TRY 1

1. Which of the following geometrical concepts is non-dimensional?
   A. Line
   B. Line segment
   C. Plane
   D. Point
2. Two complementary angles are in the ratio 2:3. Find the difference between the angles.
   A. 18^0
   B. 36^0
   C. 54^0
   D. 63^0
3. Which of the following dimensions will NOT represent the dimensions of a triangle?
   A. $5cm, 7cm$ and $14cm$
   B. $7cm, 8cm$ and $13cm$
   C. $8m, 5m$ and $12m$
   D. $12cm, 9cm$ and $7cm$
4. Which of the following properties of angles formed by a transversal on parallel lines is NOT true?
   A. Adjacent angles are equal.
   B. Alternate angles are equal.
   C. Correspondent angles are equal.
   D. Vertically opposite angles are equal.
5. A locus of points equidistant from a fixed point is a ……..
   A. bisection of two sides or three sides of a triangle.
   B. bisector of an angle.
   C. circle with centre at a fixed point.
   D. perpendicular bisector of a given line.
6. Which of the following is not needed when you are measuring a line segment?
   A. A pair of compasses
   B. A pair of dividers
   C. Pencil
   D. Ruler
7. Which of the following is NOT a Pythagorean triplet?
   A. (5, 12, 13)
   B. (7, 24, 25)
   C. (9, 40, 41)
   D. (9, 60, 61)

8. The angle of depression from the top of a vertical cliff 220m in height to a ship is 28^0. How far is the ship from the base of the cliff?
   A. 411m
   B. 412m
   C. 413m
   D. 414m

9. The sum of the interior angles of a polygon is 1440. Find the number of sides of this polygon.
   A. 7
   B. 8
   C. 9
   D. 10

10. How many non-overlapping triangles can be found in a 10-sided polygon?
    A. 6
    B. 8
    C. 10
    D. 12

11. The bearing of a point Q from another point P is 040°. Find the bearing of P from Q.
    A. 040°
    B. 130°
    C. 160°
    D. 220°

12. Which of the following vectors is parallel to the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$?
    A. $\begin{pmatrix} 12 \\ 9 \end{pmatrix}$
    B. $\begin{pmatrix} 8 \\ 6 \end{pmatrix}$
    C. $\begin{pmatrix} -8 \\ 6 \end{pmatrix}$
    D. $\begin{pmatrix} -8 \\ -6 \end{pmatrix}$

13. Find the length of the vector $\begin{pmatrix} -8 \\ 6 \end{pmatrix}$
    A. -10
    B. 10
    C. $\sqrt{10}$
    D. $\sqrt{28}$
    A. 130

14. The parallel sides of a trapezium are 11cm and 8cm. If the distance between the parallel lines is 9cm, find the area of the trapezium.
    A. 28cm^2
    B. 85.5cm^2
    C. 792cm^2
    D. 396cm^2

15. The radius of a circle is 21cm. An arc subtends an angle of ⟦81⟧ ^oat the centre. Find the length of the arc. ($Take\ \pi = 22/7$)
    A. 27.9cm
    B. 279cm
    C. 29.7cm
    D. 297cm

16. A cuboid has dimensions 10cm x 6cm x 5cm. Find the total surface area.
    A. $280cm^2$
    B. $300cm^2$
    C. $360cm^2$
    D. $600cm^2$

17. Find the total surface area of a rectangular tank of length 8cm, breadth 5cm and height 6cm.
    A. $118cm^2$
    B. $218cm^2$
    C. $236cm^2$
    D. $240cm^2$

18. The circumference of a circle is 44cm. Find the area of the circle.
    A. $154cm^2$
    B. $127cm^2$
    C. $77cm^2$
    D. $22cm^2$

19. A number is chosen at random from the set {1, 2, 3, 4, 5, 6}. What is the probability that it is odd?
    A. $\frac{1}{6}$
    B. $\frac{1}{3}$
    C. $\frac{1}{2}$
    D. $\frac{2}{3}$

20. A box contains 7 blue, 5 red and 8 white identical balls. If ball is picked at random from the box, what is the probability that it is white?
    A. $\frac{3}{5}$
    B. $\frac{2}{5}$
    C. $\frac{7}{20}$
    D. $\frac{1}{4}$

21. Find the odd one out.
    A. Mean
    B. Median
    C. Mode
    D. Range

22. Scores in Mathematics test have a mean score of 49 and a standard deviation of 4. What is the variance of the scores?
   A. 2
   B. 4
   C. 7
   D. 16

The table below shows the distribution of marks obtained by twenty pupils in a test.

