

Question 2.

a) $y = -4x + 5$.

(i) $y = mx + c$
 | |
 gradient y-intercept.

$$y = -4x + 5$$

Gradient, $M = -4$.

ii) $y = -4x + 5$

$$x = 0$$

$$y = -4(0) + 5$$

$$y = 5$$

$$(0, 5)$$

$$x = -1$$

$$y = -4(-1) + 5$$

$$y = 4 + 5 = 9$$

$$(-1, 9)$$

$$M = \frac{\Delta y}{\Delta x} = \frac{9-5}{-1-0} = \frac{4}{-1} = -4 \Rightarrow M = -4.$$

iii) for parallel lines $M_1 = M_2$.

$$\therefore M_2 = -4. \quad (0, 2) (x, y).$$

$$\frac{-4}{1} = \frac{y-2}{x} \Rightarrow y-2 = -4x$$
$$y = -4x + 2.$$

iv) $y = 11$ $y = -4x + 5$

$$-4x + 5 = 11$$

$$-4x = 11 - 5$$

$$-4x = 6$$

$$-4 \quad -4$$

$$x = -1.5$$

$$y = 11$$

Coordinate $(-1.5, 11)$ or

$$(-\frac{3}{2}, 11)$$

6) (i) $y = 2x^2 - 3x - 5$
The parabola is U-shaped.

$$y = ax^2 + bx + c$$

$$y = 2x^2 - 3x - 5$$

$a > 0$, hence the parabola opens upwards
(U-shaped)

(ii) y-intercept, $x = 0$

$$y = 2(0)^2 - 3(0) - 5$$

$$y = 0 - 0 - 5$$

$$y = -5$$

$$\text{y-intercept} = -5$$

(iii) Minimum point $\frac{dy}{dx} = 0$.

$$\frac{dy}{dx} = 4x - 3$$

$$4x - 3 = 0$$

$$4x = 3$$

$$x = \frac{3}{4}$$

$$y = 2\left(\frac{3}{4}\right)^2 - 3\left(\frac{3}{4}\right) - 5$$

$$y = \frac{9}{8} - \frac{9}{4} - 5$$

$$y = -\frac{49}{8}$$

$\therefore$ axis of symmetry $x = \frac{3}{4}$.

(iv) $(-1, 2)$

$$y = 2x^2 - 3x - 5$$

$$2 = 2(-1)^2 - 3(-1) - 5$$

$$2 = 2 + 3 - 5$$

$$2 \neq 0$$

$\therefore (-1, 2)$ does not lie on the parabola.