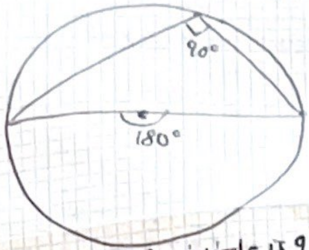
(5) Maths Revision - Geometry GCSE MATHS Y10 - 11

(1.)

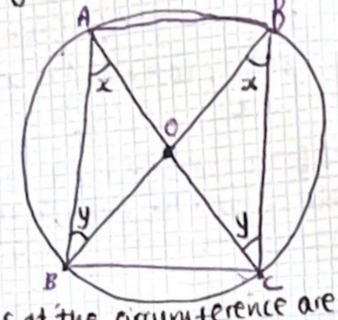


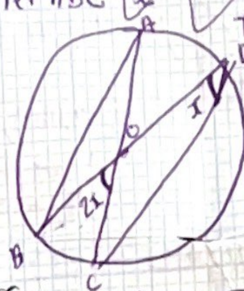
Special case of 3 where the centre is 180° so the angle at the circumference is 90°.

density = mass / volume

Angle in a semi-circle is 90°

(2.)





Draw chord BC

let $\hat{ABC} = x$ Then $B\hat{O}C = 2x$ (Angles at the centre are twice angles at circumference)

Then $B\hat{D}C = x$

let $A\hat{B}O = x$ Then $B\hat{O}C = 2x$

Then $B\hat{D}C = x$

Hence

Angles at the circumference are equal if they stand on the same arc

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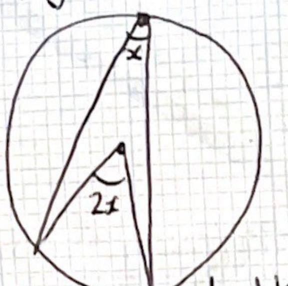
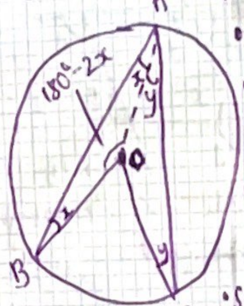
(3.)





• let $B\hat{A}O = x$ and $O\hat{A}C = y$

• Then ~~$\hat{ABO} = x$ likewise $A\hat{C}O = y$~~

Because triangles are isosceles

• Also $B\hat{O}A = 180° - 2x$ and $C\hat{O}A = 180° - 2y$

Because angles in a triangle sum to 180°.

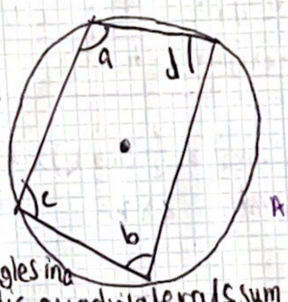
• So $B\hat{O}C = 360° - (180 - 2x) - (180 - 2y)$
$= 2x + 2y$

Alas $B\hat{O}C = 2x + 2y$ (And angles at the centre are double angles at the circumference)
$B\hat{A}C = x + y$

= 1h
1 = 3600

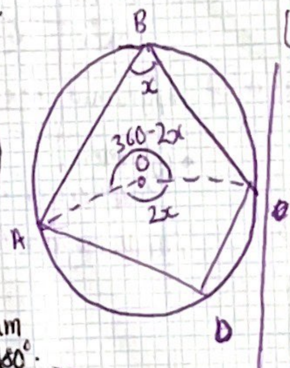
Angles at the centre are double angles at the circumference.

(4.)



a + b = 180°
c + d = 180°

Opposite angles in a cyclic quadrilaterals sum to 180°.



let $A\hat{B}C = x$, Then $A\hat{O}C = 2x$

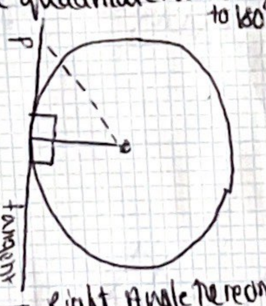
(because angles @ centre are double the size of angles at circumference)

So $A\hat{O}C$ reflex is $360 - 2x$ (angles at a point add to 360°)

Thus $A\hat{D}C$ is $\frac{360-2x}{2}$ because

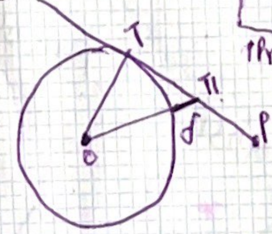
Alas, opposite angles x and $180 - x$ add to 180

(5.)



when a tangent meets a radius it's 90°.

← Right Angle Theorem



(Proof by contradiction)

Assume OT is not perpendicular to TP

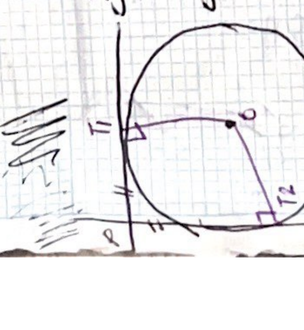
Instead OT1 is perpendicular

Then OT1 is hypotenuse

But OT1 > OT as it's length is radius + d

Hence OT1 isn't perpendicular to the line, our assumption must be false, Alas OT is perpendicular to T1

(6.)



Tangents from a common point to a circle are always equal in length

consider △ OPT1 and OPT2

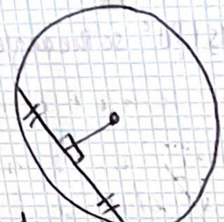
$O\hat{T_1}P$ is a right angle as is $O\hat{T_2}P$ (R)

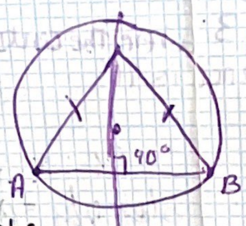
OP is common to both (H)

$OT_1 = OT_2$ as they're radii (S)

Hence congruent

7.

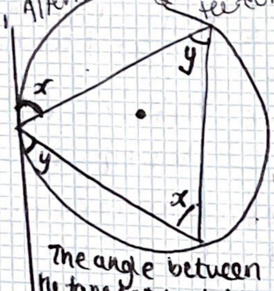




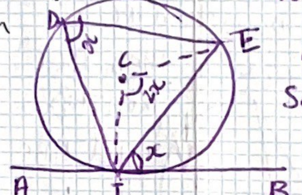
Any chord's perpendicular bisector goes through the centre of the circle.

A line drawn from the centre of a circle to the midpoint of a chord is perpendicular to the chord. (90°)

8. Alternate segment theorem



The angle between the tangent and the side of the triangle is equal to the interior opposite angle.



let $E\hat{T}B = x$, Then $C\hat{T}B = 90° - x$ (Because tangents are perpendicular to radii)

$C\hat{E}T = 90 - x$ (because $\triangle CET$ is isoscelese)

So, $T\hat{C}E = 180° - (90 - x) - (90 - x)$ (180° in triangle)

$= 2x$

Also, $T\hat{D}E = x$ because angles at the centre are double angles at the circumference.