

Start here for
Question Number: **1**

$$a) x^2 = 4x$$

$$x^2 - 4x = 0$$

$$x(x-4) = 0$$

$$\therefore x = 0 \text{ OR } x = 4$$

$$b) \frac{1}{\sqrt{5}-2} = a + b\sqrt{5}$$

$$\text{LHS} = \frac{1}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2}$$

$$\text{RHS} = a + b\sqrt{5}$$

$$= \frac{\sqrt{5}+2}{5-4}$$

$$= \frac{\sqrt{5}+2}{1}$$

$$= \sqrt{5}+2$$

$$= 2 + \sqrt{5}$$

$$\therefore a = 2, b = 1.$$

c) equation of circle :

$$(x+1)^2 + (y-2)^2 = 25.$$

$$d) |2x+3| = 9$$

$$2x+3 = 9 \quad \text{OR} \quad -(2x+3) = 9$$

$$2x = 6 \quad -2x - 3 = 9.$$

$$x = 3 \quad -2x = 12$$

$$x = -6.$$

$$\therefore x = 3 \text{ OR } -6.$$

$$\begin{aligned}
 e) \frac{d}{dx} x^2 \tan x &= v u' + u v' & \text{ } & \text{ } & u &= x^2 & v &= \tan x \\
 & & & & u' &= 2x & v' &= \sec^2 x \\
 & & & & & & & = \tan x \times 2x + x^2 \times \sec^2 x \\
 & & & & & & & = 2x \tan x + x^2 \sec^2 x \\
 & & & & & & & = x(2 \tan x + x \sec^2 x)
 \end{aligned}$$

$$f) \text{ GP : } 1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots$$

$$r = \frac{-\frac{1}{3}}{1}$$

$$= -\frac{1}{3}$$

$$S_{\infty} = \frac{a}{1-r}$$

$$= \frac{1}{1 - \frac{1}{3}}$$

$$= \frac{3}{2}$$

$$g) f(x) = \sqrt{x-8}$$

$$\sqrt{x-8} \geq 0$$

$$x-8 \geq 0$$

$$x \geq 8$$

Additional writing space on back page.