~~$(x-p)(x-2p)(x-3p)$~~

~~$=(x^2-3px+2p^2)(x-3p)$~~

using this method we could do i) ii) and iii)

Marco

Ashay ™

ax^3+bx^2+cx+d

Richard.

bi. $\sum\alpha = \frac{-b}{a} = \frac{12}{1} = 12$

$6p=12$

$p=2$

$\alpha+\beta+\gamma$

$\sum\alpha\beta = \frac{c}{a} = \frac{a}{1} = a$

$\alpha\beta\gamma = \frac{-d}{a} = \frac{48}{1} = 48$

$\alpha\beta+\alpha\gamma+\beta\gamma$

$p+2p+3p = 12$

$6p=12$

$\boxed{p=2}$!!!

ii) $(2\times4)+(2\times6)+(4\times6) = a$

$\boxed{a=44}$

$\boxed{6\times4=24}$

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METHOD #3

1 **(a)** The quadratic equation $x^2-2x+4=0$ has roots α and β.

(i) Write down the values of $\alpha+\beta$ and $\alpha\beta$. [2]

(ii) Show that $\alpha^2+\beta^2=-4$. [2]

(iii) Hence find a quadratic equation which has roots α^2 and β^2. [3]

(b) The cubic equation $x^3-12x^2+ax-48=0$ has roots p, $2p$ and $3p$.

(i) Find the value of p. [2]

(ii) Hence find the value of a. [2]

(Q8, June 2005)

ax^2+bx+c

$(x-\alpha^2)(x-\beta^2)=0$

$x^2-x\beta^2-x\alpha^2+\alpha^2\beta^2$

$x^2-(\alpha^2+\beta^2)x+(\alpha\beta)^2$

$x^2+4x+16$

a i) $\alpha+\beta = \frac{-2}{1} = -2$

$\alpha\beta = 4$

ii) $(\alpha+\beta)^2 = \alpha^2+2\alpha\beta+\beta^2$

$(-2)^2 = \alpha^2+8+\beta^2$

$4 = \alpha^2+8+\beta^2$

$\alpha^2+\beta^2+8=4$

$\alpha^2+\beta^2=-4$

$\sum\alpha^2\beta^2 = \sum(\alpha\beta)^2$

$\sum\alpha^2 = -4 = \frac{-b}{a}$ $\quad c=\frac{c}{a}$ METHOD #2

$a=1 \quad b=+4 \quad c=4$

$y^2+4y+c \quad = \frac{c}{a} = \frac{16}{1} = 16$

$y^2+4y+16$

iii) $y=x^2$ METHOD #1

$\sqrt{y}=x$

$(\sqrt{y})^2-(2\times\sqrt{y})+4=0$

$y-2\sqrt{y}+4=0$

~~$y^2+4y+16=0$~~

Marco! ®

Ashay™®

Richard

$$\int_2^3 y^2 - 6y + 9$$

$$= \left[\frac{y^3}{3} - 3y^2 + 9y\right]_2^3$$

$$= \left[\frac{3^3}{3} - (3\times 3^2) + (9\times 3)\right] - \left[\frac{2^3}{3} - (3\times 2^2) + (9\times 2)\right]$$

$$= [9] - \left[\frac{26}{3}\right]$$

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

$$\int_0^2 \frac{y}{2}$$

$$= \left[\frac{1}{4}y^2\right]_0^2$$

$$= \frac{1}{4}\cdot 4 - 0$$

$$= 1$$

$$x = \pm\sqrt{y/2}$$

$$V = \pi\left[\int_2^3 (-y+3)^2 + \int_0^2 \frac{y}{2}\right]$$

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

3 Fig. 6 shows the region enclosed by part of the curve $y = 2x^2$, the straight line $x + y = 3$, and the y-axis. The curve and the straight line meet at P (1, 2).

