

1. Solve the following equations
  - a.  $x^2 - 3x = 5x$
  - b.  $x^2 + 8x - 20 = 0$
  - c.  $x^2 - 5x + 10 = 2(x - 1)$
  - d.  $15x^2 + 7x = 2$
  - e.  $x^2 + 2(x - 1) = 2(2x + 3)$
  - f.  $(x - 5)^2 = 16$
  - g.  $\frac{1}{2}(3x - 1)^2 = 3$
  - h.  $3(x - 1)^2 = 11 - 6x^2$
  - i.  $2x(x + 4) - 10 = x + 20$
  
2. Complete the square for the equations below
  - a.  $x^2 + 2x$
  - b.  $x^2 - 5x + 1$
  - c.  $3x^2 - 6x$
  - d.  $5x^2 + 6x + 8$
  - e.  $x^2 + 10x - 3$
  - f.  $2x^2 + 2x + 5$
  - g.  $x^2 - 5x + \frac{1}{2}$
  - h.  $-2x^2 + 8x + 3$
  - i.  $4x^2 - 10x + 18$
  
3. Solve the equations by completing the square
  - a.  $x^2 + 6x + 4 = 0$
  - b.  $3x^2 - 6x - 2 = 3(x - 1)$
  - c.  $6x^2 - 8x - 1 = 0$
  - d.  $x^2 - 4x + 5 = 0$
  - e.  $3x(x - 4) = 3$
  - f.  $x^2 - \frac{1}{2}x = \frac{1}{2}$
  - g.  $3x^2 - 12 = 0$
  - h.  $-x^2 + 6x + 9 = 0$
  - i.  $5x^2 = 2(5x - 2)$
  
4. The discriminant
  - a. State the formula for the discriminant
  - b. Using illustrations and equations explain what can information can be deduced from calculating the discriminant
  - c. Use the discriminant to establish the nature of the roots for the equations in question 3a, 3c, 3e, 3g and 3i.
  
5. Sketch the graph of showing all intercepts and turning points.
  - a.  $y = x^2 - 2x + 4$
  - b.  $y = 3x^2 - 2x - 3$
  - c.  $y = -x^2 + 8x - 1$
  - d.  $x = -2y^2 - 8y - 1$
  - e.  $y = 3x^2 + 5x + 4$
  - f.  $x = -2y^2 - 3y - 3$
  - g.  $2y = 4x^2 - 3x + 3$
  - h.  $5x = 2y^2 - 10y - 10$
  - i.  $-3y = 6x^2 + 4x - 1$
  
6. Find the value of k which gives the equation equal roots
  - a.  $x^2 + kx + 16 = 0$
  - b.  $2x^2 + kx - 5 = 0$
  - c.  $kx^2 + 3x - 1 = 0$
  
7. Find the values of m for which the equation does not have real roots
  - a.  $mx^2 + 2x + 1 = 0$
  - b.  $3x^2 - 5x - m = 0$
  - c.  $5x^2 + mx - 2 = 0$
  
8. Write the equation for the graph which has
  - a. the turning point (3,1) and passes through the point (1,5)
  - b. the turning point (-2, -1) and passes through the point (2,-17)
  - c. a vertex of (5,-2) and a y-intercept of 48
  - d. x-intercepts at 2 and 3, and goes through (1,6)
  - e. a y-intercept of -1 and passes through both the points (1,2) and (2,7)