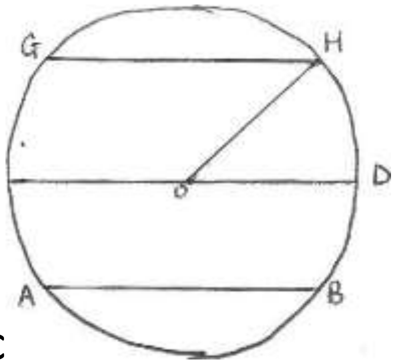
E PROPERTIES

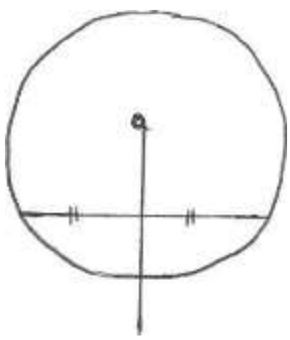
CTIVën t fu circle



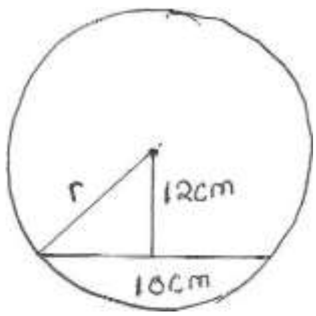
C

fine CD thL diameter % clu circlee une OH -fam Che tsęnfsŁ Of flu CU"CIŁ tne circumśŁ(ŁnCc l.-nc c&cLL rccd-ôo , Th,L AB and â H COLI" Ctuords .

NB : A pupenLcuLax b" eclor ctJQ+) chard of the cGc1L page' thrOw56 tlu CLOfre Of the circle andwill bosec-t thL Chord ,



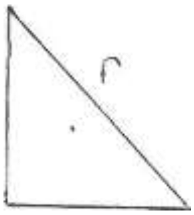
eg 1. A Ô length 10cm cLLDCcunCL et; IR cm frcm Che CQACrc Funa, the the circle . radius c irele



The lunŁ fam ceJWe the círcle 6óecb thÂ

efore to fund pccLDD we cure ugusg pythagccwn

t I-wore m .



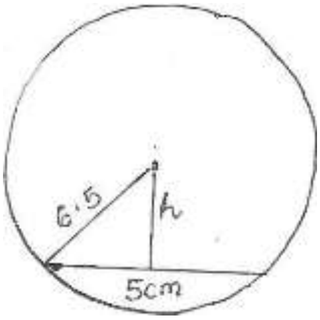
$r^2 = 5^2 + 12^2$

$r^2 = 25 + 144$

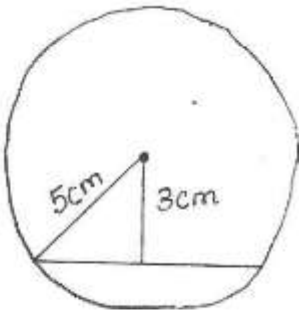
$r^2 = 169$ 2 2

5 . r ad-L'O j 3 cm

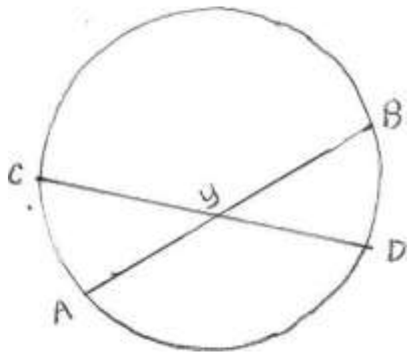
Eg Q How fur co C Chord Lnqth 5 cm (rom the centre of roc-LL. 6·5 cm



Eg Ibe ongth of a curd 3ern rom Centre of CTCI-L % raaus 5cryz .