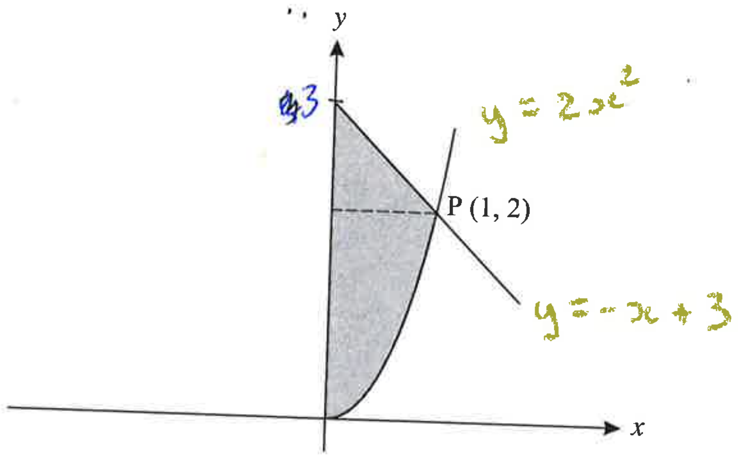


Fig. 6

The shaded region is rotated through 360° about the y-axis. Find, in terms of π, the volume of the solid of revolution formed. **[7]**

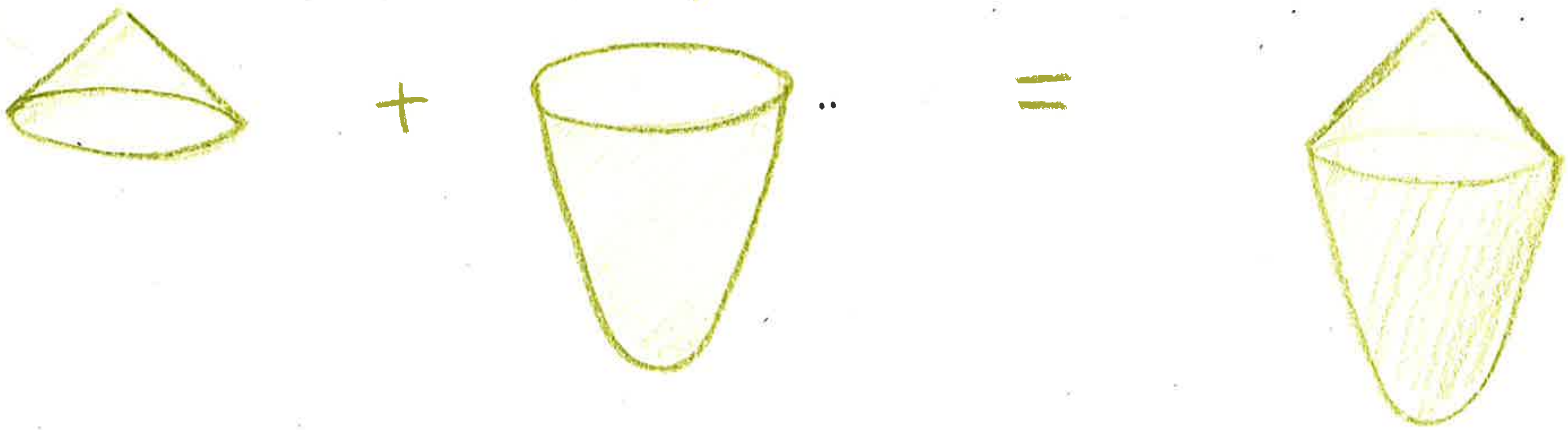
$x = \sqrt{\frac{y}{2}}$

$x = -y + 3$

~~$-x + 3 = 0$, $x = 3$~~

$y = 3$

when revolved :



$i: \quad 16+30i$

$ii: \quad (x-(16+30i))(x-16-30i)$

$= x^2 - 16x - 30ix - 16x + 16^2 + 480i$

$+ 30ix + 480i - 90i^2$

$= x^2 - 32x + 1156$

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19 One root of the quadratic equation $x^2 + ax + b = 0$, where a and b are real, is $16 - 30i$.

(i) Write down the other root of the quadratic equation. **[1]**

(ii) Find the values of a and b. **[4]**

(Q9, June 2011)

$\sum \alpha\beta = b$

$(16-30i)(16+30i) = b$

19i) $x = 16+30i$

$(x-16-30i)(x-16+30i)$

$= x^2 - 16x \cancel{+30xi} - 16x + 256 + \cancel{-480i}$

$\cancel{= x^2 - 32x} \; \cancel{-30ix} \; \cancel{+480i} + 900$

$= x^2 - 32x + 1156$

$a = -32 \quad b = 1156$