1. $f(x) = \dfrac{x^2 - 2\sqrt{x}}{x}$. Find $f'(1)$.

2. Solve the equation $2\cos x = -\sqrt{3}$ for $0 \leq x \leq 2\pi$

3. Triangle ABC has coordinates A(9 ,5) , B(-1,1) and C(4,9). Find the equation of the median from C.

4. Express $5\cos x - 3\sin x$ in the form $k\cos(x - a)°$ $0° \leq a \leq 360°$

5. Show that the curve with equation $f(x) = 2x^3 - 12x^2 + 42x - 3$ has no stationary points.

6. P and Q have coordinates (-4,2,0) and (1,7,5) respectively. Find the coordinates of the point R which divides PQ in the ratio 2 : 3.

7. A curve has equation $y = 3x^3 + 6x^2 + 9x + 2$.

   (a) Show that the line $y = 2x - 2$ intersects the curve at the point (-1,-4).
   (b) Show that there are no other points of intersection between the curve and the line $y = 2x - 2$.

8. A straight line has equation $3x + 7y = 2$. What is the equation of the line perpendicular to this line and passing through the point (-2,1)?

9. Show that the roots of $(t - 1)x^2 + 2tx + 4 = 0$ are real for all values of t.

10. (a) A circle has centre (2 , 4) and passes through (0 , 2). Write down the equation of this circle.
   (b) Another circle has the same centre with a radius 3 times as big, Find the equation of this second circle.