

Start here for
Question Number: **1**

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

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

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

$$x=0, x=4$$

b)
$$\frac{1}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2} = \frac{\sqrt{5}+2}{5-4}$$

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

$$2 + \sqrt{5} \equiv a + b\sqrt{5}$$

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

c) $(-1, 2), r=5$

Formula for circle: $(x-p)^2 + (y-q)^2 = r^2$

$$\therefore (x+1)^2 + (y-2)^2 = 5^2$$

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

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

$$2x+3 = 9 \quad \vee \quad 2x+3 = -9$$

$$2x = 6 \quad \quad \quad 2x = -12$$

$$x = 3 \quad \quad \quad x = -6$$

e)
$$\frac{d}{dx} x^2 \tan x = x^2 \sec^2 x + \tan x \times 2x$$

$$= x(x \sec^2 x + 2 \tan x)$$

$$y = uv$$

$$y' = uv' + vu'$$

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

ratio: $-\frac{1}{3} \div \frac{1}{9} = \frac{-\frac{1}{3} \times 9}{1}$

$$= -3$$

$$|r| > 1$$

Limiting sum $\Rightarrow S_{\infty} = \frac{a}{1-r}$
$$= \frac{1}{1-(-3)} = \frac{1}{4}$$

$$2) f(x) = \sqrt{x-8}$$

domain $\rightarrow x \geq 8$ as $f(x) \neq$ less than zero

Additional writing space on back page.