



$$\begin{aligned}
 1. \quad & -3x^2 - 18x = -7 \\
 & x^2 + 6x = \frac{7}{3} \\
 & x^2 + 6x + (3)^2 = \frac{7}{3} + (3)^2 \\
 & (x + 3)^2 = \frac{34}{3} \\
 & \sqrt{(x + 3)^2} = \pm \sqrt{\frac{34}{3}} \\
 & x + 3 = \sqrt{\frac{34}{3}} \qquad x + 3 = -\sqrt{\frac{34}{3}} \\
 & x = 0.3665 \qquad x = -6.3665
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & x^2 = 4(2x + 3) \\
 & x^2 = 8x + 12 \\
 & x^2 - 8x - 12 = 0 \\
 & x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(-12)}}{2(1)} \\
 & = \frac{8 \pm \sqrt{112}}{2} \\
 & x = \frac{8 + \sqrt{112}}{2} \quad \text{atau / or} \quad x = \frac{8 - \sqrt{112}}{2} \\
 & = 9.29 \qquad \qquad \qquad = -1.29 \text{ (tidak diterima)} \\
 & \qquad \qquad \qquad \qquad \qquad \text{(rejected)} \\
 & \therefore x = 9.29
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & \alpha + \beta = -\frac{(-6)}{3} = 2, \quad \alpha\beta = \frac{-8}{3} \\
 & \text{Hasil tambah punca / Sum of roots:} \\
 & (\alpha + 5) + (\beta + 5) = (\alpha + \beta) + 10 \\
 & \qquad \qquad \qquad = 2 + 10 \\
 & \qquad \qquad \qquad = 12
 \end{aligned}$$

$$\begin{aligned}
 & \text{Hasil darab punca / Product of roots:} \\
 & (\alpha + 5)(\beta + 5) = \alpha\beta + 5(\alpha + \beta) + 25 \\
 & \qquad \qquad \qquad = -\frac{8}{3} + 5(2) + 25 \\
 & \qquad \qquad \qquad = \frac{97}{3}
 \end{aligned}$$

Persamaan kuadratik / Quadratic equation

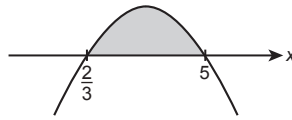
$$\begin{aligned}
 & x^2 - (12)x + \left(\frac{97}{3}\right) = 0 \\
 & 3x^2 - 36x + 97 = 0
 \end{aligned}$$

4. $-3x^2 + 17x - 10 > 0$

$(3x - 2)(-x + 5) > 0$

Apabila / When $(3x - 2)(-x + 5) = 0$,

$x = \frac{2}{3}$ atau / or $x = 5$



Untuk $(3x - 2)(-x + 5) > 0$, julai nilai x ialah $\frac{2}{3} < x < 5$.

For $(3x - 2)(-x + 5) > 0$, the range of the values of x is $\frac{2}{3} < x < 5$.

5. $(4x)(3x) - 3x^2 \geq (x^2 + 32)$

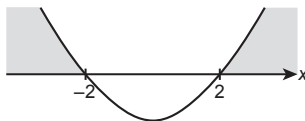
$12x^2 - 3x^2 \geq x^2 + 32$

$8x^2 - 32 \geq 0$

$8(x^2 - 4) \geq 0$

$8(x - 2)(x + 2) \geq 0$

Apabila / When $8(x - 2)(x + 2) = 0$, $x = 2$ atau / or $x = -2$



Untuk / For $8(x - 2)(x + 2) \geq 0$, $x \leq -2$ (diabaikan) atau / (ignore) or $x \geq 2$.

