Angles and Their Measurement
Ex 13A

Q1

Answer :

1) Angle formed at the vertex of our elbow with the upper arm and the lower arm as the two rays. This angle will vary as per the position of our arm.

2) Angle formed between the two hands of the clock that are hinged at a point.

3) Angle formed between the two hands of a windmill. They are also hinged at a point, which is called the vertex of that angle.

Q2

Answer :

The vertex is B.

Arms of $\angle ABC$ *are rays* $\overrightarrow{BA}$ *and* $\overrightarrow{BC}$.

Q3

Answer :

(i) Here, three angles are formed. They are $\angle ABC$, $\angle ACB$ *and* $\angle BAC$.
(ii) Here, four angles are formed. They are $\angle ABC$, $\angle BCD$, $\angle CDA$ *and* $\angle DAB$.
(iii) Here, eight angles are formed. They are
$\angle ABC$, $\angle BCD$, $\angle CDA$, $\angle DAB$, $\angle ABD$, $\angle ADB$, $\angle CDB$, $\angle CBD$.

Q4

Answer :

(i) Q and S are in the interior of $\angle AOB$.

(ii) P and R are in the exterior of $\angle AOB$.

(iii) A, O, B, N and T lie on the angle ∠AOB.

Q5

Answer :

(i)False
Point *C* is on the angle $\angle AOC$.

(ii)True
Point *C lies* in the interior of $\angle AOD$.

(iii) False
Point *D* lies in the exterior of $\angle AOC$.

(iv) True
Point *B* lies in the exterior of $\angle AOD$.

(v) False
Point C lies in the interior of ∠AOB.

Q6

Answer :

(i) ∠EPB
(ii) ∠PQC
(iii) ∠FQD

Angles and Their Measurement
Ex 13B

Q1

Answer :

(i) ∠AOB is an obtuse angle since its measure is more than 90°.

(ii) ∠COD is a right angle since its measure is 90°.

(iii) ∠FOE is a straight angle since its measure is 180°.

(iv) ∠POQ is a reflex angle since its measure is more than 180° but less than 360°.

(v) ∠HOG is an acute angle since its measure is more than 0 but less than 90°.

(vi) ∠POP is a complete angle since its measure is 360°.

Q2

Answer :

(i) Acute angle
This is because its measure is less than 90° but more than 0°.
(ii) Obtuse angle
This is because its measure is more than 90° but less than 180°.
(iii) Obtuse angle
This is because its measure is more than 90° but less than 180°.
(iv)Right angle
This is because its measure is 90°.
(v) Reflex angle
This is because its measure is more than 180° but less than 360°.

(vi) Complete angle
This is because its measure is 360°.
(vii) Obtuse angle
This is because its measure is more than 90° but less than 180°.
(viii) Obtuse angle
This is because its measure is more than 90° but less than 180°.
(ix) Acute angle
This is because its measure is more than 0° but less than 90°.
(x) Acute angle
This is because its measure is more than 0° but less than 90°.
(xi) Zero angle
This is because its measure is zero.
(xii) Acute angle
This is because its measure is more than 0° but less than 90°.

Q3

Answer :

(i) One right angle has 90°.
(ii) Two right angles have 90° + 90° = 180°.
(iii) Three right angles have 90° + 90° + 90° = 270°.
(iv) Four right angles have 90° + 90° + 90° + 90° = 360°.
(v) $\frac{2}{3} \times 90 = 60^\circ$
(vi) $\left(1+\frac{1}{2}\right) right\ angles = \frac{3}{2} \times 90$
$= 135^\circ$

Q4

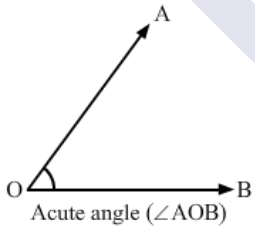
Answer :

(i) At 3 o'clock the angle formed between the hour hand and the minute hand is right angle, i.e. 90°.
(ii) At 6 o'clock the angle formed between the hour hand and the minute hand is a straight angle, i.e. 180°.
(iii) At 12 o'clock the angle formed between the hour hand and the minute hand is a complete angle, i.e. 0°.
This is because the hour hand and minute hand coincides to each other at 12 o'clock.
(iv) At 9 o'clock the angle formed between the hour hand and the minute hand is a right angle, i.e. 90°.

Q5

Answer :

(i) Acute angle

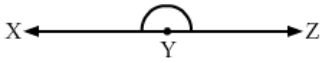


Acute angle (∠AOB)

(ii) Obtuse angle

Obtuse angle (∠ PQR)

(iii) Straight angle



Straight angle (∠XYZ)

Angles and Their Measurem
Ex 13C

Q1

Answer :

(i) $\angle AOB = 45^\circ$
(ii) $\angle PQR = 75^\circ$
(iii) $\angle DEF = 135^\circ$
(iv) $\angle LMN = 55^\circ$
(v) $\angle TSR = 135^\circ$
(vi) $\angle GHI = 75^\circ$

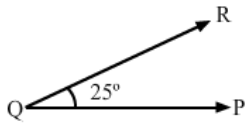
We have measured all the above angles by placing the protractor on one of the arms of the angle and measuring the angle through the other arm that coincides with the angle on the protractor.

