(10) $AB = AC = 12\sqrt{5}$ cm
$BC = 24$ cm , $BM = CM = 12$ cm.

$AM^2 = AB^2 - BM^2$
$AM^2 = (12\sqrt{5})^2 - (12)^2$
$AM^2 = (144 \times 5) - 144$
$AM^2 = 720 - 144$
$AM = \sqrt{576}$
$AM = 24$ cm

$OM = AM - AO$
$OM = 24 - r$

In $\triangle OBM$,
$OB^2 = BM^2 + OM^2$
$OB^2 = 12^2 + (24 - r)^2$
$OB^2 = 144 + 24^2 + r^2 - 48r$
$\cancel{r^2} = 144 + 576 + \cancel{r^2} - 48r$
$48r = 720$
$r = \frac{\cancel{720}\ 15}{\cancel{48}}$

$\therefore$ $\boxed{\text{radius} = 15\text{cm.}}$ ans

(11) $AB = BC = AC = 6$ cm
$BM = MC = 3$cm

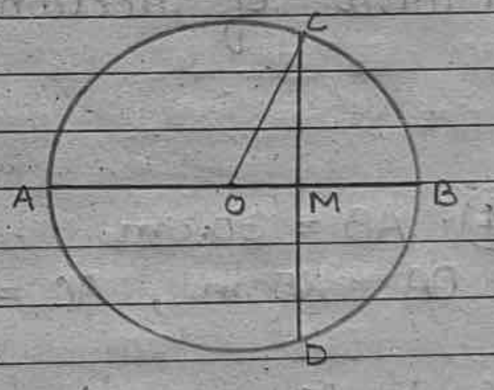
$AM^2 = AB^2 - BM^2$
$AM^2 = 6^2 - 3^2$

$AM^2 = 36 - 9$
$AM = \sqrt{27}$
$AM = 3\sqrt{3}$

$OM = AM - AO$
$OM = 3\sqrt{3} - r$ $\boxed{AO = OB = \text{radius}}$

$OB^2 = BM^2 + OM^2$
$OB^2 = 3^2 + (3\sqrt{3} - r)^2$
$r^2 = 9 + (9 \times 3) + r^2 - 2 \times 3 \times \sqrt{3} \times r$
$\cancel{r^2} = 9 + 27 + \cancel{r^2} - 6\sqrt{3}r$
$6\sqrt{3}r = 36$
$r \Rightarrow \frac{\cancel{36}\,6}{\cancel{6}\sqrt{3}} \Rightarrow \frac{6}{\sqrt{3}} \Rightarrow \frac{2 \times \sqrt{3} \times \cancel{\sqrt{3}}}{\cancel{\sqrt{3}}}$
$\therefore$ radius $= \boxed{2\sqrt{3}\text{ cm}}$ ans

(12) $AM = 18\text{cm}$, $MB = 8\text{cm}$
$AB = 26\text{ cm}$ (diameter)



radius $\Rightarrow \frac{26}{2} = 13\text{ cm}$

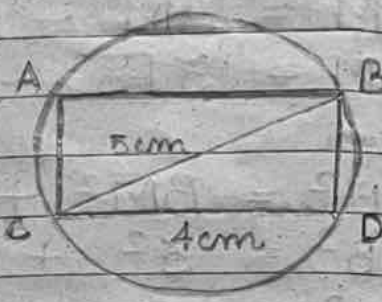
$OC = 13\text{ cm} = OA$
$OM = AM - OA$
$OM = 18\text{ cm} - 13\text{cm}$
$OM = 5\text{cm}$

In ΔOCM,
$CM^2 = OC^2 - OM^2$
$CM^2 = 13^2 - 5^2$
$CM^2 = 169 - 25$
$CM = \sqrt{144}$

$CM = 12 \text{ cm}$

$\therefore CD = 2 \times 12 \text{ cm}$
$= 24 \text{ cm}$ ans.

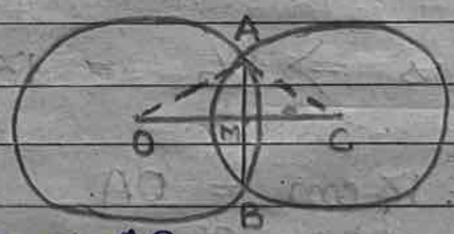
(13) $AB = CD = 4 \text{ cm}$
$CB = 5 \text{ cm}$



In $\triangle BCD$,
$BC^2 = CD^2 + BD^2$
$5^2 = 4^2 + BD^2$
$25 - 16 = BD^2$
$\sqrt{9} = BD$
$BD = 3 \text{ cm}$

$\therefore$ area of rectangle $= \cancel{2 \times}(l \times b)$
$= 4 \text{ cm} \times 3 \text{ cm}$
$= \boxed{12 \text{ cm}^2}$ ans.

(14) $AB = 30 \text{ cm}$
$OA = 25 \text{ cm}$, $AC = 17 \text{ cm}$



$OC \perp AM$, M is the mid-point of AB.
$AM = MB = 15 \text{ cm}$

$OM^2 = AO^2 - AM^2$
$OM^2 = 25^2 - 15^2$
$OM^2 = 625 - 225$
$OM = \sqrt{400}$
$OM = 20 \text{ cm}$

$CM^2 = AC^2 - AM^2$

$CM^2 = 17^2 - 15^2$

$CM^2 = 289 - 225$

$CM = \sqrt{64}$

$CM = 8$ cm

$\therefore$ Difference between their centres $= OM + CM$

$= 20 + 8$

$= \boxed{28 \text{ cm}}$ ans

(15) L is the mid-point of AB.

