Discriminant and the nature of roots

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. How many real roots has $x^2 - 7x + 10 = 0$? [2 marks]

The discriminant is 49-40=9, positive.

Answer: Two distinct real roots.

2. How many real roots has $3x^2 + 2x + 4 = 0$? [2 marks]

The discriminant is 4-48=-44.

Answer: No real roots.

3. Find k for a repeated root in $x^2 + 8x + k = 0$. [2 marks]

Set 64-4k=0.

Solve for k.

Answer: $k = 16$

4. For which real k does $x^2 + 2x + k = 0$ have two distinct real roots? [3 marks]

Require 4-4k>0.

Rearrange the inequality.

Answer: $k < 1$

5. Find k for a repeated root in $x^2 + kx + 9 = 0$. [3 marks]

Require $k^2 - 36 = 0$.

Keep both square-root branches.

Answer: $k = -6$ or 6.

6. Classify $kx^2 + 2x + 1 = 0$ at k=1 and at k=0. [3 marks]

At 1, the discriminant is zero.

At 0, the coefficient of x squared vanishes.

Answer: k=1: repeated root -1; k=0: linear equation with root -1/2.