PAPER 1

1 D $0.02886 = 0.0289 \rightarrow$ three sigificant figures
Add 1 to digit 8, because the digit next to it, which is 6 is greater in value than 5

2 C $0.00825 = 8.25 \times 10^{-3}$
Shift the decimal point 3 places to the right

3 D $\dfrac{20210}{5} = 4042$

$\qquad = 4.042 \times 10^{3}$

4 A Distance = Speed × Time

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$\text{Time} = \frac{1.43 \times 10^9 \times 10^3}{3 \times 10^8}$$

$$= \left(\frac{1.43}{3}\right) \times \frac{10^{12}}{10^8} \Big\} \frac{10^m}{10^n} = 10^{m-n}$$

$$= 0.477 \times 10^{12-8}$$

$$= 0.477 \times 10^4$$

$$= 4.77 \times 10^4 \times 10^{-1}$$

$$= 4.77 \times 10^3$$

5 B

5^3	5^2	5^1	5^0
1	m	1	1

$$5^3 + m5^2 + 5^1 + 5^0 = 181$$
$$125 + 25m + 5 + 1 = 181$$
$$25m + 131 = 181$$
$$25m = 50$$
$$m = 2$$

6 B

$$\begin{array}{r} 11011101_2 \\ -\ \ 1000110_2 \\ \hline 10010111_2 \\ \hline \end{array}$$

7 D $x + y + 90° = 360°$

$x + y = 270°$

Angle $x >$ Angle y

So, $\angle x > \dfrac{270°}{2}$

Interior angle x is

$$\frac{(n-2)180°}{n} > 135°$$

By using try and error method

$n = 5,\ \dfrac{(5-2) \times 180°}{5} = 108° < 135°$

Not satisfying the statement $x > 135°$

$n = 6,\ \dfrac{(6-2) \times 180°}{6} = 120°,\ 120° < 135°$

Not satisfying the statement $x > 135°$

$n = 7,\ \dfrac{(7-2) \times 180°}{7} = 128\dfrac{4}{7}°,\ 128\dfrac{4}{7}° < 135°$

Not satisfying the statement $x > 135$

$n = 9,\ \dfrac{(9-2) \times 180°}{9} = 140°,\ 140° > 135°$

Satisfies the statement $x > 135°$

8 D Interior angle $LMNOP$

$$= \frac{(5-2) \times 180°}{5} = 108°$$

$\angle LPQ = 360° - 95° - 108° = 157°$

$\angle PLR$ exterior angle $= 72°$

$\angle QRL = 360° - 45° - 157° - 72° = 86°$
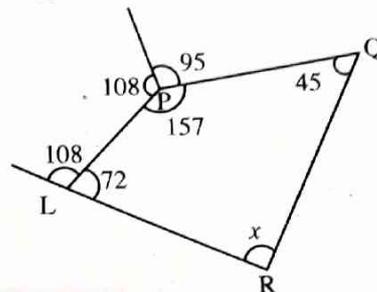
9 D $\angle OQR = \angle ORQ = \dfrac{180° - 130°}{2} = 25°$

$\angle RPQ = 65°$

$\angle ORT =$ tangent line to the circle

$\angle ORT = 90°$

$\angle QRT = 90° - \angle ORQ$

$= 90° - 25°$

$= 65°$

so $x = 65°$

10 A

Clockwise
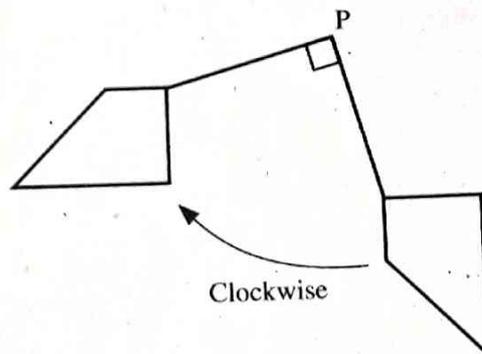
11 A $5\ m \times \dfrac{1}{5} = 1\ m$

