

Section 5.4: Factoring Trinomials in the Form  $ax^2 + bx + c$  where  $a \neq 1$   
Chapter 5: Factoring

#1 – 18: Rewrite as a polynomial with 4 terms (if possible) then factor by grouping and check your answer, state if a polynomial is prime.

$$\begin{aligned} 1) \quad 5x^2 + 11x + 6 &= \underbrace{5x^2 + 5x}_{\text{Group 1}} + \underbrace{6x + 6}_{\text{Group 2}} \\ &= 5x(x+1) + 6(x+1) \\ &= (x+1)(5x+6) \end{aligned}$$

$$\begin{aligned} 3) \quad 5x^2 - 11x + 6 &= \underbrace{5x^2 - 5x}_{\text{Group 1}} - \underbrace{6x + 6}_{\text{Group 2}} \\ &= 5x(x-1) - 6(x-1) \\ &= (x-1)(5x-6) \end{aligned}$$

$$\begin{aligned} 5) 4x^2 + 7x + 3 &= 4x^2 + 4x \mid + 3x + 3 \\ &= 4x(x+1) + 3(x+1) \\ &= (x+1)(4x+3) \end{aligned}$$

$$\begin{aligned} 7) 4x^2 - 7x + 3 &= 4x^2 - 4x \mid - 3x + 3 \\ &= 4x(x-1) - 3(x-1) \\ &= (x-1)(4x-3) \end{aligned}$$

$$\begin{aligned} 9) 2z^2 + 5z - 7 &= \underbrace{2z^2 - 2z} + \underbrace{7z - 7} \\ &= 2z(z-1) + 7(z-1) \\ &= (z-1)(2z+7) \end{aligned}$$

$$\begin{aligned} 11) 2z^2 - 5z - 7 &= \underbrace{2z^2 - 7z} + \underbrace{2z - 7} \\ &= z(2z-7) + 1(2z-7) \\ &= (2z-7)(z+1) \end{aligned}$$

$$13) 6x^2 + 23x + 7$$

$$= \cancel{6x^2 + 21x} + 2x + 7$$

$$= 3x(2x+7) + 1(2x+7)$$

$$= (2x+7)(3x+1)$$

$$15) 3x^2 + 10x + 7$$

$$= 3x^2 + 7x + 3x + 7$$

$$= x(3x+7) + 1(3x+7)$$

$$= (3x+7)(x+1)$$

$$17) 5x^2 + 13x + 6$$

$$= (5x^2 + 10x) + (3x + 6)$$

$$= 5x(x+2) + 3(x+2)$$

$$= (x+2)(5x+3)$$

#19 - 38: Factor out the GCF and then factor by grouping

$$19) 4m^2 + 34m - 18$$

$$= 2(2m^2 + 17m - 9)$$

$$= 2(2m-1)(m+9)$$

$$2m^2 + 17m - 9$$

$$= (2m^2 - 1m) + (18m - 9)$$

$$= m(2m-1) + 9(2m-1)$$

$$= (2m-1)(m+9)$$

$$21) 4z^3 - 13z^2 + 3z = z(4z^2 - 13z + 3)$$

$$= z(4z-1)(z-3)$$

$$\begin{aligned} &4z^2 - 13z + 3 \\ &= 4z^2 - 1z - 12z + 3 \\ &= z(4z-1) - 3(4z-1) \\ &= (4z-1)(z-3) \end{aligned}$$

$$23) 20x^3 - 18x^2 + 4x$$

$$= 2x(10x^2 - 9x + 2)$$

$$= 2x(5x-2)(2x-1)$$

$$\begin{aligned} &10x^2 - 9x + 2 \\ &= 10x^2 - 4x - 5x + 2 \end{aligned}$$

$$= 2x(5x-2) - 1(5x-2)$$

$$= (5x-2)(2x-1)$$

$$25) -16x^2 + 44x - 10 = -2(8x^2 - 22x + 5)$$

$$= 2(2x-5)(4x-1)$$

$$8x^2 - 22x + 5$$

$$= 8x^2 - 20x - 2x + 5$$

$$= 4x(2x-5) - 1(2x-5)$$

$$= (2x-5)(4x-1)$$

$$27) 18x^2 - 21x - 15$$

$$= 3(6x^2 - 7x - 5)$$

$$6x^2 - 7x - 5$$

$$= 6x^2 - 10x + 3x - 5$$

$$= 2x(3x-5) + 1(3x-5)$$

$$= (3x-5)(2x+1)$$

$$= 3(3x-5)(2x+1)$$

$$29) 18x^3 - 21x^2 - 15x = 3x(6x^2 - 7x - 5)$$

See #27

$$= 3x(3x-5)(2x+1)$$

$$31) -18x^2 + 21x + 15 = -3(6x^2 - 7x - 5)$$

$$6x^2 - 7x - 5$$

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

$$= 2x(3x - 5) + 1(3x - 5)$$

$$= (3x - 5)(2x + 1)$$

$$= -3(3x - 5)(2x + 1)$$

$$33) 12x^2 + 10x + 12 =$$

$$2(6x^2 + 5x + 6)$$

$$6x^2 + 5x + 6$$

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MULT 36

ADD 5

This cannot be  
factored



$$35) 3x^3 + 5x^2 + 6x = x(3x^2 + 5x + 6)$$

Cannot  
factor  
further

$$37) 4b^3 + 6b^2 - 6b = 2b(2b^2 + 3b - 3)$$

Cannot  
factor  
further

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