Start here for Question Number: 1

a) $x^2 = 4x$

$x^2 - 4x = 0$

$x(x-4) = 0$

$\therefore x = 0$ or $x = 4$

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

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

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

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

$= \sqrt{5}+2$

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

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

c) $(x-x_1)^2 + (y-y_1)^2 = r^2$

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

~~$x^2+2x+1+y^2-2y+4=25$~~

~~$x^2+2x+y^2-2y=20$~~

d) $2x+3 = 9$ or $2x+3 = -9$

$2x = 6$ $2x = -12$

$x = 3$ $x = -6$

$\therefore x = 3$ or $x = -6$

e) $\int x^2 \tan x \, dx =$ ~~2xcotx~~

$u = x^2 \qquad v = \tan x$

$u' = 2x \qquad v' = \sec x$

$\therefore v \cdot u' + u \cdot v' = \tan x \cdot 2x + x^2 \cdot \sec x$

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

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

common ratio $= \frac{-1}{27} \div \frac{1}{9} = \frac{-9}{27} = -\frac{1}{3}$

$= \frac{1}{9} \div -\frac{1}{3} = \frac{-3}{9} = -\frac{1}{3}$

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

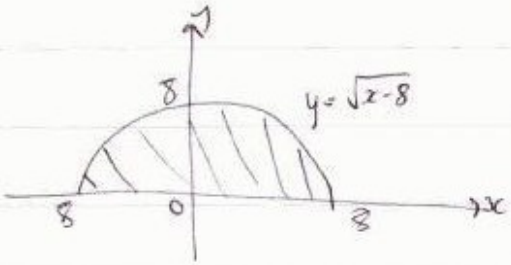
$a = 1$

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

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

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

$= \frac{3}{4}$



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

$8 \leqslant x \leqslant 8$

Additional writing space on back page.