## 2. Equations of straight lines

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|---|---|---|---|
| **1** | $RV = 3.2 + \frac{1}{4}V$<br>$R = \frac{3.2}{V} + \frac{1}{4}$<br>$Gradient = 3.2$<br>$y - \text{int}\,ercept = \frac{1}{4}$ | $B_1$<br>$B_1$<br>$B_1$ | |
| | | 3 | |
| **2.** | $y = -\frac{2}{3}x + \frac{5}{3}$<br>$Grad\,of \perp line\,\frac{3}{2}$<br>$\frac{3}{2} = \frac{1+k}{-2-2}$<br>$2k = -14$<br>$k = -7$ | B1<br>M1<br>A1 | Equating to grad |
| | | 03 | |
| **3.** | $-y\sqrt{3} = -x - 3$<br>$y = \frac{1}{\sqrt{3}}x + 3$<br>$grad = \frac{1}{\sqrt{3}}$<br>$= 0.5774$<br>$Tan^{-1}0.5774 = 30^0$ | M1<br>M1<br>A1 | |
| | | 03 | |

1. *a) Length of diagonal* $= \sqrt{10^2 + 8^2}$
$= \sqrt{164}$

*Vertical height* $= \sqrt{16^2 - (\frac{\sqrt{164}}{2})^2}$ $= 14.66cm$

*b) Height of the slant surfaces*
$\sqrt{16^2 - 4^2} = \sqrt{240}$
$\sqrt{16^2 - 5^2} = \sqrt{231}$
*Area of slant surfaces*
*( ½ x 8 x* $\sqrt{240}$ *x 2)* $= 124.0\ cm^2$
*(½ x 10x* $\sqrt{231}$ *x 2)* $= 152.0cm^2$

*Area of the rectangular base= 8 x 10 = 80cm$^2$*

*Total surface area = $\underline{356cm^2}$*

*c) Volume*

*= ( $^1/_3$ x 80 x 14.66) = 391.0cm$^3$*

2. *Gradient of line AB = $\frac{3 - 3k}{K + 1}$*

*Equation of other line can be written as*

$$Y = -\frac{3x}{2} + \frac{9}{2}$$

*∴ its gradient = $^{-3}/_2$*

*Hence* $\frac{3 - 3k}{K + 1} = -\frac{3}{2}$

$$6 - 6K = -3k - 3$$

$$-3K = -9$$

$$K = 3$$

*A(-1, 9), B (3,3)*

3. $M_1 = 2x - 3x2$

$M_2 = 1 - 2ax$

$M_1 = M_2$ *at* $x = {}^1/_3$

$2x - 3x^2 = 11 - 2ax$

$^2/_3 - 3\,(^1/_3)^2 = 1 - 2ax\,{}^1/_3$

$^2/_3 - {}^1/_3 = 1 - {}^2/_3\,a$

$-{}^3/_2 = -{}^2/_3 a$

$^9/_4 = a$

4. $M1 = \frac{5 - 1}{4 - -2} = \frac{4}{6} = \frac{2}{3}$

$M2 = {}^{-3}/_2$

*i.e.* $^{-3}/_2 = \frac{y - 5}{x - 4}$

$$2(y - 5) = -3(x - 4)$$

$$2y - 10 - -3x + 12$$

$$3x + 2y - 22$$

5. *Points (3, 0) and (-5, 2)*

$M = -\,¼$

$y - 0 = -\,¼$

$x - 3$

$y = -\,¼\,x + ¾$

7. *Grad =* $\frac{2}{3}$

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

$$y = \frac{2}{3}x + \frac{16}{3}$$

8. $3y - 5x = 4$ 0r equivalence

$5y = 3x - 10$

$y = \frac{3}{5}x - 2$

$\therefore Gradient = \frac{-5}{3}$

$5 = \frac{y-3}{x+1}$

$3y - 9 = 5x - 5$

9. $L.S.F = \frac{4}{2000000} = \frac{1}{500000}$

$A.S.F = \left(\frac{1}{5 \times 10^5}\right)^2 = \frac{1}{2.5 \times 10^{11}}$

$Area\ of\ rectangle = (2.4 \times 1.5)\ cm^2$

$= 3.6cm^2$

$Actual\ area = \frac{3.6 \times 2.5 \times 10^{11}}{100 \times 10000}\ ha$

$= 9 \times 10^5$

$= 900{,}000ha$

10. $2y - 5x = 11$

$Y = {}^5/_2\, x + {}^{11}/_2$

$g = {}^5/_2$

${}^5/_2 m = -1$

$M = -{}^2/_5$

$\frac{Y-4}{X+4} = -{}^2/_5$

$5y + 2x = 14$

$P(x,o)$

$5 \times o + 2x = 14$

$X = 7$

$Q(o, y)$

$5y + 2 \times o = 14$

$Y = 2.8$

$P\ (7,0)$

$Q\ (0, 2.8)$

11. i) $K\left(\frac{3-7}{2}, \frac{4+2}{2}\right)$ $(-2, 3)$

$P\left(\frac{3+1}{2}, \frac{4-2}{2}\right) = (2,1)$

ii) $K_1 = \frac{3-1}{-2-2} = -\frac{1}{2}$

$= 2$

12. $Gradient\ of\ L1 = {}^1/_5$

$Gradient\ of\ L2 = -5$

$Y = mx + c$

$2 = -5\ (1)\ t\ c$

$2 = -5tc$

$C = 7$

*Epuding L2*

$Y = -5x + 7$

13. $3y - 5x = 4$ *0r equivalence*

$5y = 3x - 10$

$y = \frac{3}{5}x - 2$

$\therefore$ *Gradient* $= \frac{-5}{3}$

$5 = \frac{y - 3}{x + 1}$

$3y - 9 = 5x - 5$

14. *Gradient* $= g = \frac{m - 1}{4 - 2} = \frac{m - 1}{2}$

$3y = 5 - 2x$

$y = {}^{5}/_{3} - {}^{2x}/_{3}$ $\quad g_1 = {}^{-2}/_{3}$

$g \times g1 = \frac{m - 1}{2} \cdot \frac{-2}{3} = -1$

$-2(m - 1) = -6$

$-2m + 2 = -6$

$-2m = -8$

$M = 4$

15. $L_1\ y = -\frac{2}{3}x - \frac{4}{3}$

$M_1 = -\frac{2}{3}$

$M_2 = \frac{3}{2}$

$L_2\ y = \frac{3}{2}x + c \quad x = 1, y = 1$

$1 = \frac{3}{2} + c$

$c = -\frac{1}{2}$

$L_2 \quad y = \frac{3}{2}x - \frac{1}{2}$

16. $BP$ = shs. $\frac{144}{6} \times 100$

$SP$ = shs. $\frac{140}{100} \times \frac{144}{6} \times 100$

*Let pineapples sold at shs. 72 for every shs. 3 be x*

$\therefore$ *At shs. 60 for every 2 will be* $144 - x$

$$\frac{x}{3} \times 72 + \frac{144 - x}{3} = 3360$$

$$24x + 30(144 - x) = 3360$$

$$-6x = -960$$

$$x = 60$$

17. $$\frac{x + 2}{3} - \frac{x - 1}{2} = \frac{5}{1}$$

$$2(x + 2) - 3(x - 1) = 30$$

$$22x + 4 - 3x + 3 = 30$$

$$-x + 7 = 30$$

$$-x = 23$$

$$x = -23$$