Exercise: Algebraic Break-even

An toy store sells soccer balls. The unit variable costs are $5. The selling price of a ball is $12. Fixed costs for the period are $2805.
The capacity is 1200 soccer balls for the period.

Using the algebraic method, find the break-even point in units and in dollars.

Step 1 Find the *TR* equation

$TR = SP \times Q \Rightarrow \qquad TR = 12Q$

Step 2 Find the *TC* equation.

$TC = TVC + FC$
$TVC = \text{VC} \times \text{Q} \Rightarrow TVC = 5Q$
$FC = 2805$
$TC = 5Q + 2805$

Step 3 Write the equation $TR = TC$ and solve it to find the break-even point in units.

We know that at the break-even point $TR = TC \Rightarrow 12Q = 5Q + 2805$

We solve this equation for the break-even point in units, (Q).

$12x - 5x = 2805 \;\Rightarrow\; 17x = 2805 \;\Rightarrow\; Q = 165$

The break-even point in units is 165. The store has to sell 165 balls to break even. When it sells more than 165 balls, it makes a profit. When it sells less than 165 balls, it incurs a loss.

Step 4 Substitute the break-even point in units into the *TR* equation to find the break-even point in dollars.

$TR = 12Q \Rightarrow \quad TR = (12) \times (165) \Rightarrow TR = \$1980$
The break-even point in dollars is $1980.