Maka / Hence, $x \geq 2$

6. $a = 1, b = 2p, c = 3p + 4$

$b^2 - 4ac = 0$

$(2p)^2 - 4(1)(3p + 4) = 0$

$4p^2 - 12p - 16 = 0$

$p^2 - 3p - 4 = 0$

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

$p + 1 = 0$ atau/or $p - 4 = 0$
 $p = -1$ $p = 4$

7. (i) Dalam bentuk $f(x) = a(x - h)^2 + k$

In the form $f(x) = a(x - h)^2 + k$

$h = -2, k = -9$

$\therefore f(x) = a(x + 2)^2 - 9$

$= a(x^2 + 4x + 4) - 9$

$= ax^2 + 4ax + 4a - 9$

Bandungkan / Comparing:

$ax^2 + bx + c = ax^2 + 4ax + 4a - 9$

$\therefore b = 4a$ dan / and $c = 4a - 9$

$f(-1) = a(-1)^2 + 4a(-1) + 4a - 9$

$-7 = a - 4a + 4a - 9$

$-7 = a - 9$

$a = 2$

$b = 4(2)$

$= 8$

$c = 4(2) - 9$

$= -1$

(ii) $x = -2$

8. $a = -1 < 0$

$$b^2 - 4ac = (6)^2 - 4(-1)(-5) \\ = 16 > 0$$

Maka, graf $f(x)$ berbentuk $\cap$ dengan titik maksimum dan menyalang paksi-x pada dua titik yang berbeza.
Thus, graph $f(x)$ has shape $\cap$ with maximum point and intersect the x-axis at two distinct points.

$$f(x) = -x^2 + 6x - 5 \\ = -\left[x^2 - 6x + \left(\frac{-6}{2}\right)^2 - \left(\frac{-6}{2}\right)^2\right] - 5 \\ = -(x - 3)^2 + 9 - 5 \\ = -(x - 3)^2 + 4$$

Titik maksimum ialah / Maximum point is $(3, 4)$.

Apabila $f(x) = 0$,

$$-x^2 + 6x - 5 = 0$$

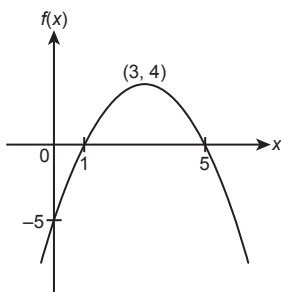
$$x^2 - 6x + 5 = 0$$

$$(x - 1)(x - 5) = 0$$

$$x = 1 \text{ atau } x = 5$$

Apabila $x = 0$

$$f(0) = -(0)^2 + 6(0) - 5 \\ = -5$$



Persamaan paksi simetri ialah $x = 3$.

Equation of axis of symmetry is $x = 3$.

9. $f(x) = -x^2 - 2kx + 4k - 5$

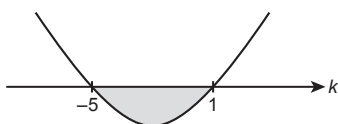
$f(x) < 0$, fungsi tidak mempunyai punca nyata

$f(x) < 0$, the function does not have real roots.

$$b^2 - 4ac < 0 \\ (-2k)^2 - 4(-1)(4k - 5) < 0 \\ 4k^2 + 16k - 20 < 0 \\ k^2 + 4k - 5 < 0 \\ (k + 5)(k - 1) < 0$$

Apabila / When $(k + 5)(k - 1) = 0$,

$$k = -5, k = 1$$



Untuk / For $(k + 5)(k - 1) < 0$, $-5 < k < 1$.

Maka / Hence, $m = -5, n = 1$

10. (a) $f(x) = 12h - 4(x - 2)^2$
 $h - 11 = 12h$
 $11h = -11$
 $h = -1$

(b) $f(x) = 0$
 $-12 - 4(x - 2)^2 = 0$
 $-12 - 4(x^2 - 4x + 4) = 0$
 $-12 - 4x^2 + 16x - 16 = 0$
 $-4x^2 + 16x - 28 = 0$
 $-x^2 + 4x - 7 = 0$
 $a = -1, b = 4, c = -7$

$$b^2 - 4ac = 4^2 - 4(-1)(-7)$$

$$= 16 - 28$$

$$= -12$$

$$b^2 - 4ac < 0$$

Tidak ada punca nyata / No real roots