Marks	1	2	3	4	5	6	7
No. of students	1	3	5	6	2	1	2

Use the table to answer Questions 23 to 25.

23. What is the modal mark of the distribution?
   A. 2
   B. 3
   C. 4
   D. 5
24. Find the median mark.
   A. 3
   B. 4
   C. 5
   D. 6
25. Find the mean mark for the distribution.
   A. 3.8
   B. 2.9
   C. 2.7
   D. 1.9

Answer three (3) questions in this section.

1. (a) P, Q and R are three villages on a level ground. Q is 3km on a bearing 040° from P, while R is 4km on the bearing 130° from Q. calculate the distance and bearing of P from R. State $\overrightarrow{PR}$ in distance bearing form.

(b) If $a = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$, $b = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ and $r = a + \frac{1}{2}(a - b)$, find

    (i) r

    (ii) $|r|$

2. (a) Using a ruler and a pair of compasses only, construct;

    (i) ΔABC such that $|AB| = 8cm$, $\angle ABC = 60^0$ and $\angle BAC = 75^0$.

    (ii)   the locus l_1 of points equidistant from B and C.

    (iii)   the locus l_2 of points equidistant from A and B.

    (iv)   locate O, the point of intersection of l_1 and l_2 inside the ΔABC equidistant from A, B and C.

    (v)   construct the circle with centre O, which passes through A.

(b) Measure

    (i) $|OA|$

    (ii) angle ACB

(c) The five interior angles of an octagon are 130, 120, 110, 160 and 140. If the remaining angles are equal, find the size of each of the remaining angles.

3. (a) If $270 < \emptyset < 360$ and $\cos \emptyset$ 0.6, find $\sin \emptyset$ and $\tan \emptyset$ without using tables

(b) Two points A and C on opposite sides of a vertical pole are on the same level ground as the foot of the pole, B. the angles of elevation of the top of the pole D from A and C respectively are 30^0 and 48^0 respectively. If the distance between A and C is 50m, find /BD/ the height of the pole.

1 (a)
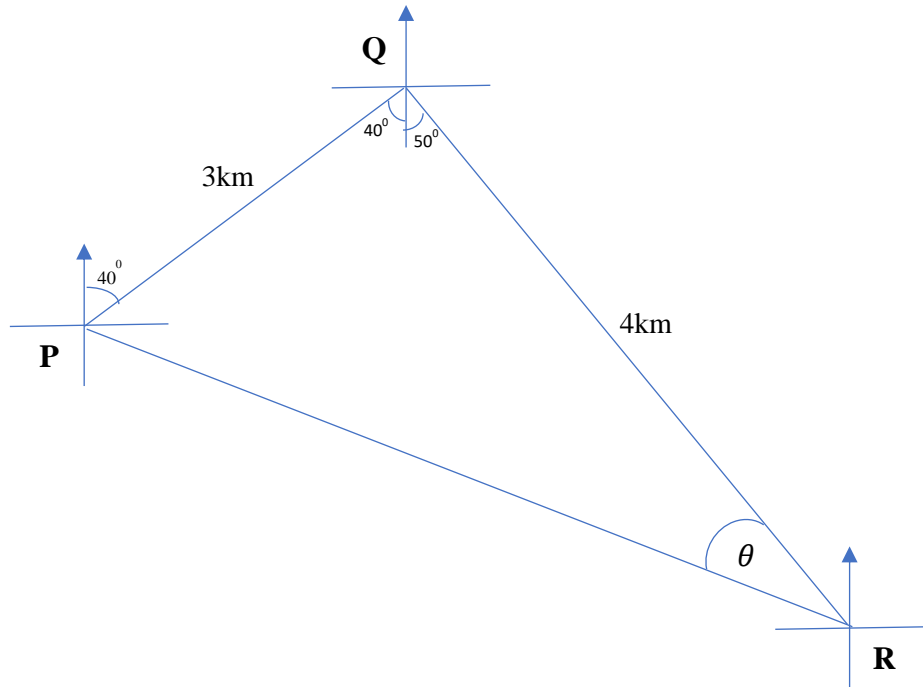
Triangle PQR is a right-angled triangle.

