Ex 1.6.

Q1 (x) (i) $3x - 2y = 4$

$3x = 4 + 2y$

$x = \frac{4+2y}{3}$

(ii) $2x - b = 4c$

$2x = 4c + b$

$x = \frac{4c+b}{2}$

(iii) $5x - 4 = \frac{y}{2}$

$10x - 8 = y$

$10x = y + 8$

$x = \frac{y+8}{10}$

(iv) $5(x - 3) = 2y$

$5x - 15 = 2y$

$5x = 2y + 15$

$x = \frac{2y+15}{5}$

(v) $3y = \frac{x}{3} - 2$

$3y + 2 = \frac{x}{3}$

$9y + 6 = x$

(xi) $xy = xz + yz$

$xy - xz = yz$

$x(y - z) = yz$

$x = \frac{yz}{y-z}$

Q2 (x) (i) $2x - \frac{y}{3} = \frac{1}{3}$

$6x - y = 1$

$6x = 1 + y$

$x = \frac{1+y}{6}$

(ii) $z = \frac{y-2x}{3}$

$3z = y - 2x$

$2x = y - 3z$

$x = \frac{y-3z}{2}$

(iii) $\frac{a}{x} - b = c$

$a - bx = cx$

$a = cx + bx$

$a = x(c + b)$

$\frac{a}{c+b} = x$

Q3 (i) $V = \pi r^2 h$ (r)

$$\frac{V}{\pi h} = r^2$$

$$\sqrt{\frac{V}{\pi h}} = r$$

(ii) $A = 2\pi r h$ (r)

$$\frac{A}{2\pi h} = r$$

(iii) $A^2 = 4\pi h V$

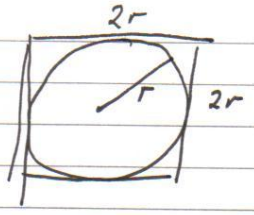
$$\sqrt{\frac{V}{\pi h}} = \frac{A}{2\pi h}$$

$$\frac{V}{\pi h} = \frac{A^2}{4\pi^2 h^2}$$

$$\frac{V 4\pi^2 h^2}{\pi h} = A^2$$

$$4\pi h V = A^2$$

Q4



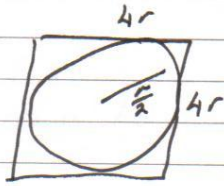
(a) $A_{cir} = \pi r^2$

(b) $A_{sq} = 4r^2$

(c) corners $4r^2 - \pi r^2$

$r^2(4 - \pi)$

(d)



sides doubled $\Rightarrow 4r$

radius $\frac{1}{2}$

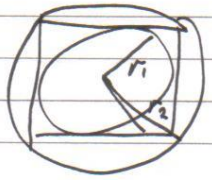
$A_{cir} = \pi\left(\frac{r}{2}\right)^2 = \frac{\pi r^2}{4}$

$A_{sq} = 16r^2$

corners: $16r^2 - \frac{\pi r^2}{4}$

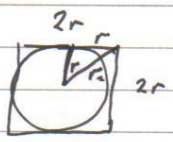
$r^2\left(16 - \frac{\pi}{4}\right)$

(e)



$A_{inner} = \pi r_1^2$

$A_{outer} = \pi r_2^2$



$r_2^2 = r_1^2 + r_1^2$

$r_2^2 = \sqrt{2}r_1^2$

$A_{(inner)} = \pi r^2$

$A_{(outer)} = \pi\left(\sqrt{2}r^2\right)^2 = 2\pi r^2$

$\Rightarrow$ outer = Double.