$8\ m \times \dfrac{1}{5} = 1.6\ m$

**12 C** $\sin 90° = 1$

$\sin 180° = 0$

$\sin 270° = -1$
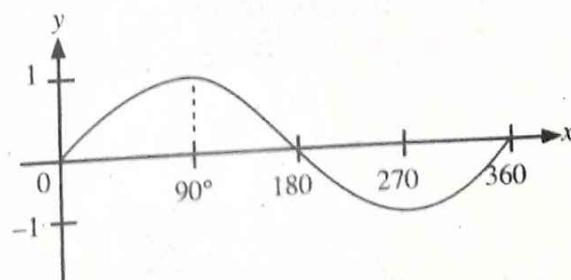
13 B
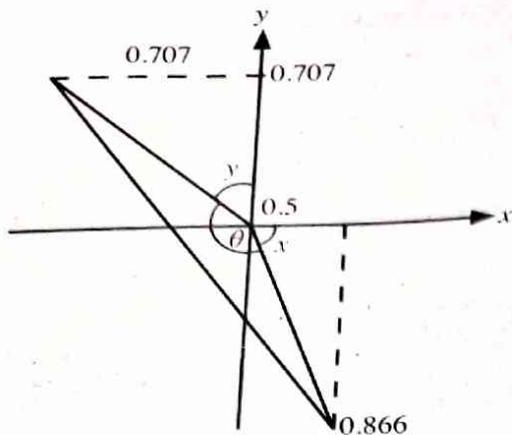
$$\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$$

$$\tan x = \frac{0.866}{0.5} = 59.99° = 60°$$

$$\tan y = \frac{0.707}{0.707} = 45°$$

$$\theta = 360° - 45° - 90° - 60° = 165°$$

14 A Plane **K** is *WRQX*, where the line is *VQ* and the angle is $\angle WQV$

15 D $z°$ is the angle of depression from the hot air balloon to Rahman

16 B $\angle MPN = 40°$

$MN = 30$ m

$$\sin 40° = \frac{30 \text{ m}}{PM}$$

$PM = 46.672$

$PM = NQ$

$NQ = 46.672$

$$\tan \theta = \frac{46.672}{45 \text{ m}}$$

$\tan \theta = 1.037$

$\angle NKQ = 46.04°$

Angle of depression from point Q to point K
$= 90° - \angle NKQ$
$= 90° - 46.04°$
$= 43.96°$

