 5)$$

Product = 35	Sum = 12
<u>$7 \cdot 5 = 35$</u>	<u>$7 + 5 = 12$</u>
$-7 \cdot -5 = 35$	$-7 + -5 = -12$

$$16) \quad x^2 - 2x - 35 = (x - 7)(x + 5)$$

Product = -35	Sum = -2
<u>$-7 \cdot 5 = -35$</u>	<u>$-7 + 5 = -2$</u>
$7 \cdot -5 = -35$	$7 + -5 = 2$

$$17) \quad x^2 - 12x + 35 = (x - 7)(x - 5)$$

Product = 35	Sum = -12
<u>$-7 \cdot -5 = 35$</u>	<u>$-7 + -5 = -12$</u>
$7 \cdot 5 = 35$	$7 + 5 = 12$

$$18) \quad x^2 - 5x - 24 = (x + 3)(x - 8)$$

Product = -24	Sum = -5
$-6 \cdot 4 = -24$	$-6 + 4 = -2$
$6 \cdot -4 = -24$	$6 + -4 = 2$
$-3 \cdot 8 = -24$	$-3 + 8 = 5$
<u>$3 \cdot -8 = -24$</u>	<u>$3 + -8 = -5$</u>

$$19) x^2 + 10x - 24 = (x - 2)(x + 12)$$

Product = -24

Sum = 10

$$-6 \cdot 4 = -24$$

$$-6 + 4 = -2$$

$$6 \cdot -4 = -24$$

$$6 + -4 = 2$$

$$\underline{-2 \cdot 12 = -24} \quad \underline{-2 + 12 = 10}$$

$$2 \cdot -12 = -24$$

$$-12 + 2 = -10$$