E٣٣١٤

Arab Republic of Egypt
Ministry of Education
The completion of the basic education certificate
Examination 2016for our sons abroad

Geometry ,Trigonometry — **Second Term** — **Time : 2 hours**

(الفصل الدراسى الثانى ٢٠١٦) — الصف الثالث الاعدادى — مادة : الهندسة وحساب المثلثات

(الأسئلة فى صفحتين) — تنبيه هام : (يسلم الطالب ورقة امتحانيه باللغة العربية مع الورقة المترجمة)

يسمح باستخدام الآلة الحاسبة

Answer the following questions:-

First Question: Choose the correct answer from those between brackets:

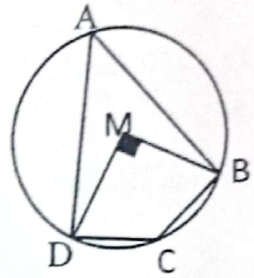
(1) The ratio between the measure of the central angle and the measure of the inscribed angle subtended by the same arc is … (1:2 ; 2:1 ; 1:1 ; 1:3)

(2) The number of common tangent of two circles touch internally ……

(1 ; 2 ; 3 ; 0)

(3) In the opposite figure if $m(\angle BMD) = 90°$ Then $m(\angle C) =$…..

(45° ; 135° ; 90° ; 150°)



(4) The measure of inscribed angle drawn in semi-circle

(360° ; 180°; 120° ; 90°)

(5) M is a circle with diameter length 8 cm, If the straight line L is distant from its center 3 cm then L is ….

(tangent to the circle ; a secant for the circle ; outside the circle ; axe of symmetry for the circle)

(6) M and N are two circles touching interlay, If their radii lengths are 4cm, 7cm. Then MN = … cm

(3; 4 ; 7 ; 11)

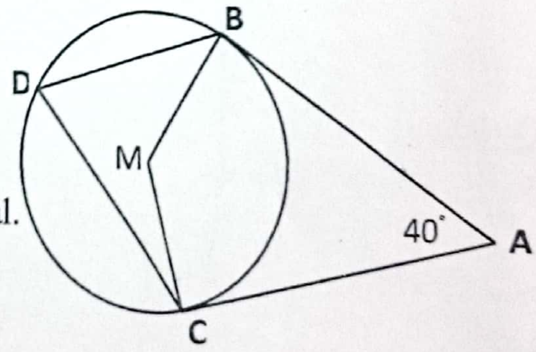
Second Question:

a) In the opposite figure :

$\overline{AB}, \overline{AC}$ are two tangents for the circle M at B,C

$m(\angle A) = 40°$

1) Find $m(\angle D)$ 70
2) Prove That: ABMC is a cyclic quadrilateral.

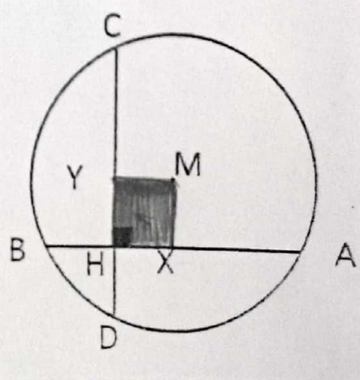


b) In the opposite figure :

$\overline{AB}, \overline{CD}$ are two perpendicular chords and have the same length in the circle M.

If X and Y are the midpoints of $\overline{AB}, \overline{CD}$ respectively .

Prove that: MXHY is a square.



(بقية الأسئلة فى الصفحة الثانية)

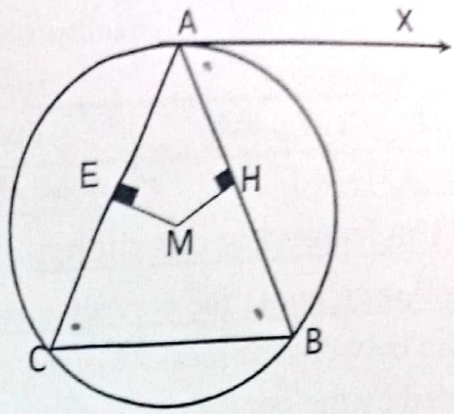
Third Question:

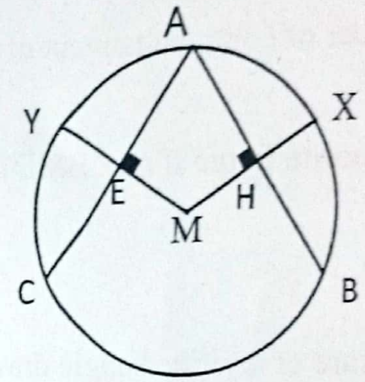
a) In the opposite figure:

$\overline{AX}$ is a tangent of circle M at A

$\overline{MH} \perp \overline{AB}, \overline{ME} \perp \overline{AC}, MH = ME.$

Prove That: $\overline{AX} // \overline{CB}$





b) In the opposite figure:

$\overline{MH} \perp \overline{AB}$,$\overline{ME} \perp \overline{AC}$, XH=YE

Prove That: AB=AC

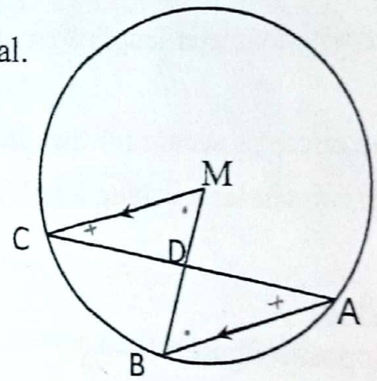
Fourth Question:

a) State two cases of quadrilateral is cyclic quadrilateral.

b) In the opposite figure:

$\overline{MC} // \overline{AB}$.

