

Grade 10 Tutorial 1 : Paper 1

1a) $2\frac{2}{3} \times \frac{1}{7} = \frac{8}{3} \times \frac{1}{7} = \frac{8}{21}$

1b) $\frac{2}{5} \div \frac{7}{12} = \frac{2}{5} \times \frac{12}{7} = \frac{24}{35}$

2(a) $\frac{13 \times 5}{20 \times 5} = \frac{65}{100} = 0.65$

(b) (i) $\frac{56}{70} = \frac{4}{5}$

(ii) $\frac{56}{70} \times 100 = \frac{4}{5} \times 100$
 $= 80\%$

3(a) $40g : 2kg$
 $40g : 2000g$
 $1 : 50$

(b) $I = \frac{P \times R \times T}{100}$

$= \frac{500 \times 6 \times 8}{100}$

$= \frac{500 \times 6 \times 8}{100 \times 12} = \text{Rs } 20$

①

$$\begin{aligned}
 4 \quad & 4 - 2x < 6 \\
 & -2x < 6 - 4 \\
 & -2x < 2 \\
 & \frac{-2x}{-2} > \frac{2}{-2} \\
 & x > -1
 \end{aligned}$$

$$\begin{aligned}
 5(a) \quad \text{error} &= \frac{1}{2} \times 10000 \\
 &= 5000
 \end{aligned}$$

$$(b) \quad \text{error} = \frac{1}{2} \times 1 \text{ cm} = 0.5$$

$$\begin{aligned}
 \text{Lower bound of length} \\
 &= 7 - 0.5 = 6.5
 \end{aligned}$$

$$\begin{aligned}
 \text{Lower bound of width} \\
 &= 4 - 0.5 = 3.5
 \end{aligned}$$

$$\begin{aligned}
 \text{Smallest perimeter} \\
 &= 2 [L.B \text{ of } L + L.B \text{ of } w] \\
 &= 2 [6.5 + 3.5] \\
 &= 2 \times 10 = 20 \text{ cm}
 \end{aligned}$$

$$6(a)(i) \quad 6.7 \times 10^3$$

$$(ii) \quad 5.78 \times 10^{-4}$$

$$\begin{aligned}
 (b) \quad 4 &= 4 \times 1 = 4 \times 10^0 \Rightarrow x = 0 \\
 0.05 &= 5 \times 10^{-2} \Rightarrow y = -2
 \end{aligned}$$

①

$$7(a) \quad \frac{1}{7} \approx 0.1428 = 0.143 \quad (3 \text{ d.p.})$$

$$(b) \quad 31.6824 \approx 31.7 \quad (3 \text{ s.f.})$$

$$8(a) \quad 22 \textcircled{2} \cdot 222$$

$$(b) \quad 5 \times 10^{-2} = 0.05 = \frac{5}{100}$$

$$(c) \quad 8^0 = 1$$

$$\begin{aligned}
 (d) \quad 8^{-\frac{2}{3}} &= (2^3)^{-\frac{2}{3}} = 2^{-2} \\
 &= \frac{1}{2^2} = \frac{1}{4}
 \end{aligned}$$

$$9(a) \quad \text{increase} = 265 - 250 = 15$$

$$\begin{aligned}
 \% \text{ increase} &= \frac{15}{250} \times 100 \\
 &= 6\%
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad \text{reduction} &= 4000 - 2800 \\
 &= 1200
 \end{aligned}$$

$$\begin{aligned}
 \% \text{ reduction} &= \frac{1200}{4000} \times 100 \\
 &= 30\%
 \end{aligned}$$

②

$$10(a) \quad 360^\circ - 12^\circ = 348^\circ$$

$$1(b) \quad 180^\circ + (50 - 12) \\ = 180^\circ + 38^\circ = 218^\circ$$

$$11 \quad y = 2x - 3 \quad \text{--- (1)} \\ 3x - 2y = 0 \quad \text{--- (2)} \\ \text{Substitute (1) into (2).} \\ 3x - 2(2x - 3) = 0 \\ 3x - 4x + 6 = 0 \\ -x + 6 = 0 \\ x = 6$$

replace $x = 6$ in (1)

$$y = 2(6) - 3 = 12 - 3 \\ = 9$$

$$x = 6, y = 9.$$

$$12(a) \quad 3tx - 2sx + 5ty - 10sy \\ x(3t - 2s) + 5y(3t - 2s) \\ = (3t - 2s)(x + 5y)$$

$$(b) \quad \frac{x-2}{4} + \frac{(x+1)}{3} = 1$$

$$\text{r.c.m} = 12$$

$$\frac{3(x-2)}{4 \times 3} + \frac{4(x+1)}{3 \times 4} = 1$$

$$\frac{3x-6+4x+4}{12} = 1$$

$$7x - 2 = 12$$

$$7x = 12 + 2 \Rightarrow 7x = 14$$

$$x = \frac{14}{7} = 2$$

$$(c) \quad 2y^2 - 3y - 2 \\ 2y^2 - 4y + y - 2 \\ 2y(y-2) + 1(y-2) \\ (y-2)(2y+1)$$

$$13(a) \quad f(x) = \frac{2x-1}{3}$$

$$f(5) = \frac{2(5)-1}{3}$$

$$= \frac{10-1}{3} = \frac{9}{3} = 3$$

$$(b) \quad \text{let } f(x) = y$$

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

$$2x - 1 = 3y$$

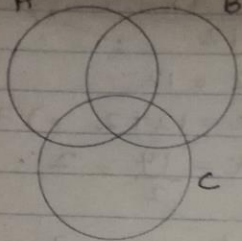
$$2x = 3y + 1$$

$$x = \frac{3y+1}{2}$$

$$f^{-1}(x) = \frac{3x+1}{2}$$

(3)

