

COORDINATE GEOMETRY(I)

Form 6

Vol 4

Part 8 – Vertex/Intersection

1. (a) y -intercept = -1

(b) $2x^2 + 4x - 1 = 0$

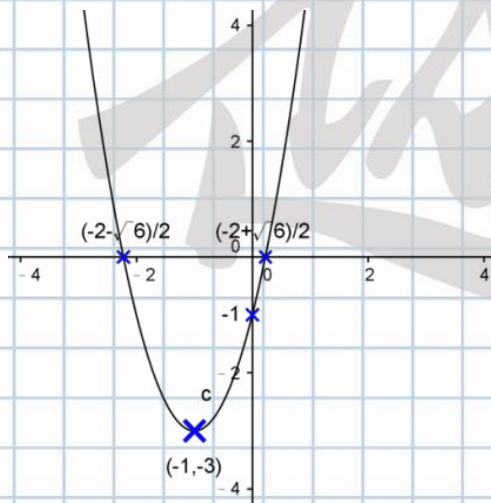
$$x = \frac{-2 \pm \sqrt{6}}{2}$$

$$x\text{-intercept} = \frac{-2 \pm \sqrt{6}}{2}$$

(c) $f(x) = 2(x+1)^2 - 3$

Vertex = $(-1, -3)$

(d)



$$\begin{aligned}
 2. \quad (a) \quad y &= \frac{1}{2}(x^2 - 24ax) - 9 \\
 &= \frac{1}{2}[(x-12a)^2 - 144a^2] \\
 &= \frac{1}{2}(x-12a)^2 - 72a^2 - 9 \\
 -72a^2 - 9 &= -17 \\
 a^2 &= \frac{1}{9} \\
 a &= \pm \frac{1}{3}
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad \text{When } a &= -\frac{1}{3}, \\
 y\text{-intercept} &= -9 \\
 \text{Vertex} &= (-4, -17)
 \end{aligned}$$

$$3. \quad V = (2, 9), \quad C = (0, 5)$$

Put $y = 0$,

$$(x-2)^2 = 9$$

$$x = 2 \pm 3$$

$$x = -1(\text{rej.}) \text{ or } x = 5$$

$$B = (5, 0)$$

$$\text{Area of } OCVB = \frac{1}{2}(5+9)(2) + \frac{1}{2}(9)(3) = 27.5$$

$$4. \quad 3x^2 + 7x - 1 = 0$$

$$2x^2 = -\frac{14}{3}x + \frac{2}{3}$$

$$2x^2 - 5x = -\frac{29}{3}x + \frac{2}{3}$$

$$2x^2 - 5x + 1 = -\frac{29}{3}x + \frac{5}{3}$$

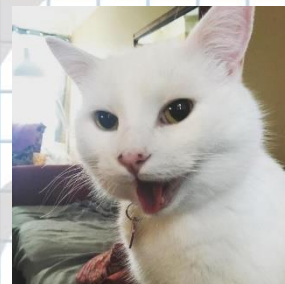
Therefore, $y = -\frac{29}{3}x + \frac{5}{3}$ should be added.

$$5. \quad x^2 + \frac{3}{2}x - 4 = 0$$

$$-x^2 + 1 = \frac{3}{2}x - 3$$

Therefore, $y = \frac{3}{2}x - 3$ should be added.

走去 expand 正傻仔



$$6. \quad (a) \quad \begin{cases} y = x^2 - x - 3 \\ y = 3x + k \end{cases}$$

$$x^2 - 4x - (3+k) = 0$$

$$a_1 + b_1 = 4$$

$$a_1 b_1 = -3 - k$$

$$(b) \quad x\text{-coordinate of the mid-point} = \frac{a_1 + b_1}{2} = 2$$

Put $x = 2$ into $y = 3x + k$,

$$y = 3(2) + k = 6 + k$$

Coordinate of mid-point = $(2, k + 6)$

(c) Since $a_1 < 0 < b_1$, P is between A and B .

By section formula,

$$P = \left(\frac{3a_1 + 2b_1}{5}, \frac{3a_2 + 2b_2}{5} \right)$$

Since P is the y -intercept of the line, $P = (0, k)$

$$\frac{3a_1 + 2b_1}{5} = 0 \quad \text{and} \quad \frac{3a_2 + 2b_2}{5} = k$$

$$\Rightarrow 3a_1 + 2b_1 = 0 \quad \text{and} \quad \frac{3a_2 + 2b_2}{5} = k$$

From (a), $a_1 + b_1 = 4$

$$\begin{cases} a_1 + b_1 = 4 \\ 3a_1 + 2b_1 = 0 \end{cases}$$

By solving, $a_1 = -8, b_1 = 12$

From (a), $a_1 b_1 = -3 - k$

$$(-8)(12) = -3 - k$$

$$k = 93$$

7. B

Idea:

加: $y = ?$ (橫線) 先可以同 $f(x)$ 相交 3 點

實識做啦!