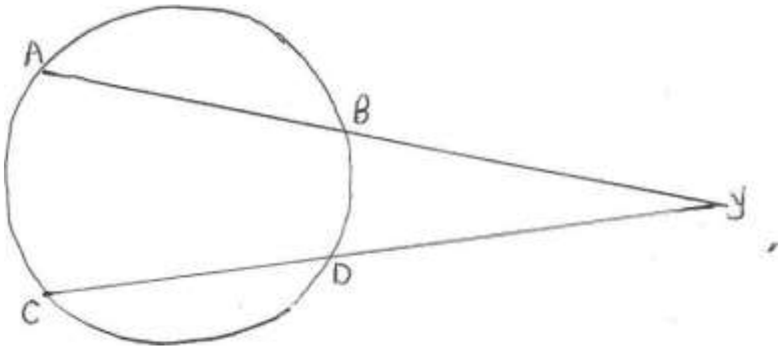


INFERSECT jNCx CHORDS$
O.)ü'TSiDE)



Cuven that c]-uzrds AB Of)d CD Out IJiTMCect/JÖg æt

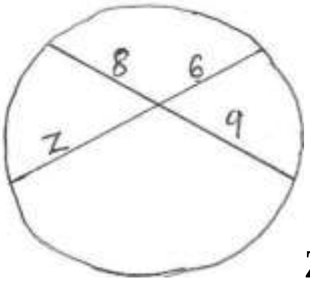
Cy x Dy



Qkven than chordvD AB tnct CD intersecting a-t g than

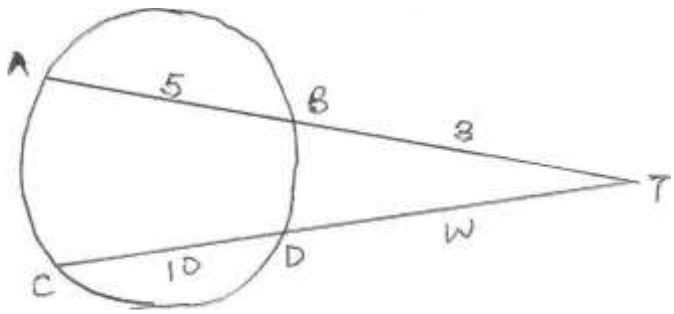
Examples

1' Find the length



Z lh t he diægræ,m .

2. Fun a thx b-nqth t hD CCCqram



u gusg $AT \times BT$ C T X D T

$$8 \times 3 = (10 + \omega)\,\omega$$

$$24 = \omega^2 + 10\omega$$

$$\omega^2 + 10\omega - 24 = 0$$

$$\omega^2 + 12\omega - 2\omega - 24 = 0$$

$$\omega(\omega + 12) - 2(\omega + 12) = 0$$

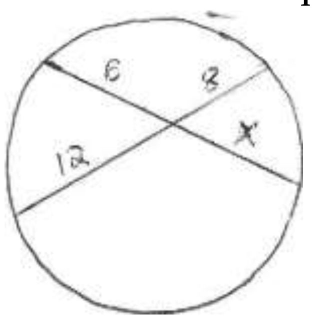
$$(\omega - 2)(\omega + 12) = 0$$

LD — Q = D Dr LO tl Ù = O

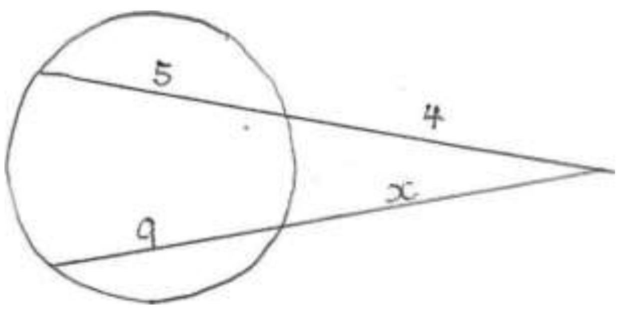
$$\omega = -12$$

LIE 'S t11Lae

t U-nqtn x



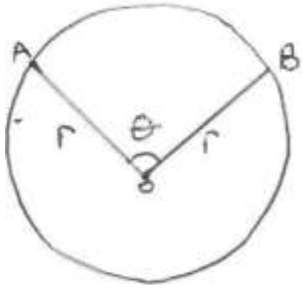
alue Of x.



LENGTH OF AN ARC.

An arc (J) pose a

ancfz l&nqCt1 A (B



A

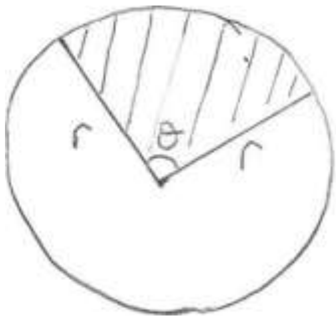
The An

∴ the le

$= \frac{\theta}{360} \times 2\pi r$

cn

sector past of a circle bound by Q rædu-Cand arc.



