

- 1** The equation $x^2 + kx + 2 = 0$, where k is a constant, has no real roots.

Find the set of possible values for k .

(Total for question 1 is 3 marks)

- 2** The equation $kx^2 + 5x + k = 0$, where k is a positive constant, has equal roots.

Find the value of k .

(Total for question 2 is 3 marks)

3 The equation $kx^2 + 6kx + 2 = 0$, where k is a constant, has no real roots.

Find the set of possible values for k .

(Total for question 3 is 4 marks)

- 4** The equation $(k + 5)x^2 + 4x + (k + 2) = 0$, where k is a constant, has two distinct real solutions for x .

Find the set of possible values for k .

(Total for question 4 is 7 marks)

- 5** The equation $x^2 + (n + 1)x + (3 - 3n) = 0$, where n is a constant, has two distinct real roots.
Find the set of possible values for n .

(Total for question 5 is 7 marks)

- 6** The equation $x^2 + (2k - 3)x + (k + 3) = 0$, where k is a constant, has no real roots.
Find the set of possible values for k .

(Total for question 6 is 8 marks)

- 7 The curve with equation $y = px^2 - 4px - 5p$, where p is a constant, does not intersect the line with equation $y = 2x - 12$.

(a) Show that $9p^2 - 8p + 1 < 0$.

(5)

(b) Find the set of possible values for p .

(3)

(Total for question 7 is 8 marks)

8 The line $y = mx - 2$ is a tangent to the circle $x^2 + 6x + y^2 - 8y + 5 = 0$.

Find the two possible values of m , giving your answers in exact form.

(Total for question 8 is 7 marks)

9 The line $y = mx + 2$ is a tangent to the circle $(x - 5)^2 + (y + 1)^2 = 15$.

Find the two possible values of m , giving your answers in exact form.

(Total for question 9 is 7 marks)
