

FOLDER 1

1 $(x+77)(x-43) = 0$ Equal to zero

$$(x+77) = 0$$

$$x = -77 \text{ or}$$

$$x-43 = 0$$

$$x = 43$$

$$x = 43 \text{ or } -77$$

2 $x^2 + 5x - 14 = 0$

$$x^2 - 2x + 7x - 14 = 0$$

$$x(x-2) + 7(x-2) = 0$$

$$(x+7)(x-2) = 0$$

$$(x+7) = 0$$

$$x = -7 \text{ or}$$

$$(x-2) = 0$$

$$x = 2$$

$$\Rightarrow x = 2 \text{ or } x = -7$$

Look for two numbers
where Product is

-14 and Sum is

5. The two numbers

are -2 and 7

92

3 $x^2 - 11x + 18 = 0$

$$x^2 - 2x - 9x + 18 = 0$$

$$x(x-2) - 9(x-2) = 0$$

$$(x-9)(x-2) = 0$$

$$(x-2) = 0$$

$$x = 2 \text{ or}$$

$$(x-9) = 0$$

$$x = 9$$

$$\Rightarrow x = 2 \text{ or } 9$$

Look for two numbers
where the Product is

18 and Sum is -11

(-9 and -2)

4

FOLDER 1

$$12x^2 + 60x = 0$$

factor out the common terms

$$\frac{12x(x+5)}{12} = \frac{0}{12}$$

12x

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

$$x = 0 \quad \text{or}$$

$$x+5 = 0$$

$$x = -5$$

$$\Rightarrow x = 0 \quad \text{or} \quad -5$$

5

$$2x^2 + 5x - 12 = 0$$

$$(2x, -3)(x, 4) = 0$$

$$(2x-3)(x+4) = 0$$

$$(2x-3) = 0$$

$$2x = 3$$

$$x = \frac{3}{2} \quad \text{or}$$

$$(x+4) = 0$$

$$x = -4$$

$$x = \frac{3}{2} \quad \text{or} \quad -4$$

✓ fact $2x^2$ firstto have $(2x, -)(x,)$

✓ Then find the factors

of 12 such that
the ^{sum} product of
middle terms and
the first term is
equal to $5x$

FOLDER 1

$$6 \quad 3x^2 - 10x + 3 = 0$$

$$(3x - 1)(x - 3) = 0$$

$$(3x - 1) = 0$$

$$3x = 1$$

$$x = \frac{1}{3} \text{ or}$$

$$(x - 3) = 0$$

$$x = 3 \Rightarrow x = \frac{1}{3} \text{ or } 3$$

if you have

$$3x^2 - 3 = -9x$$

$$+ 1x^2 = -x$$

middle
term

$$-10x$$

$$7 \quad 3x^2 - 13x + 10 = 0$$

$$(3x - 10)(x - 1) = 0$$

$$(3x - 10)(x - 1) = 0$$

$$(3x - 10) = 0$$

$$3x = 10$$

$$x = \frac{10}{3} = 3\frac{1}{3}$$

$$x - 1 = 0$$

$$x = 1 \Rightarrow x = 3\frac{1}{3} \text{ or } 1$$

FOLDEN 1

8

$$5x^2 + 24x - 6 = 0$$

$$(5x+1)(x-6) = 0$$

$$\text{such that } 5x+1 = -6x \\ + x \cdot x = x$$

$$(5x+1) = 0$$

$$\text{middle term } -24x$$

$$5x = -1$$

$$x = -\frac{1}{5} \text{ or}$$

$$x-6 = 0$$

$$x = 6 \Rightarrow x = -\frac{1}{5} \text{ or } 6$$

9

$$3x^2 + 5x - 2 = 0$$

$$(3x-1)(x+2) = 0$$

$$3x-1 = 0$$

$$3x = 1$$

$$x = \frac{1}{3} \text{ or}$$

$$x+2 = 0$$

$$x = -2$$

$$x = \frac{1}{3} \text{ or } -2$$

FOLDER 2

1 Write the polynomial in factored form

$$x^2 - 3x - 10 = 0$$

Look for two numbers

$$x^2 + 2x - 5x - 10 = 0$$

that product is -10
and sum is -3

$$x(x+2) - 5(x+2) = 0 \quad (-5 \text{ and } 2)$$

$$(x-5)(x+2) \Rightarrow \text{Final answer}$$

$$(x+5) = 0$$

$$x = -5$$

$$x+2 = 0$$

$$x = -2$$

Zero Product Property

* If $ab = 0$, then either $a = 0$ or $b = 0$. *

If the product of two quantities is zero,
then at least one of the quantities is zero