17 D
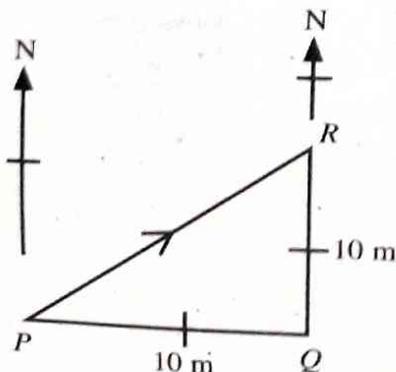
18 C $60 \times \theta = 6300$

$\theta = 105°$

$\theta = 105° - 90°$

$= 105°S$

19 A $p^2 - q^2 - (p^2 + 2pq + q^2)$

$p^2 - q^2 - p^2 - 2pq - q^2$

$- 2pq - 2q^2$

20 A

$$\frac{1}{h - r} - \frac{2h}{h^2 - r^2}$$

$$= \frac{h^2 - r^2 - 2h(h - r)}{(h - r)(h^2 - r^2)}$$

$$= \frac{h^2 - r^2 - 2h + 2hr}{(h - r)(h^2 - r^2)}$$

$$= \frac{-h^2 + 2hr - r^2}{(h - r)(h^2 - r^2)}$$

$$= \frac{-(h^2 - 2hr + r^2)}{(h - r)(h^2 - r^2)}$$

$$= \frac{-(h - r)^2}{(h - r)(h^2 - r^2)}$$

$$= \frac{-(h - r)}{(h - r)(h + r)} = -\frac{1}{h + r}$$

21 B

$$\frac{3r^2 + p}{2} = 2(3 + 4p)$$

$3r^2 + p = 4(3 + 4p)$

$3r^2 + p = 12 + 16p$

$16p - p = 3r^2 - 12$

$15p = 3(r^2 - 4)$

$$p = \frac{3(r^2 - 4)}{15}$$

$$= \frac{r^2 - 4}{5}$$

22 C $2(x + 3) + 2x = 48 + x$

$2x + 6 + 2x = 48 + x$

$4x - x = 48 - 6$

$3x = 42$

$$x = \frac{42}{3}$$

$= 14$

23 B $n = 3^{-2} \times 3^{(4 \times \frac{3}{4})}$

$n = 3^{-2} \times 3^3$

$n = 3^{-2+3}$

$n = 3^1$

$n^2 = 3^2$

$= 9$

24 C
$$\left[\frac{r^{10} \times (4s^8)^{\frac{1}{2}}}{(r^{16}s^{24})^{\frac{1}{4}}}\right]^3$$

$$= \left[\frac{r^{10} \times 4^{\frac{1}{2}}s^4}{r^4 s^6}\right]^3$$

$$= (r^{(10-4)} \times 2 \times s^{(4-6)})^3$$

$$= \left(\frac{2r^6}{s^2}\right)^3$$

$$= \frac{2^3 r^{(6 \times 3)}}{s^{(2 \times 3)}}$$

$$= \frac{8r^{18}}{s^6}$$

25 A
$4m - 3 \leq 13 + 6m$
$4m - 6m \leq 13 + 3$
$-2m \leq 16$
$m \geq \dfrac{16}{-2}$
$m \geq -8$

26 B
$\dfrac{y}{2} - 7 \geq -9$ $1 - 3y > 6$
$y - 14 \geq -18$ $-3y > 6 - 1$
$y \geq -18 + 14$ $-3y > 5$
$y \geq -4$

$\qquad\qquad\qquad y < \dfrac{-5}{3}$
$\qquad\qquad\qquad y < -1.67$

Thus, $-4 \leq y < -1.67$
$\qquad y = -4, -3, -2$

27 B
$$\text{Mean} = \frac{\text{sum of data}}{\text{number of data}}$$
$$14 = \frac{4 + 6 + 8 + 9 + x + y + 17 + 21 + 22 + 23}{10}$$
$x + y = 30$
Median = 4, 6, 8, 9, ⓧ, ⓨ, 17, 21, 22, 23
$\qquad = \dfrac{x + y}{2}$
$\qquad = \dfrac{30}{2}$
$\qquad = 15$

28 C
Total angle of a circle = 360°
$2x° + 3x° + 20° + 140° + 60° = 360°$
$5x° + 220° = 360°$
$\qquad 5x° = 140°$
$\qquad x° = 28°$
Grade D = $3x°$
$\qquad\quad = 3 \times 28°$
$\qquad\quad = 84°$
Total students with grade D
$= \dfrac{84°}{360°} \times 1080$ students
$= 252$ students

29 D
April = 40×30 cars = 120 cars
If Jun = x, May will be $3x$
So, $3x + x + 120 = 240$
$\qquad\qquad 4x = 120$
$\qquad\qquad x = 30$
May = $3x$
Thus May = $3(30) = 90$ cars

30 B
$$\text{Mean} = \frac{\text{sum of (midpoint} \times \text{frequency)}}{\text{sum of frequencies}}$$

Time	Frequency, f	Midpoint, x	fx
5–9	14	$\dfrac{5+9}{2} = 7$	$7 \times 14 = 98$
10–14	8	$\dfrac{10+14}{2} = 12$	$12 \times 8 = 96$
15–19	10	$\dfrac{15+19}{2} = 17$	$17 \times 10 = 170$
20–24	6	$\dfrac{20+24}{2} = 22$	$22 \times 6 = 132$
25–29	12	$\dfrac{25+29}{2} = 27$	$27 \times 12 = 324$

Mean $= \dfrac{98 + 96 + 170 + 132 + 324}{50}$
$\qquad = \dfrac{820}{50}$
$\qquad = 16.4$

31 B $y = ax^2 + bx + c \rightarrow$ quadratic equation
When $y = 0, x = 1$ $c = 1$ } y – intercept
$\qquad\quad y = 0, x = -1$ $c = 1$
$0 = a(1)^2 + b(1) + 1$ $0 = a(-1)^2 + b(-1) + 1$
$a + b = -1$ ─────── ①
$a - b = -1$ ─────── ②
①−② $\quad b - (-b) = -1 - (-1)$
$\qquad\qquad 2b = -1 + 1$
$\qquad\qquad 2b = 0$
$\qquad\qquad b = 0$

