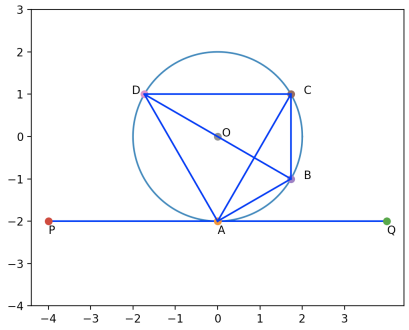
ICSE 2017 Q8 b

Suryaansh Jain*

0.1. Solution:

$\angle BAQ = 30°$
$\Rightarrow \angle BAC = 30°$
also $\angle CAP = 180° - \angle CAQ \Rightarrow \angle CAP = 120°$
$\Rightarrow \angle CAD = \angle PAD = 60°$
$\Rightarrow \angle BAD = 90°$
$\Rightarrow BD$ is a diameter
$\angle ADB = \angle ACB = 30°$
[Angle made a chord at two different points]
Also $\angle CAB = 30°$
$\Rightarrow \triangle ABC$ is an isosceles triangle



Steps for drawing the diagram:

a) Draw a circle with radius 2 and center O$(0, 0)$.
b) Draw the tangent PQ
c) Plot A
d) Draw the chord AB
e) Draw the chord AC
f) Draw the chord AD
g) Draw the chord BD

Finding the coordinates of the points A.

a) A is on the line segment PQ.
b) The point closest to the circle on the segment lies on a line passing through O and perpendicular to PQ $\Rightarrow A(0, -2)$.

Finding the coordinates of the points B.

a) A(0. -2).
b) $\angle BAQ = 30°$
c) $|AB| = 2$
d) $\Rightarrow B(-1, \sqrt{3})$

Finding the coordinates of the points C.

a) A(0. -2).
b) $\angle CAQ = 60°$
c) $|AC| = 2\sqrt{3}$
d) $\Rightarrow C(1, \sqrt{3})$

Finding the coordinates of the points D.

a) A(0. -2).
b) $\angle DAP = 60°$
c) $|AD| = 2\sqrt{3}$
d) $\Rightarrow D(1, -\sqrt{3})$