Solve the Equations by Factoring

$$2 \quad (x-2)(x+1) = 0$$

$$(x-2) = 0$$

$$x = 2 \quad \text{or}$$

$$(x+1) = 0$$

$$x = -1$$

$$x = 2 \text{ or } -1$$

FOLDER 2

$$3 \quad x(4x+5) = 0$$

$$x = 0 \text{ or}$$

$$(4x+5) = 0$$

$$4x = -5$$

$$x = -\frac{5}{4}$$

$$x = 0 \text{ or } -\frac{5}{4}$$

$$4 \quad x^2 - 7x + 10 = 0$$

$$x^2 - 2x - 5x + 10 = 0$$

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

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

$$(x-5) = 0$$

$$x = 5 \text{ or}$$

$$(x-2) = 0$$

$$x = 2$$

$$\Rightarrow x = 2 \text{ or } 5$$

$$5 \quad x^2 - 3x - 54 = 0$$

$$x^2 + 6x - 9x - 54 = 0$$

$$x(x+6) - 9(x+6) = 0$$

$$(x-9)(x+6) = 0$$

$$x-9 = 0$$

$$x = 9 \text{ or}$$

$$x+6 = 0$$

$$x = -6$$

$$\Rightarrow x = -6 \text{ or } 9$$

FOLDER 2

6 $8x^2 - 9x + 1 = 0$

$$(8x, -) (x, -) = 0$$

check on factors of 1

-1 and -1 are factors of 1
 $(8x+1)(x-1) = 0$

$$(8x-1)(x-1) = 0$$

$$8x-1 = 0$$

$$8x = 1$$

$$x = \frac{1}{8} \text{ or}$$

$$x-1 = 0$$

$$x = 1 \Rightarrow x = \frac{1}{8} \text{ or } 1$$

7 $4x^2 + 11x - 3 = 0$

$$(4x, -) (x, -) \Rightarrow \text{factor out } 4x^2$$

Factors of -3 are 3 and -1

$$(4x-1)(x+3) = 0$$

$$(4x-1) = 0$$

$$4x-1 = 0$$

$$4x = 1$$

$$x = \frac{1}{4}$$

$$x+3 = 0$$

$$x = -3$$

$$x = -2 \Rightarrow x = \frac{1}{4} \text{ or } -3$$

FOLDER 3

Factoring

1. $3x^2 + 7x + 4$
 $(3x + 4)(x + 1)$

⇒ Factor out $3x^2$ first
as $(3x,) (x,)$

⇒ Then look for two
factors of 4 such that
they must give you
the middle term

$(4 \text{ and } 1)$ Factors

2. $7x^2 + 10x - 8$

✓ Factor out $7x^2$ as $(7x, -)(x, -)$

✓ Then check on two factors of -8

✓ -4 and 2 are factors of -8

$(7x - 4)(x + 2)$ ⇒ ANS such that

$$7x \times 2 = 14x +$$

$$x \times -4 = -4x$$

$10x$

← Middle term of eqn 2

3. $2x^2 - 5x - 42$

$(2x, -)(x, -)$

⇒ look for two factors
of -42 that will
give you the
middle term $-5x$

-6 and 7 are
factors of -42

$(2x + 7)(x - 6)$

FOLDER 3

4 $3x^2 - 14x + 20$

$(3x, -)(x, -)$ look for two factors of 20

-4 and -5 are factors of 20

$$(3x - 4)(x - 5)$$

$$(3x - 4)(x - 5)$$

5 $5x^2 - 42x - 27$

$(5x, -)(x, -)$ check for two factors of -27

3 and -9 are two factors of ~~42~~ -27

$$(5x + 3)(x - 9)$$

$$\Rightarrow 5x \cdot x - 9 = -45x$$

$$3x \cdot 3 = 9x$$

$$\text{middle term} \Rightarrow -42x$$

6 $5x^2 - x - 4$

$(5x, -)(x, -)$ check factors of -4

4 and -1 are factors of -4 such that