Q2

Answer :

Steps to follow:
Draw a ray QP with Q as the initial point.
Place the protractor on QP. With its centre on Q, mark a point R against the given angle mark of the protractor.
Join RQ. Now, PQR is the required angle.

(i)



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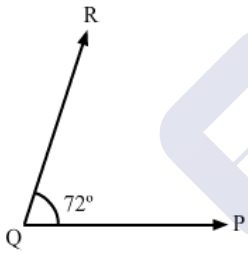

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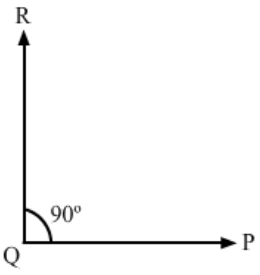

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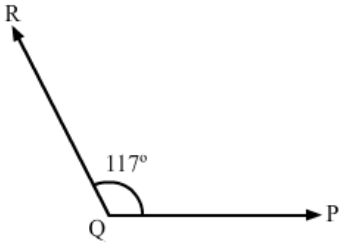

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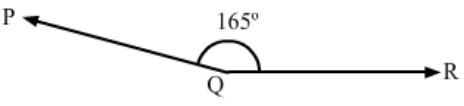

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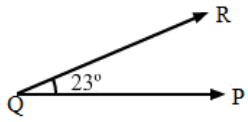

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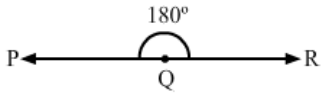
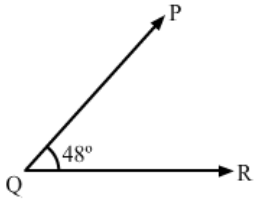


(viii)



Q3

Answer :

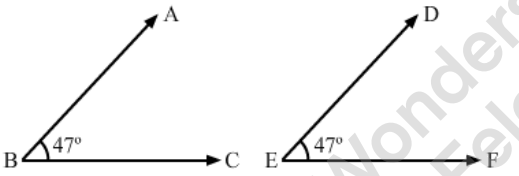
We can see that $\angle ABC = 47^\circ$.

Steps to follow to construct angle ∠DEF equal to ∠ABC:

Draw a ray EF with E as the initial point.

Place the protractor on EF. With its centre at E, mark a point D against the angle 47° of the protractor.

Join DE. ∠DEF = 47° = ∠ABC is the required angle.



$\angle DEF = \angle ABC = 47^\circ$

Q4

Answer :

Draw a line segment AB of length 6 cm.

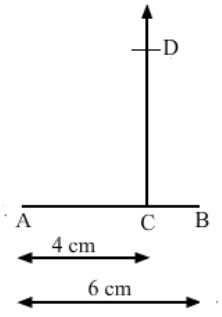
Mark point C on AB such that AC is equal to 4 cm.

Place the protractor on AB such that the centre of the protractor is on C and its base lies along AB.

Holding the protractor, mark a point D on the paper against the 90° mark of the protractor.

Remove the protractor and draw a ray CD with C as the initial point.

Now, CD ⊥ AB



Angles and Their Measurement
Ex 13D

Q1

Answer :

(c) On the angle
Vertex is the initial point of two rays between which the angle is formed. Therefore, it lies on the angle.

Q2

Answer :

(c) an angle
The initial point is called the vertex.

Q3

Answer :

(c) straight angle

Q4

Answer :

(b) right angle

Q5

Answer :

(b) an obtuse angle
This is because it is more than 90° but less than 180°.

Q6

Answer :

(d) a reflex angle
This is because it is more than 180° but less than 360°.

Q7

Answer :

(c) 180°

Q8

Answer :

(c) a reflex angle
This is because it is more than 180° but less than 360°.

Q9

Answer :

(d) a complete angle
This is because it completes the rotation of 360°.

Q10

Answer :

(b) more than 180° but less than 360°

Q11

Answer :

(b)
2 right angles = $2 \times 90^\circ = 180^\circ$ (straight angle)

Q12

Answer :

(b) 135°

$\frac{3}{2}$ right angle $= \frac{3}{2} \times 90^\circ$
$= 135^\circ$

Q13

Answer :

(c) 10°

Number of spokes = 36
Measure of the angle of the wheel = Complete angle = 360°
Angle between a pair of adjacent spokes= $\frac{\text{Measure of angle}}{\text{Number of spokes}} = \frac{360^\circ}{36} = 10^\circ$