Prove that: AD >DB



Fifth Question:

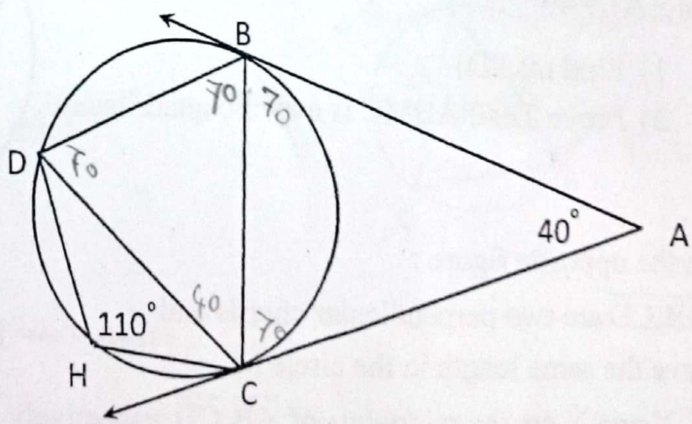
In The opposite figure:

m(∠A)=40°,m(∠H)=110°

Prove that:

1) $\overline{CB}$ bisects ∠ABD

2) BC=CD

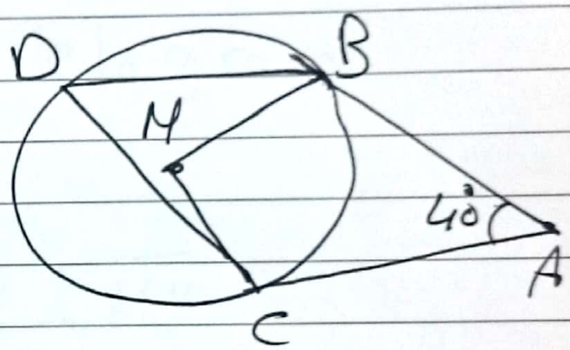


Geometry 2016
- 2nd Ferm -

Q.1 Choose

① $2:1$
② 1
③ $135°$
④ $90°$
⑤ a secent For the Circle
⑥ 3 Cm

Q.2 (a) Proof



$\because \overline{AB}, \overline{AC}$ are two tangents , $\overline{MB}, \overline{MC}$ are two radii

$\therefore \overline{MB} \perp \overline{AB}$, $\overline{MC} \perp \overline{AC}$

$\therefore m(\angle MBA) = m(\angle MCA) = 90°$

In the quadrilateral ABMC:

$m(\angle M) = 360 - (90 + 90 + 40) = 140°$

$\because m(\angle D) = \frac{1}{2} m(\angle M)$ (inscribed and Central)

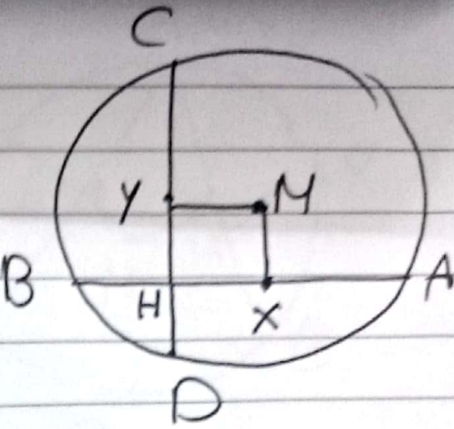
$\therefore m(\angle D) = \frac{1}{2} \times 140 = 70°$ ✗✗

In quadrilateral ABMC:

$\because m(\angle B) + m(\angle C) = 90° + 90° = 180°$
and they're opposite

$\therefore$ ABMC is cyclic quad. ✗✗

Q.2 (b) proof:



$\because$ X is mid point of $\overline{AB}$,
Y is mid point of $\overline{CD}$

$\therefore \overline{MX} \perp \overline{AB}$, $\overline{MY} \perp \overline{CD}$

$\because \overline{AB} \perp \overline{CD}$ (given)

$\therefore \overline{MX} \parallel \overline{YH}$, $\overline{MY} \parallel \overline{XH}$