$$(5x + 4)(x - 1)$$

$\Rightarrow$ PROVE middle term = -x

$$5x \cdot x = 5x^2$$

$$4x \cdot x = 4x^2$$

$$= 9x^2$$

$$\text{middle term} = -x$$

FOLDER 3

7 Factor out the GCF and then factor trinomial

$$6x^2 + 40x - 14$$

$$2(3x^2 + 20x - 7)$$

$$3x^2 + 20x - 7$$

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

Factors of -7 are
-1 and 7

$$2[(3x + 1)(x + 7)]$$

8 $10x^2 - 15x - 135$

Factor Greatest Common
Factor

$$5[2x^2 - 3x - 27]$$

$$2x^2 - 3x - 27$$

Factors of -27 are
-9 and 3

$$(2x + 9)(x - 3)$$

$$5[(2x + 9)(x - 3)]$$

9 $15x^2 - 100x + 125$

$$5(3x^2 - 20x + 25)$$

$$3x^2 - 20x + 25$$

- Factors of 25 are

$$(3x - 5)(x - 5)$$

$$5[(3x - 5)(x - 5)] = \text{ANS}$$

FOLDER 4

1 $4x - 5x^3 + 9x^5 + 1$
 $9x^5 - 5x^3 + 4x + 1$

2 $3.5a + 4a^3 - a^4$
 $a^4 + 4a^3 + 3.5a$

3 Add and Simplify

$$\begin{aligned} & -3(2x^2 - 4x - 3) + 5(3x^2 + 9x - 7) \\ & = 6x^2 + 12x + 9 + 15x^2 + 45x - 35 \\ & \quad 9x^2 + 57x - 26 \\ & \quad 9x^2 + 57x - 26 \\ & \quad 9x^2 + 57x - 26 \end{aligned}$$

Subtract

$$\begin{aligned} & (5x^3 - 2x + 3) - (-3x^3 + 4x + 4) \\ & 5x^3 - 2x + 3 + 3x^3 - 4x - 4 \\ & 8x^3 - 6x - 1 \end{aligned}$$

FOLDER 4

5

Multiply

$$(3x+4)(-6x-5)$$

$$-18x - 15x - 24x - 20$$

$$= -57x - 20$$

6

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

$$= x^2 - 20x + 100$$

7

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

$$9x^2 + 12x - 12x - 16$$

$$9x^2 - 16$$

8

Factor completely by taking GCF

$$4y^4 - 20y^3$$

$$4y^3(y-5)$$

$$GCF = 4y^3$$

9

$$16x^3y + 4x^2y^2 = 8xy$$

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

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

$$GCF = 4xy$$

FOLDER 4

10 Factor GCF if possible and then Factor the Trinomial

$$x^2 + 11x + 18$$

$$x^2 + 2x + 9x + 18$$

$$x(x+2) + 9(x+2)$$

$$(x+2)(x+9)$$

look for two numbers
when you multiply you
get 18 and when you
add them you get 11

11 $x^2 + 2x - 24$ ⁶⁴ ↗

$$x^2 - 4x + 6x - 24$$

$$x(x-4) + 6(x-4)$$

$$(x+6)(x-4)$$

12 $-3x^4 + 21x^3 - 30x^2$

$$-3x[x^3 - 7x^2 + 10x]$$

$$-3x^2[x^2 - 7x + 10]$$

$$-3x^2[x^2 - 7x + 10] *$$

$$x^2 - 2x - 5x + 10$$

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

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

$$-3x^2[(x-2)(x-5)]$$

ANS

13 $2x^2 + 5x + 2$

$$(2x, -)(x, -)$$

1 and 2 are factors of
2

$$(2x+1)(x+2)$$

$$(2x+1)(x+2) \Rightarrow \text{ANS}$$

END