When $b = 0$
$a + 0 = -1$
$a = -1$
$y = (-1)(x^2) + (0)x + 1$
$y = -x^2 + 1$

32 C   Set $\xi = \{r, s, t, u, v, w\}$
Set $Q = \{v, w\}$
Set $Q' = \{r, s, t, u\}$ – is not the element of set Q

33 B Swimming club $= 40 + 15 + 70 + x$

Hockey club $= \dfrac{1}{6}$ Swimming club

$$15 + x = \dfrac{1}{6}(40 + 15 + 70 + x)$$
$$6(15 + x) = 40 + 15 + 70 + x$$
$$90 + 6x = 125 + x$$
$$6x - x = 125 - 90$$
$$5x = 35$$
$$x = 7$$

Golf club $= 6x$
$$= 6(7)$$
$$= 42$$

34 A $y = mx + c$

Linear equation of PT is $y = x + 5$
So, $m = 1$ and $c = 5$

Linear equation of PQ is $y = mx + c$
Where the point Q has $y = 0$ and $x = 4$
So $0 = m(4) + 5$
$$0 = 4m + 5$$
$$4m = -5$$
$$m = -\dfrac{5}{4}$$

35 C $y = mx + c$
When $y = 0$, $x = -10$
So $-10m + c = 0$ ············· ①
When $y = -4$, $x = -2$
So $-2m + c = -4$ ············· ②

① $-$ ②
$$-10m - (-2m) = 0 - (-4)$$
$$-10m + 2m = 0 + 4$$
$$-8m = 4$$
$$m = -\dfrac{1}{2}$$

Thus, $-10\left(-\dfrac{1}{2}\right) + c = 0$
$$5 + c = 0$$
$$c = -5 \rightarrow y - \text{intercept}$$

36 B Total candidates $= 240$
Medical assistants $= 60$
Probability of pharmacy assistants (x) is $= \dfrac{1}{6}$

So pharmacy assistants,
$$\dfrac{x}{240} = \dfrac{1}{6}$$
$$x = \dfrac{1}{6} \times 24$$
$$x = 40$$
Nurses $= 240 - 40 - 60$
$$= 140$$

37 D There are 22 numbers in between number 14 to 35
Prime number $= 17, 19, 23, 29$ and 31
$$= 5 \text{ numbers}$$

Prime number $= \dfrac{5}{22}$

㉒

Not a prime number $= \dfrac{22 - 5}{22} = \dfrac{17}{22}$

38 C $y \propto \dfrac{1}{2x - 1}$

$$y = \dfrac{k}{2x - 1}$$

When $y = 2$, $x = 3$
So,
$$2 = \dfrac{k}{2(3) - 1}$$
$$2 = \dfrac{k}{6 - 1}$$
$$k = 2(5)$$
$$k = 10$$

Thus,
$$y = \dfrac{10}{2x - 1}$$
When $y = -2$
$$-2 = \dfrac{10}{2x - 1}$$
$$-2(2x - 1) = 10$$
$$-4x + 2 = 10$$
$$-4x = 8$$
$$x = -2$$

39 B $P = \dfrac{kQ}{\sqrt{R}}$

$$k = \dfrac{P\sqrt{R}}{Q}$$
$$k = \dfrac{9 \times \sqrt{4}}{3}$$
$$k = 3 \times 2$$
$$k = 6$$

$$P = \dfrac{6Q}{\sqrt{R}}$$
$$12 = \dfrac{6\left(\dfrac{1}{2}\right)}{\sqrt{m}}$$
$$\sqrt{m} = \dfrac{3}{12}$$
$$\sqrt{m} = \dfrac{1}{4}$$
$$m = \left(\dfrac{1}{4}\right)^2$$
$$m = \dfrac{1}{16}$$

40 **C** Ali's restaurant, $x = (4 \times RM30) + (6 \times RM21.60)$

Ayu's restaurant, $y = (7 \times RM30) + (9 \times RM21.60)$

So,

$$\begin{pmatrix} 4 & 6 \\ 7 & 9 \end{pmatrix} \begin{pmatrix} 30.00 \\ 21.60 \end{pmatrix} = \begin{pmatrix} x \\ y \end{pmatrix}$$