Start here for Question Number: 1

a) $x^2 = 4x$

$x^2 - 4x = 0$

$x(x-4) = 0$

$\therefore x = 0, 4$

b)

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

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

$= \frac{\sqrt{5}+2}{(\sqrt{5}-2)(\sqrt{5}+2)}$

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

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

$\therefore \sqrt{5}+2 = a + b\sqrt{5}$

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

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

c) $C: (-1, 2) \quad r = 5$.

$(x-a)^2 + (y-b)^2 = r^2$

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

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

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

$2x+3 = 9$ $\qquad$ $2x+3 = -9$

$2x = 6$. $\qquad$ $2x = -12$

$x = 3$ $\qquad$ $x = -6$

$\therefore x = 3, -12$.

e) $\frac{d}{dx} x^2 \tan x = u'v + uv'$ $\qquad$ $u = x^2$ $\quad v = \tan x$

$u' = 2x$ $\quad v' = \sec^2 x$

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

~~$= x(2\sin x + x \sec x)$~~

$= x \sec x (2\sin x + x \sec x)$

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

$\frac{-\frac{1}{3}}{1} = \frac{+\frac{1}{9}}{-\frac{1}{3}} = r$

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

limiting sum: $\frac{a}{1-r}$

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

$= \frac{1}{\frac{4}{3}}$

$= \frac{3}{4}$.

Additional writing space on back page.

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

domain: $x - 8 \geq 0$

$\therefore x \geq 8.$

You may ask for an extra Writing Booklet if you need more space to answer question 1.