Area of a sector

2

(i) NB: The fae mini nuncr d-rc ma-Van a smaller c-ngL cut

(ii) of the circ the centre CcFcL uoh-L mo.-JH osc rococo

(iii) angle at a big tru centre of CIF Cle.

Example

An arc AB moos ec at thx off

w c' co If -bhL rcdUJØ % thß tijclæ is 10 cm, calculate

rh-L pu-.nor v C.

length of the major rC

area % the shaded (DW&t.

(i) IPngCh

of thL mmor cuc

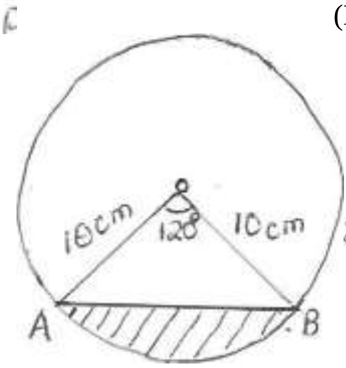
$2 \times 3.14 \times 10$

.e

(ii)

QiTr

3Co.

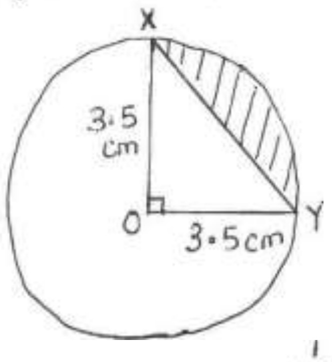


3
20·93 cm

HIL (_cngth 0b rncy&farc ·
angle the mayor arc (li cenift ω
acc - 120° = 240° = $\frac{240}{360} \times 2 \times 3.14 \times 10$
the ungth of t u mcycv Loc ·
3

=4-1.97 C {O

CLLU) A % •t-hL shod-LCL d part = Area of the Sector
– Area of the
e -a
triangle ·
CLXb suQ e $\frac{\theta}{360} \times \pi r^2 - \frac{1}{2} \times a \times$
I' OX and OY are | =I ac K g , i nds an angle The
with of radius 3·5 q- X1OXiO 22cm ·
part ·
(Eng th % a-
no-cc e hat
,Su-btL.ncb al
of CD



a) thL
cöc(e .
X tox
IRO 2 j X
10 x C' 9660

$\frac{120}{360} \times 3.14 \times 10 \times 10$ –
3

104·67

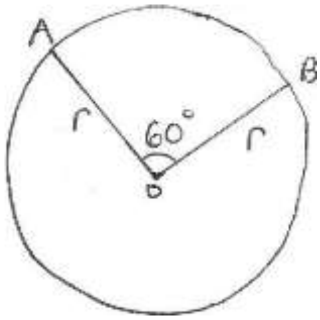
=G 1 ' g % Cm,2

E xcrcüse

Ox Ond CY Osg pCrpencL%0ær rcda
3%5 CNL 9 F cc; d thL
J coca eg Cen-ü•ö.

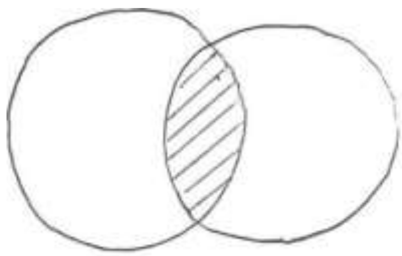
b) CO-CcuLoL thL a-rea the sector. (ure IT = $^{22}/_{7}$)

QQ cm

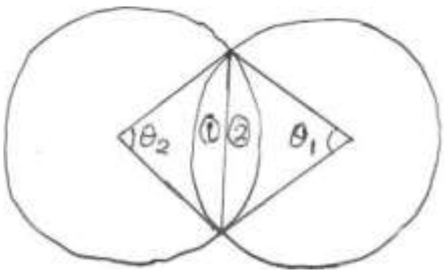


INCE Q s EC CiRCLE S When cirtLs I-nLQ.nCucL)

