3. Find the discriminant of each of the following equations and state if the roots are
   (a) real and different (b) real and equal (c) imaginary.

   (i) $2x^2 + x + 5 = 0$ (ii) $-2x^2 + 3x + 1 = 0$ (iii) $3x^2 + 2x - 1 = 0$
   (iv) $-3 + 2x - x^2 = 0$ (v) $x^2 + 8x + 16 = 0$ (vi) $25 - 10x + x^2 = 0$

Remember...
Discriminant = Δ
$\Delta = b^2 - 4ac$

(i) $a=2, b=1, c=5$
$\Delta = (1)^2 - 4(2)(5)$
$= 1 - 40$
$= -39 < 0$
imaginary roots

(ii) $a=-2 \quad b=3, c=1$
$\Delta = (3)^2 - 4(-2)(1)$
$= 9 + 8$
$= 17 > 0$
real and different

(iii) $a=3, b=2, c=-1$
$\Delta = (2)^2 - 4(3)(-1)$
$= 4 + 12$
$= 16 > 0$
real and different

(iv) $a=-1, b=2, c=-3$
$\Delta = (2)^2 - 4(-1)(-3)$
$= 4 - 12$
$= -8 < 0$
imaginary roots

(v) $a=1, b=8, c=16$
$\Delta = (8)^2 - 4(1)(16)$
$= 64 - 64$
$= 0$
real and equal

(vi) $a=1, b=-10, c=25$
$\Delta = (-10)^2 - 4(1)(25)$
$= 100 - 100$
$= 0$
real and equal