14(a) A B C



(b) $P: \{x\}$

15(a) gradient PB
 $P \begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$
 $B \begin{pmatrix} x_2 \\ y_2 \end{pmatrix} = \begin{pmatrix} 1 \\ 7 \end{pmatrix}$

$$= \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{7 - 1}{1 - (-2)} = \frac{6}{3}$$

$$= 2$$

(b) Equation of line PB

$$y = mx + c$$

$m = \text{gradient} = 2$
 $y = 2x + c$
 $(1, 7) \Rightarrow x = 1, y = 7$

$$7 = 2(1) + c$$

$$c = 7 - 2 = 5$$

Equation: $y = 2x + 5$

Q1) $2y + 3x + k = 0$
 $(-2, 1) \Rightarrow x = -2; y = 1$

$$2(1) + 3(-2) + k = 0$$

$$2 - 6 + k = 0$$

$$-4 + k = 0 \Rightarrow k = 4$$

ii) $2y + 3x + k = 0$

$$2y = -3x - k$$

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

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

$$y = mx + c$$

$$m = \frac{-3}{2} \Rightarrow \text{gradient} = \frac{-3}{2} = -\frac{1}{2}$$

16(a) $\sqrt{\frac{9}{16}} = \sqrt{\frac{25}{16}} = \frac{5}{4}$

(b) $\sqrt{3270} = \sqrt{32 \cdot 7 \cdot 100}$
 $= \sqrt{32 \cdot 7} \times \sqrt{100}$
 $= 5 \cdot 718 \times 10$
 $= 57 \cdot 18$

(4)

$$17(a) \quad 3p^2 - 12$$

$$= 3(p^2 - 4)$$

$$= 3[(p)^2 - (2)^2]$$

$$= 3(p+2)(p-2)$$

$$(b) \quad x^2 + 2x - 3 = 0$$

$$x^2 + 3x - x - 3 = 0$$

$$x(x+3) - 1(x+3) = 0$$

$$(x+3)(x-1) = 0$$

$$x+3=0 \text{ or } x-1=0$$

$$x = -3 \quad x = 1$$

$$18(i) \quad x = 162^\circ - 90^\circ = 72^\circ$$

$$(ii) \quad y = 162^\circ - \left[\frac{180^\circ - 72^\circ}{2} \right]$$

$$= 162^\circ - 54^\circ = 108^\circ$$

$$19(a) \quad 7$$

$$(b) \quad \sqrt{5}$$

$$(c) \quad 0.33333 \dots$$

$$20(a) \quad \text{determinant} = \begin{vmatrix} 1 & 2 \\ -1 & x \end{vmatrix}$$

$$= (1 \times x) - (-1 \times 2)$$

$$= 2 - (-2)$$

$$= 2 + 2$$

$$(b)(i) \quad \text{determinant} = 5$$

$$2 + x = 5$$

$$x = 5 - 2 = 3$$

$$(ii) \quad A^{-1} = \frac{1}{\det A} \begin{pmatrix} 2 & -x \\ 1 & 1 \end{pmatrix}$$

$$= \frac{1}{5} \begin{pmatrix} 2 & -3 \\ 1 & 1 \end{pmatrix}$$

$$21(a) \quad c = \frac{2d+1}{3d-1}$$

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

$$= \frac{\frac{1}{2} + 1}{\frac{3}{4} - 1} = \frac{\frac{3}{2}}{-\frac{1}{4}}$$

$$= -6$$

$$(b) \quad c = \frac{2d+1}{3d-1}$$

$$c(3d-1) = 2d+1$$

$$3cd - c = 2d + 1$$

$$3cd - 2d = 1 + c$$

$$d(3c-2) = 1+c$$

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

(5)

22 (a) area circle = πr^2

$$\frac{22}{7} \times r^2 = 154$$

$$r^2 = \frac{154 \times 7}{22}$$

$$r^2 = 49$$

$$r = \sqrt{49} = 7$$

(b) circumference = $2\pi r$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{ cm}$$

23 (a) exterior angle = $2 \times 18^\circ$

$$= 36^\circ$$

(b) number of sides

$$= \frac{360}{36} = 10$$

(c) ~~interior angle~~

$$144^\circ - 18^\circ = 126^\circ$$

24 (a) $5^3 - 10$

(b) $n^2 - 2n$

(c) $10^{\text{th}} \Rightarrow 10^3 - 2(10)$

$$= 1000 - 20$$

$$= 980$$

25 (a) $\$ 50 = \$ 616$

$$(\$ 1) = \frac{616}{50} = \$ 12.32$$

(b) 5 persons — 8 hours

1 person — 8×5

4 persons — $\frac{8 \times 5}{4}$

— 10 hours