DAY 4 - Simple Trinomial Factoring – Sum & Product

1. Factor each trinomial. Check your answers by expanding.

a) $x^2 + 12x + 36$

x x 1 2 3 4 6 / 36 18 12 9 6

$= (x+6)(x+6)$

b) $x^2 - 12x + 27$

x x -1 -3 / -27 -9

$= (x-3)(x-9)$

c) $x^2 + 7x - 30$

x x 1 2 -3 5 / 30 15 10 6

$(x-3)(x+10)$

d) $x^2 - 16x - 36$

x x 1 2 3 4 6 / 36 -18 12 9 6

$(x+2)(x-18)$

/4

2. For each rectangle, find the binomials that represent the length and the width.

a) $A = x^2 + 4x + 4$

x x 1 2 / 4 2

$A = (x+2)(x+2)$

$\therefore L = x+2$
$W = x+2$

b) $A = x^2 - 4x - 5$

x x 1 / -5

$A = (x+1)(x-5)$

$\therefore L = x+1$
$W = x-5$

c) $A = x^2 + 9x - 22$

x x 1 -2 / 22 11

$A = (x-2)(x+11)$

$\therefore L = x-2$
$W = x+11$

d) $A = x^2 - 9x + 20$

x x 1 2 -4 / 20 10 -5

$A = (x-4)(x-5)$

$\therefore L = x-4$
$W = x-5$

/8

Factor, if possible.

3. $x^2 + 8x + 12$

x x 1 2 3 / 12 6 4

$(x+2)(x+6)$

4. $c^2 - 3c - 18$

c c 1 2 3 / 18 9 -6

$(c+3)(c-6)$

5. $d^2 + 10d + 21$

d d 1 3 / 21 7

$(d+3)(d+7)$

6. $d^2 - 12d + 35$

d d 1 -5 / 35 -7

$(d-5)(d-7)$

7. $x^2 + x + 1$

can't

8. $c^2 - 11c + 30$

c c 1 2 3 -5 / 30 15 10 -6

$(c-5)(c-6)$

/9

9. $y^2 + 15y + 56$

y y 1 2 4 7 / 56 28 14 8

$(y+7)(y+8)$

10. $x^2 - x - 72$

x x 1 2 3 4 6 8 / 72 36 24 18 12 -9

$(x+8)(x-9)$

11. $x^2 - 9x + 0$

x x 0 / -9

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

OR $x\left(\frac{x^2}{x} + \frac{9x}{x}\right)$

$x(x+9)$

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Factor completely

12. $3\left(\frac{3x^2}{3} + \frac{21x}{3} + \frac{30}{3}\right)$

$= 3(x^2 + 7x + 10)$

$x \quad x \qquad 1 \; 10 \quad 2 \; 5$

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

13. $-1\left(\frac{-x^2}{-1} + \frac{4x}{-1} - \frac{3}{-1}\right)$

$= -1(x^2 - 4x + 3)$

$x \quad x \qquad -3 \; -1$

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

14. $4\left(\frac{4x^2}{4} - \frac{12x}{4} - \frac{72}{4}\right)$

$= 4(x^2 - 3x - 18)$

$x \quad x \qquad 1 \; 18 \quad 2 \; 9 \quad 3 \; -6$

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

15. $2\left(\frac{2x^2}{2} + \frac{4x}{2} + \frac{2}{2}\right)$

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

$x \quad x \qquad 1 \; 1$

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

/8

16. The area of an Olympic-sized pool is modelled by the quadratic equation $A = x^2 + 9x + 8$.

a) Find expressions for the dimensions of the pool.

b) Suppose the length of the pool is 33 m. Find the area of the pool.

ⓐ $A = x^2 + 9x + 8$

$x \quad x \qquad 8 \; 1 \quad 4 \; 2$

$= (x+8)(x+1)$

$\therefore L = x + 8$

$W = x + 1$

ⓑ $33 = x + 8$

$25 = x$

$A = 25^2 + 9(25) + 8$

$= 625 + 225 + 8 = 858 \text{ m}^2$

/8

17. The area of Rheena's original garden is represented by the trinomial $x^2 + 12x + 36$.

a) Factor the trinomial to find the length and width of her original garden.

b) What is the shape of Rheena's garden? How do you know?

c) Calculate the actual dimensions if $x = 1$ m.

ⓐ $x^2 + 12x + 36$

$x \quad x \qquad 1 \; 36 \quad 2 \; 18 \quad 3 \; 12 \quad 4 \; 9 \quad 6 \; 6$

$(x+6)(x+6)$

$\therefore L = x + 6$

$W = x + 6$

ⓒ $L = 1 + 6 = 7\text{m}$

$W = 7\text{m}$

ⓑ It's a square since $L = W$

18. The perimeter of a rectangle is 32 cm. Its area is shown in the diagram. Find the actual dimensions of the rectangle.

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

$x \quad x \qquad 1 \; 14 \quad -2 \; 7$

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

W L

$\boxed{P = 2L + 2W}$

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$32 = 2(x+7) + 2(x-2)$

$32 = 2x + 14 + 2x - 4$

$32 = 4x + 10$

$22 = 4x$

$5.5 = x$

$\therefore L = x + 7 = 5.5 + 7 = 12.5 \text{ cm}$

$W = x - 2 = 5.5 - 2 = 3.5 \text{ cm}$

19. The perimeter of a rectangular sandbox is 30 m. The area is represented by $x^2 + 7x - 8$. Find the actual dimensions of the sandbox.

$A = x^2 + 7x - 8$

$x \quad x \qquad -1 \; 8 \quad 2 \; 4$

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

W L

$\boxed{P = 2L + 2W}$

$30 = 2(x+8) + 2(x-1)$

$30 = 2x + 16 + 2x - 2$

$30 = 4x - 14$

$16 = 4x$

$4 = x$

$\therefore L = x + 8$

$= 4 + 8$

$= 12\text{ m}$

$W = x - 1$

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