Werkkaart 2015-11AC-00014(4)

(1) Los op vir x deur van **twee** verskillende metodes gebruik te maak: $2x^2 - 8x + 4 = 0$
Waar nodig, laat jou antwoord in eenvoudigste wortelvorm.

Metode 1: (Formule)

$2x^2 - 8x + 4 = 0$

$a = 2 \qquad b = -8 \qquad c = 4$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(4)}}{2(2)}$$

$$= \frac{8 \pm \sqrt{32}}{4}$$

$$x = 2 \pm \sqrt{2}$$

Metode 2: (Vierkantsvoltooiing)

$$2x^2 - 8x + 4 = 0$$

$$\frac{2x^2}{2} - \frac{8x}{2} + \frac{4}{2} = \frac{0}{2}$$

$$x^2 - 4x + 2 = 0$$

$$x^2 - 4x = -2$$

$$x^2 - 4x + \left(\frac{4}{2}\right)^2 = -2 + \left(\frac{4}{2}\right)^2$$

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

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

$$x - 2 = \pm\sqrt{2}$$

$$x = 2 \pm \sqrt{2}$$

(2) Beskou: $(2x - 1)(y + 4) = 0$. Vir watter waardes van y sal:

(a) $x = -1$ (b) $x = \frac{1}{2}$

(a) $(2(-1)-1)(y+4) = 0$

$(-2-1)(y+4) = 0$

$\therefore y+4 = \frac{0}{-3}$

$y = -4$

(b) $(2(\frac{1}{2})-1)(y+4) = 0$

$(1-1)(y+4) = 0$

$0(y+4)$

$\therefore y \in \mathbb{R}$, want een faktor is reeds 0.

(3) As $f(x) = x^2 + 6x$ en $g(x) = 8 - x^2$, bereken:
[Waar nodig, laat jou antwoord in eenvoudigste wortelvorm.]

(a) x as $g(x) = 0$ (b) $f(-6)$

(c) x as $f(x) = g(x)$

(a) $g(x) = 0$

$8 - x^2 = 0$

$8 = x^2$

$\pm\sqrt{8} = x$

$\therefore x = \pm 2\sqrt{2}$

(b) $f(x) = x^2 + 6x$

$f(-6) = (-6)^2 + 6(-6)$

$\therefore f(-6) = 36 - 36$

$f(-6) = 0$

(c) $f(x) = g(x)$

$x^2 + 6x = 8 - x^2$

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

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

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

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

$x = -4$ of $x = 1$

(4) Bepaal $\frac{y}{x}$ as $4x^2 - 4xy - 3y^2 = 0$

$4x^2 - 4xy - 3y^2 = 0$

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

$2x = 3y$ of $-2x = 1y$

$\therefore \frac{y}{x} = \frac{2}{3}$ $\quad\therefore \frac{y}{x} = -\frac{2}{1}$

$\frac{y}{x} = -2$

(5) (a) Toon aan dat $3(x + 1)^2 + 4 > 0$ vir alle reële waardes van x.

(b) Vervolgens of andersins, los op vir x: $\frac{x^2 - 4}{3(x + 1)^2 + 4} \leq 0$

(a) $3(x+1)^2 + 4 > 0$:

$(x+1)^2 \geq 0 \quad \forall\ x \in \mathbb{R}$

$\therefore 3(x+1)^2 \geq 3 \times 0 \quad \forall\ x \in \mathbb{R}$

$\therefore 3(x+1)^2 \geq 0$

$3(x+1)^2 + 4 \geq 0 + 4 \quad \forall\ x \in \mathbb{R}$

$\therefore 3(x+1)^2 + 4 \geq 4$

$\therefore 3(x+1)^2 + 4 > 0 \quad \forall\ x \in \mathbb{R}$

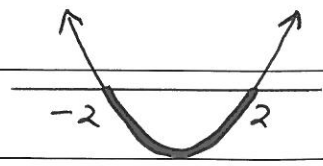
(b) $\frac{x^2 - 4}{3(x+1)^2 + 4} \leq 0$

$\frac{x^2 - 4}{+} \leq 0$ (sien (a))

$\therefore x^2 - 4 \leq 0$ want $\frac{-}{+} \leq 0$

$(x-2)(x+2) \leq 0$

$[\, x = 2$ of $x = -2 \,]$



$\therefore -2 \leq x \leq 2$