Co L (Lnunon area unILÊ sectio ,



s area is calculated by cccLdu'òfJ eh.. cu-ezo of tYIL CJD
two SCB segments which mprvbe th. Ccm-rn-C(2 area ,



Are /\r-eœ 1 = Area of sector with θ_1 − Area of triangle

A

bia•oglL

Area ② = Area of sector with θ_2 − Area of triangle

Q Sector 2 Are L e-f C Küa-ngG-

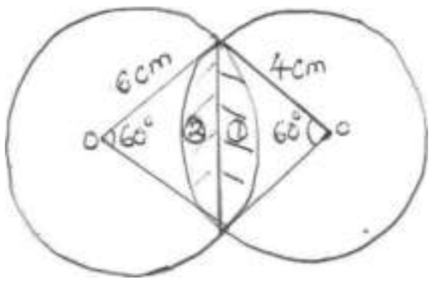
Example 1

Calculate the area of the shaded region below;

eLou;

{f) tau CLÒCIZS

b



Area ① = Area of sector − Area of triangle

$= \cancel{\frac{60}{360} \times 6 \times 6}$

$= \frac{\theta}{360} \times \pi r^2 - \frac{1}{2}ab\sin\theta$

A ta anga

B 60

$\frac{60}{360} \times 3.14 \times 6 \times 6 -$

$3.14 \times 6 - 3 \times 6 \times 0.8660$

I A Z XC X SUZ Co

— 15. 5 g g

2

Area ② = of sector

Apes tna-nqL

K æbSuå e

360

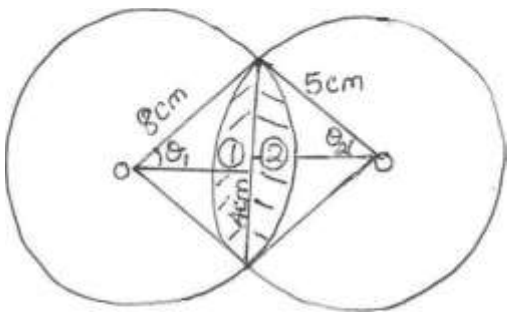
$$= \frac{\cancel{60}^{1}}{\cancel{360}_{\cancel{6}\,3}} \times 3.14 \times \cancel{4}^{2} \times 4 \quad - \quad \frac{1}{\cancel{2}_{1}} \times \cancel{4}^{2} \times 4 \times \sin 60^\circ$$

$1.445\ cm^2$

a of ghccLccl pcut $= 3.252 + 1.445$

$= 4.697\ cm^2.$

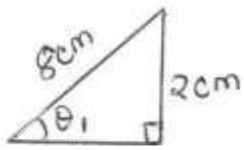
Examp(ø Q diagram C two cntrsectu%g radio 5cm and g cm , L Corruru.rj



C h6JiLd port .

In the circles above the angles ct tn-c % the circles are not given . Therefore A-cd to fm du the angles first .

Let's first find θ_1 using pytha Pyehæggcun ttu-oæm



$\sin \theta_1 = \frac{opp}{hyp}$

$2 \times 14.48^\circ$

5 cm

θ₂ =epp

[hL CLf19(L a.C cft-L

Canine = Qx23 58

=471 IG

5

SUI 6a -0 4

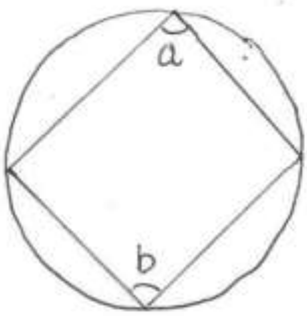
ShLd-ucI post .

raece aen -fu» (L tu 0-N.0v of (
ComplLLu the fu-unben) .

e RO PER Ti E S

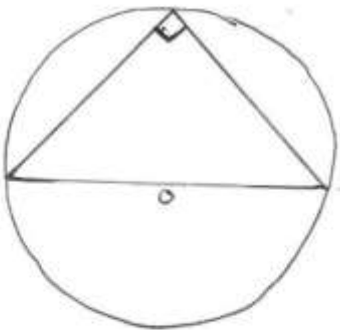
1 , Opp cg üL onglLo Uh Cyclul Supp quadrilateral are-
UnnunL cug .