Applying Pythagoras' theorem

$|PR|^2 = |PQ|^2 + |QR|^2$

$|PR|^2 = 3^2 + 4^2$

$|PR|^2 = 25$

$|PR| = \sqrt{25} = 5$

$\therefore$ The distance of P from R is 5km

Also, $tan\theta = \frac{3}{4}$

$\theta = \tan^{-1}\left(\frac{3}{4}\right) = 36.8699 = 37^o$

The bearing of P from R is $360^o - 37^o - 50^o = 273^o$ OR $270^o + 3^o = 273^o$
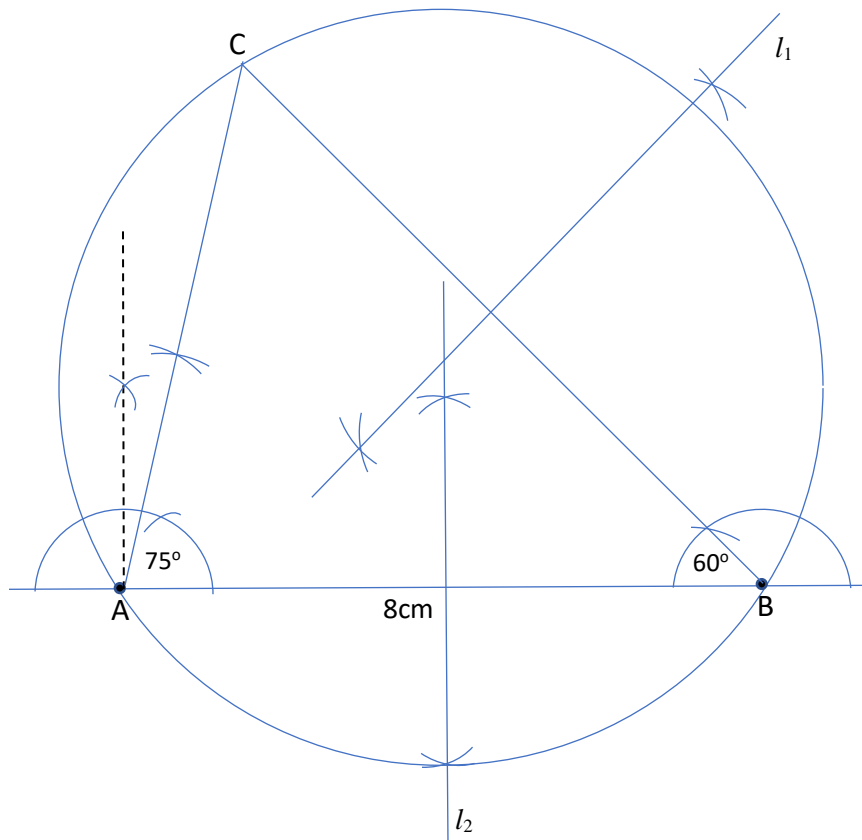
$\therefore \overrightarrow{PR} = (5km, 273^o)$

1 (b) Given $a = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$, $b = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ and $r = a + \frac{1}{2}(a - b)$,

(i) $r = a + \frac{1}{2}(a - b)$

$r = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + \frac{1}{2}\left[\begin{pmatrix} 2 \\ 3 \end{pmatrix} - \begin{pmatrix} 4 \\ 5 \end{pmatrix}\right]$

$r = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + \frac{1}{2}\begin{pmatrix} -2 \\ -2 \end{pmatrix}$

$r = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} \frac{1}{2} \times -2 \\ \frac{1}{2} \times -2 \end{pmatrix}$

$r = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} -1 \\ -1 \end{pmatrix}$

$r = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

(ii) $r = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

$|r| = \sqrt{1^2 + 2^2}$

$|r| = \sqrt{1 + 4}$

$|r| = \sqrt{5}$ units

2 (a)

(b) (i) $|OA| = 5.6\ cm$

   (ii) angle $ACB = 45^{\circ}$

2 (c). An octagon has eight sides. Since the remaining three angles are equal, we will represent each with y

$$130 + 120 + 110 + 160 + 140 + y + y + y = 180(8 - 2)$$
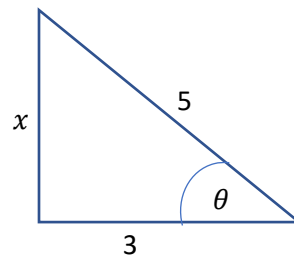$$660 + 3y = 1080$$
$$3y = 1080 - 660$$
$$3y = 420$$
$$y = 140$$

3 (a) $cos\theta = 0.6 = \dfrac{3}{5}$

   This means that the adjacent is 3 and the hypotenuse is 5

Using Pythagoras Theorem;
$$x^2 + 3^2 = 5^2$$
$$x^2 + 9 = 25$$
$$x^2 = 25 - 9$$
$$x^2 = 16$$
$$x = 4$$

Since θ is in the fourth quadrant,
$$sin\theta = -\frac{4}{5}\ and$$
$$tan\theta = -\frac{4}{3}$$