OL $\perp$ AB

$\angle OLA = 90°$

M is the mid-point of CD.

OM $\perp$ CD

$\angle OMD = 90°$

$\angle OLA = \angle OMD$; so they are alternate angles.

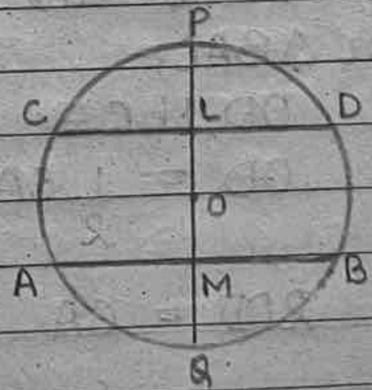
$\therefore$ AB $\parallel$ CD

(16) AB $\parallel$ CD

PQ $\perp$ AB

$\angle AMO = 90°$

PQ bisects AB



$\angle OLD = 90°$ (alternate angles)

$\therefore$ OL or PQ is perpendicular to CD.

Therefore PQ bisects CD.

(17) $AB = BC = AC$
$OA = OB = OC$

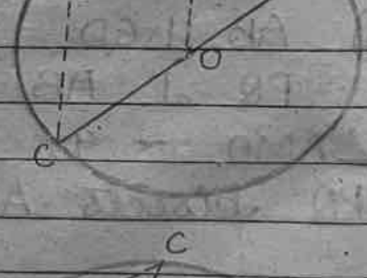
D is the mid-point of BC.
AD is the median of $\triangle ABC$.

In $\triangle ABD$ and $\triangle ACD$
$AB = AC$
$AD = AD$
$BD = DC$

$\therefore \triangle ABD \cong \triangle ACD$ (by SSS rule of congruency)
$\angle ADB = \angle ABC$ (c.p.c.t)
$\angle ADB + \angle ADC = 180°$ (linear pair)
$\angle ADB = \angle ADC = 90°$

AD is $\perp$ on BC which passes through O.
$\therefore$ centroid and circumcentre of $\triangle ABC$ coincide each other

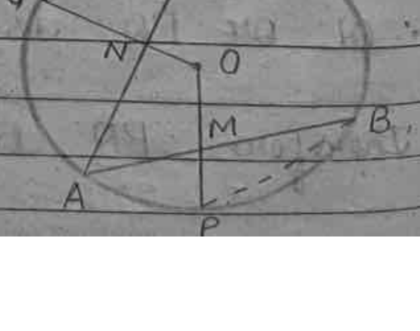
(18) 1. O is the mid-point of AB.
In $\triangle BAC$,



$OD \parallel CA$
$\Rightarrow OD = \frac{1}{2} CA$ ($\parallel$ lines of a $\triangle$)

$\Rightarrow 2OD = CA$ proved!

(2) $AB = AC$, $OP \perp AB$; $OQ \perp AC$



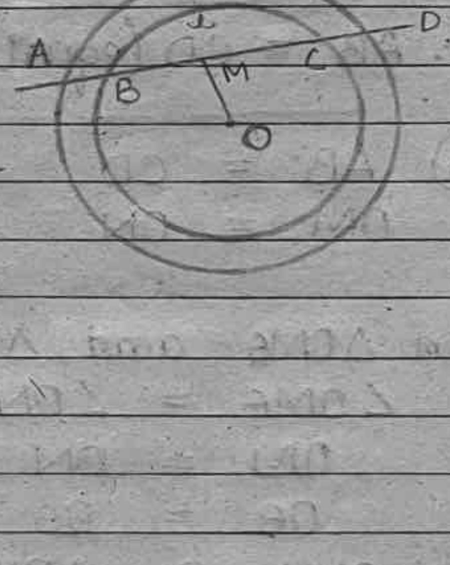
$AM = MB$
$AN = NC$

As $AB = AC$
then, $MB = NC$
$ON = OM$ (equal chords have equal dist. from centre)
$OP = QO$ (radius of circle)
$MP = NQ$

In $\triangle MPB$ and $\triangle NQC$,
$MB = NC$
$MP = NQ$
$\angle PMB = \angle QNC$
$\triangle MPB \cong \triangle NQC$ (SAS rule of congruency)

$\therefore PB = QC$ (c.p.c.t) proved!

19i) $OM \perp l$, $OM \perp BC$



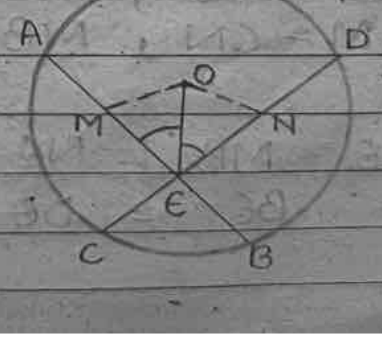
$\therefore BM = MC$ —— (i)

$OM \perp AD$
$\therefore AM = MD$ —— (ii)

substracting (i) from (ii),

$AM - BM = MD - MC$
$AB = CD$ proved!

(ii) $OM \perp AB$, $ON \perp CD$



In $\triangle OME$ and $\triangle ONE$,
$OE = OE$
$\angle OEM = \angle OEN$

$\angle OME = \angle ONE = 90^\circ$

$\Delta OME \cong \Delta ONE$ (ASA rule of congruency)

$OM = ON$

$\therefore AB = CD$ (equal dist. from the centre = equal chords)