Name: …………………..………….   Date: ………………..

1. Solve $x^2 + 5x + 6 = 0$

$$x^2 + 5x + 6 = 0$$
$$x^2 + 3x + 2x + 6 = 0$$
$$x(x+3) + 2(x+3) = 0$$
$$(x+3)(x+2) = 0$$

$$x+3 = 0 \quad | \quad x+2 = 0$$
$$x = -3 \quad | \quad x = -2$$

2. Victor is y years old.
    His brother Fred is **4 years older** than Victor.
    The product of their ages is **780**.

    (a) Write an equation in terms of y to represent this situation.

    Fred's age is $y+4$

    (b) Solve the equation to find Victor's age.

$$y(y+4) = 780$$

$$y(y+4) = 780$$
$$y^2 + 4y = 780$$
$$y^2 + 4y - 780 = 0$$
$$y^2 + 30y - 26y - 780 = 0$$
$$y(y+30) - 26(y+30) = 0$$

$$(y+30)(y-26)=0$$

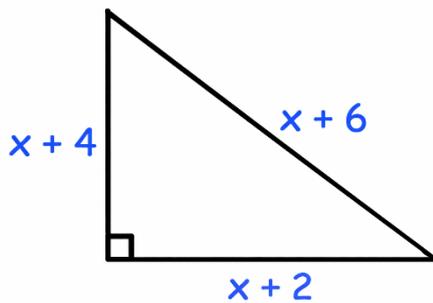$$y+30=0 \quad \text{or} \quad y-26=0$$

$$y=-30 \qquad\qquad y=26$$

Since age can't be negative

$$y=26.$$

Victor's age is 26 years old.

3. The diagram shows a right-angled triangle.

(a) Form a quadratic equation in terms of x.

By using right angled rule

$$(x+4)^2 + (x+2)^2 = (x+6)^2$$

(b) Solve the equation to find the value of x.

$$(x+4)^2 + (x+2)^2 = (x+6)^2$$

$$x^2+8x+16+x^2+4x+4 = x^2+12x+36$$

$$2x^2+12x+20 = x^2+12x+36$$

$$2x^2-x^2+12x-12x+20-36=0$$

$$x^2-16=0$$

$$x^2-16=0$$

$$x^2=16$$

$$x=\pm\sqrt{16}$$

$$x=\pm 4$$

Reject negative value

$$x=4$$

4.

Solve $\dfrac{25}{m + 3} = m + 3$

$$\frac{25}{m+3} = m+3$$

$$25 = (m+3)(m+3)$$

$$25 = m^2 + 3m + 3m + 9$$

$$25 = m^2 + 6m + 9$$

$$m^2 + 6m + 9 - 25 = 0$$

$$m^2 + 6m - 16 = 0$$

$$m^2 + 8m - 2m - 16 = 0$$

$$m(m+8) - 2(m+8) = 0$$

$$(m+8)(m-2) = 0$$

$$m + 8 = 0 \quad | \quad m - 2 = 0$$

$$m = -8 \quad | \quad m = 2$$

Since $m + 3 \neq 0$

$$\Rightarrow m = -3$$

both values are valid.

$$\therefore m = 2 \text{ or } m = -8$$