Q5

$$f' = \frac{fc}{c-u} \qquad (u)$$

(i) $f'(c-u) = fc$

$f'c - f'u = fc$

$f'c - fc = f'u$

$c(f'-f) = u.$

$\frac{c(f'-f)}{f'}$

(ii) $f' = \frac{fc}{c-u}$ (c)

$f'(c-u) = fc$

$f'c - f'u = fc$

$f'c - fc = f'u$

$c(f'-f) = f'u$

$c = \frac{f'u}{f'-f}.$

Q6

$$T = 2\pi\sqrt{\frac{l}{g}} \qquad (l)$$

$T^2 = 4\pi^2 \frac{l}{g}$

$T^2 g = 4\pi^2 l$

$\frac{T^2 g}{4\pi^2} = l$

$T = 3 \cdot g \cdot 10$

(ii) $\frac{(3)^2(10)}{4\pi} = l$

$\frac{90}{4\pi^2} = l \Rightarrow 2.3 = l.$

Q7 (a)

(i) $\frac{x}{y} = \frac{a+b}{a-b}$

$ax - bx = ay + by$

$ax - ay = by + bx$

$a(x-y) = b(x+y)$

$a = \frac{b(x+y)}{x-y}$

(ii) $bc - ac = ac$

$bc = ac + ac$

$bc = 2ac$

$\frac{bc}{2c} = a$

$\frac{b}{2} = a.$

Q8 (v)

(i) $y = \frac{3(u-v)}{4}$

$4y = 3u - 3v$

$3v = 3u - 4y$

$v = \frac{3u-4y}{3}$ $\Rightarrow$ $u - \frac{4}{3}y.$

(ii) $S = \frac{t}{2}(u+v)$

$2s = tu + tv$

$2s - tu = tv$

$\frac{2s-tu}{t} = v$

$\frac{2s}{t} - u = v$

Q9

$$A = P\left(1+\frac{i}{100}\right)^3 \qquad (i)$$

$$\sqrt[3]{A} = \sqrt[3]{P}\left(1+\frac{i}{100}\right)$$

$$\frac{\sqrt[3]{A}}{\sqrt[3]{P}} = 1 + \frac{i}{100}$$

$$100\sqrt[3]{\frac{A}{P}} = 100 + i$$

$$100\sqrt[3]{\frac{A}{P}} - 100 = i$$

$$i = 100\sqrt[3]{\frac{2650}{2500}} - 100$$

$$i = 1.96 \quad = 2.0\%$$

Q10 (c)

(i) $d = \sqrt{\frac{a-b}{ac}}$

$$d^2 = \frac{a-b}{ac}$$

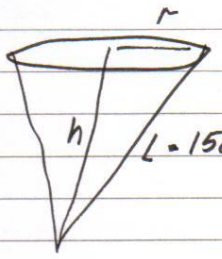
$$ac = \frac{a-b}{d^2}$$

$$a = \frac{a-b}{d^2c}$$

(ii) $b = \frac{2c-1}{c-1}$

$$bc - b = 2c - 1$$
$$bc - 2c = b - 1$$
$$c(b-2) = b-1$$
$$c = \frac{b-1}{b-2}$$

Q11



(i) (h)

$15^2 = h^2 + r^2$

$225 - r^2 = h^2$

$\sqrt{225 - r^2} = h.$

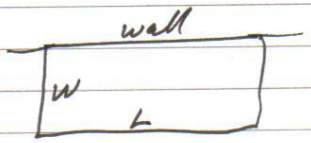
(ii) $r=5$ $h = \sqrt{225-5^2} = \sqrt{225-25} = \sqrt{200} = 10\sqrt{2}.$

(iii) $r = 15/2.$ $h = \sqrt{225-(7.5)^2}$

$h = \sqrt{168.75}$

$h = 12.99 = 13.$

Q12 300 m



$\Rightarrow$ Fence = $2w + L$.

(i) $300 = 2w + L$ (L)

$300 - 2w = L$

(ii) $A = L \times w$

$= (300 - 2w)w$

$= 300w - 2w^2$

(iii) $10{,}000 = 300w - 2w^2$

$2w^2 - 300w + 10{,}000 = 0$

$w^2 - 150w + 5000 = 0$

$(w - 50)(w - 100) = 0$

$w = 50$ $w = 100$

$\Rightarrow L = 300 - 2(50)$ $L = 300 - 2(100)$

$L = 200$ $L = 100.$