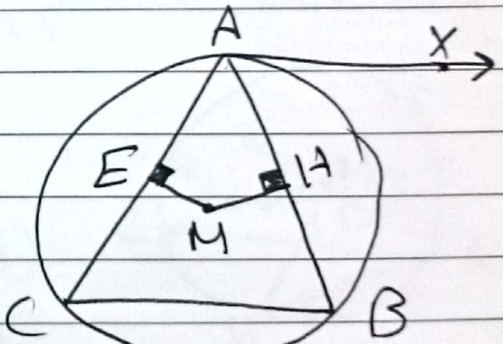
$\therefore$ MXHY is a parallelogram

$\because AB = CD$

$\therefore MX = MY$, $\overline{MX} \perp \overline{MY}$

$\therefore$ MXHY is a square #

Q.3 (a) proof



$\because \overrightarrow{AX}$ is a tangent, $\overline{AB}$ is a chord

$\therefore m(\angle XAB) = m(\angle C) \rightarrow (1)$

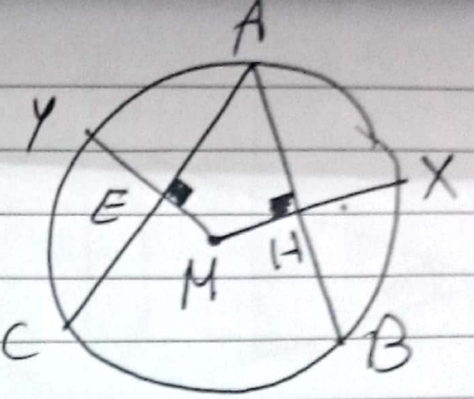
$\because \overline{MH} \perp \overline{AB}$, $\overline{ME} \perp \overline{AC}$, $MH = ME$

$\therefore AB = AC$ $\therefore \triangle ABC$ is isoscelss

$\therefore m(\angle B) = m(\angle C) \rightarrow (2)$

From (1), (2) $m(\angle XAB) = m(\angle B)$
and they're alternate $\therefore \overleftrightarrow{AX} \parallel \overline{CB}$ #

$\boxed{Q.3}$ (b) proof



$\because MX = MY =$ radius $\rightarrow$ (1)

$\because HX = EY \rightarrow$ (2) (given)

by subtracting (2) from (1)

$\therefore MH = ME$

$\because \overline{MH} \perp \overline{AB}$, $\overline{ME} \perp \overline{AC}$

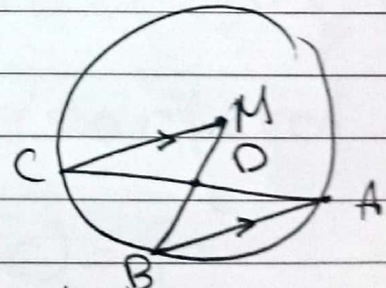
$\therefore AB = AC$ #

$\boxed{Q.4}$ (a) The quadrilateral is cyclic if:

(1) Each Two opposite angles are supplementary.

(2) The measure of the exterior angle at a vertex equals the measure of the interior angle at the opposite vertex.

(b) Proof : $\because \overline{MC} \parallel \overline{AB}$



$\therefore m(\angle M) = m(\angle B) = m(\overset{\frown}{CB})$ (alternate)

$\because m(\angle A) = \frac{1}{2} m(\overset{\frown}{CB})$ (inscribed)

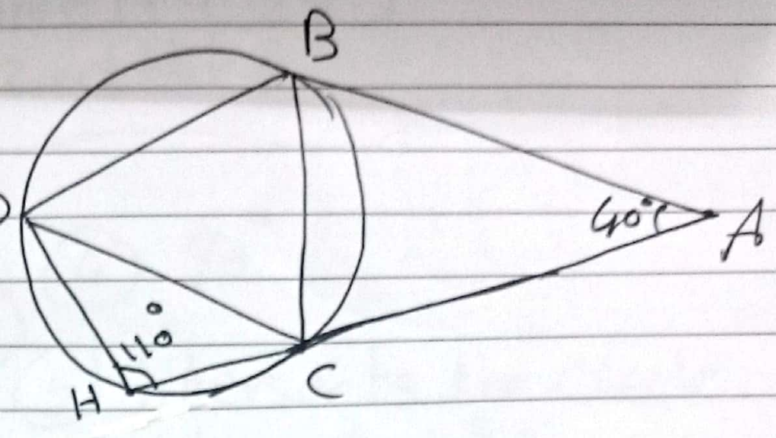
In $\triangle ABD$

$m(\angle B) > m(\angle A)$

$\therefore AD > BD$ #

24

Q.5



Proof :-

∵ $\overline{AB}$, $\overline{AC}$ are two tangent segments from A ∴ AB = AC

∴ $m(\angle ABC) = m(\angle ACB) = \frac{180-40}{2} = 70^\circ \rightarrow (1)$

∵ BCHD is cyclic quad, ∠H, ∠CBD are opposite

∴ $m(\angle CBD) = 180 - 110 = 70^\circ \rightarrow (2)$

From (1) and (2)

$m(\angle ABC) = m(\angle CBD) = 70^\circ$

∴ $\overline{BC}$ bisects angle ABD ## 4

∵ $\overline{AB}$ is a tangent, $\overline{BC}$ is a chord

∴ $m(\angle ABC) = m(\angle BDC) = 70^\circ$

∴ In $\triangle BCD$:-

$m(\angle CBD) = m(\angle BDC) = 70^\circ$

∴ BC = CD ## 4

25