

Short Assessment 2

Time Allowed: 15 minutes

Total Marks: 15

1. Find the discriminant of the following quadratic expressions:

(a) $5x^2 - 2x - 2$

$$\begin{aligned}\Delta &= b^2 - 4ac \\ &= (-2)^2 - 4(5)(-2) \\ &= \underline{\underline{44}}\end{aligned}$$

(b) $2x^2 + 4x + 2$

$$\begin{aligned}\Delta &= b^2 - 4ac \\ &= 4^2 - 4(2)(2) \\ &= \underline{\underline{0}}\end{aligned}$$

(2 marks)

2. Use the discriminant to determine the number of real roots of each of the following quadratic equations:

(a) $x^2 - 7x + 3 = 0$

$$\begin{aligned}\Delta &= b^2 - 4ac \\ &= (-7)^2 - 4(1)(3) \\ &= 37 > 0\end{aligned}$$

Since $\Delta > 0$, there are two distinct real roots.

(b) $3x^2 + 5x - 2 = 0$

$$\begin{aligned}\Delta &= b^2 - 4ac \\ &= 5^2 - 4(3)(-2) \\ &= 49 > 0\end{aligned}$$

Since $\Delta > 0$, there are two distinct real roots.

(4 marks)

3. The quadratic equation $kx^2 - 5x + k = 0$ has repeated real roots.

Find the possible values of the constant k .

Since this has repeated real roots,

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

$$(-5)^2 - 4(k)(k) = 0$$

$$25 - 4k^2 = 0$$

$$25 = 4k^2$$

$$k^2 = \frac{25}{4}$$

$$k = \pm \frac{5}{2}$$

(4 marks)

4. (a) Find the discriminant of $3x^2 + 6x - p$ in terms of p .

$$\Delta = b^2 - 4ac$$

$$= 6^2 - 4(3)(-p)$$

$$= 36 + 12p$$

(2 marks)

- (b) Given that the quadratic equation $3x^2 + 6x - p = 0$ has no real roots, find the set of possible values of p .

Since this has no real roots,

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

$$36 + 12p < 0$$

$$12p < -36$$

$$p < -3$$

(3 marks)

- End of Test -