Sketching Quadratic Graphs

(a) Sketch the graph of $y = x^2 - 2x - 3$
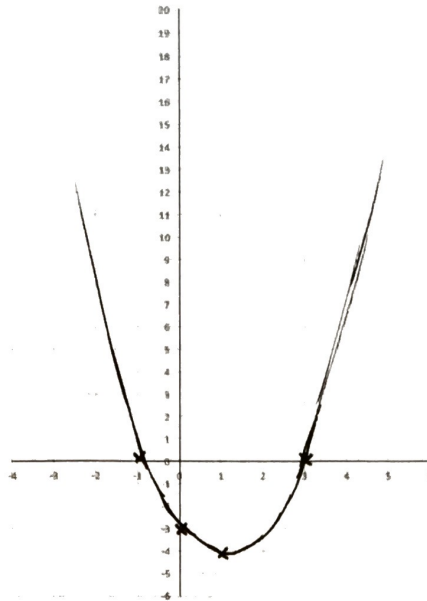
Shape – Is it u-shaped or n-shaped?

U

Turning Point– Complete the square into the format $(x - p)^2 + q$ where the turning point is (p, q)

$(x-1)^2 - 4$

$(1, -4)$

Y-Axis – Find out where it crosses the y-axis by putting $x = 0$.

$(0, -3)$

X-Axis – Find out where it crosses the x-axis by putting $y = 0$, then solving the quadratic equation.

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

$x = 3, x = -1$

$(3, 0)$

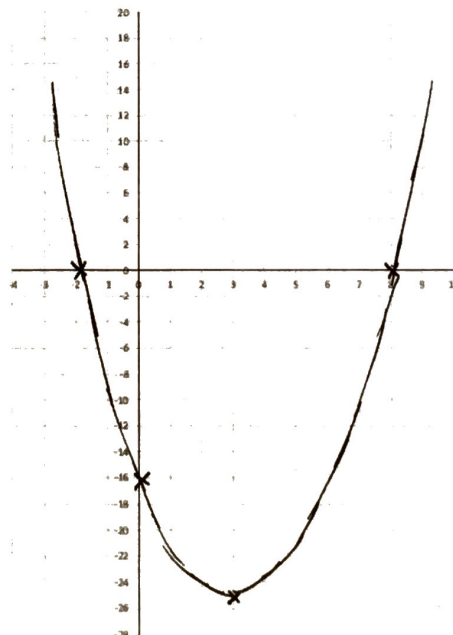$(-1, 0)$

(b) Sketch the graph of $y = x^2 - 6x - 16$

Shape – Is it u-shaped or n-shaped?

U

Turning Point– Complete the square into the format $(x - p)^2 + q$ where the turning point is (p, q)

$(x-3)^2 - 25$

$(3, -25)$

Y-Axis – Find out where it crosses the y-axis by putting $x = 0$.

$(0, -16)$

X-Axis – Find out where it crosses the x-axis by putting $y = 0$, then solving the quadratic equation.

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

$x = 8, x = -2$

$(8, 0)$

$(-2, 0)$

(c) Sketch the graph of $y = 12 + 4x - x^2$

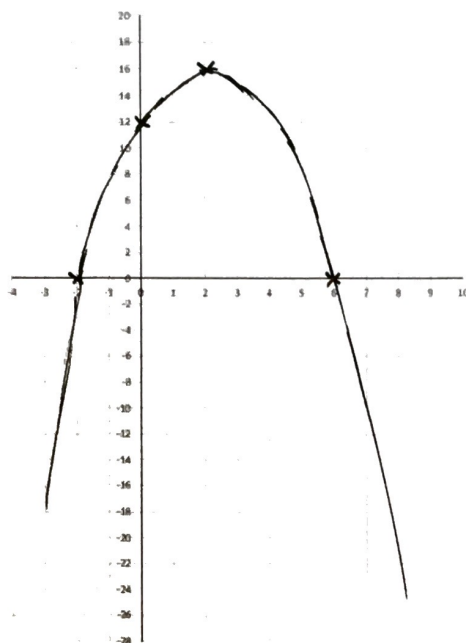**Shape** – Is it ∪-shaped or ∩-shaped?

∧

Turning Point– Complete the square into the format $q - (x - p)^2$ where the turning point is (p, q)

$16 - (x-2)^2$

$(2, 16)$

Y-Axis – Find out where it crosses the y-axis by putting $x = 0$.

$(0, 12)$

X-Axis – Find out where it crosses the x-axis by putting $y = 0$, then solving the quadratic equation.

$(6 - x)(2 + x) = 0$

$x = 6 , x = -2$

$(6, 0)$

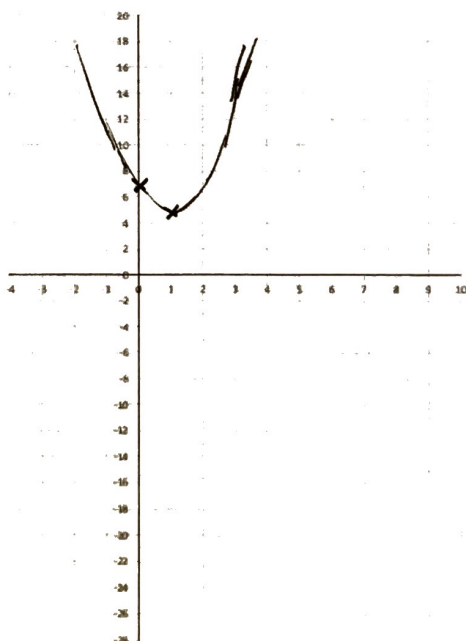$(-2, 0)$

(d) Sketch the graph of $y = 2x^2 - 4x + 7$

Shape – Is it ∪-shaped or ∩-shaped?

∪

Turning Point– Complete the square into the format $a(x - p)^2 + q$ where the turning point is (p, q)

$2(x-1)^2 + 5$

$(1, 5)$

Y-Axis – Find out where it crosses the y-axis by putting $x = 0$.

$(0, 7)$

X-Axis – Find out where it crosses the x-axis by putting $y = 0$, then solving the quadratic equation.

using formula

$x = \dfrac{4 \pm \sqrt{-12}}{4}$

no real solutions