NB A Cxye,Le oua-dJ4AvCLü-naL JO L fou-r SCdLcL fCgwre circumS crcbe d. U/ L OLC th-v ecLges ftu must ttu tLhcwrnff- figure must tou renc-L t circle .



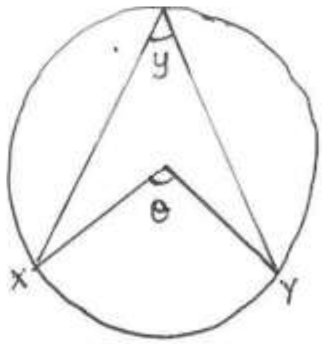
$a + b = 180$

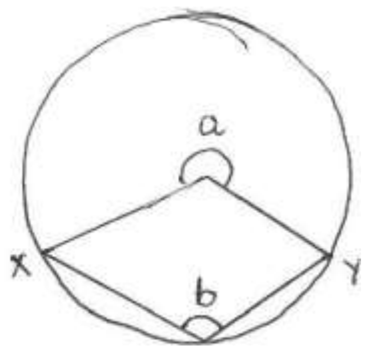
. The angle in a se SumJ circleJo agln-t angu .



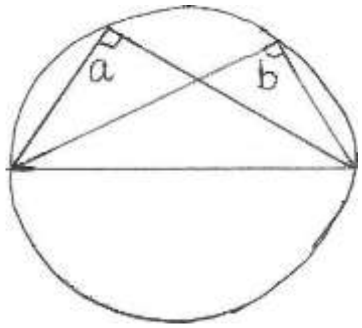
3·[¯hL angle an OJI, gubtuoclD cut tfu tuJCee €hccC

It Cu-bfandvo ej tn-L circumference tlucircle



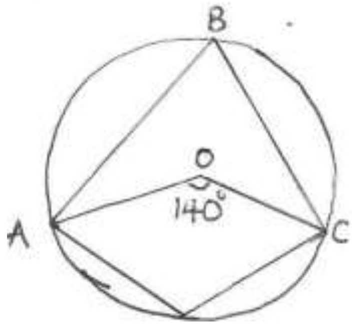


1+ , Angus thx Cegaunt cu4v equaL ,



Example

the figure be In O thL c&cL ngle AOC = 140 and



FuncL Q) anglL ABC

c = ½ x A OC (fTu ange o.n on g wblLhcbS at •thi centre

Co t bat Lt Cu.blind4 at Clhd-um JU'éncz)

D

= 700

(-JÅ Aog(L ADC

Z ADc ID 0 Z ABC , ch c CBC-LUCuadri

are S ccpp ementary)

$180^\circ - 70^\circ$

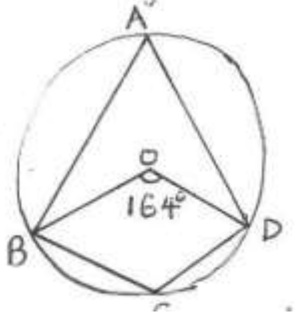
OR(b we find the angle the major arc n mcUcco
The centre is $360^\circ - 140^\circ$
$= 220^\circ$
using the property that the angle an Hun co-c
subtends e centre is twice that it subtends at
n Lerencc $\angle ADC$ = J/ x QQ0°

ehL

Cxun

Exercise

1. In the diagram below O thx centre %the cir and angle BOD = 164°



C

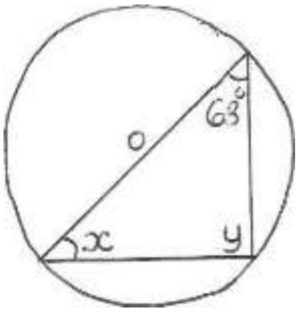
Find

a) 13h D

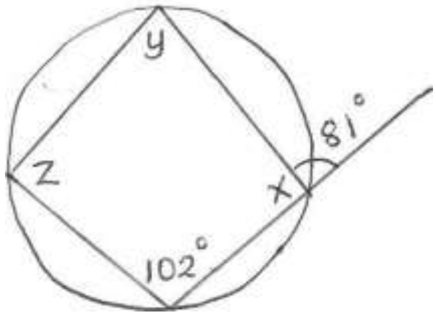
b) ungla BC D

Find the angles marked with a letter.

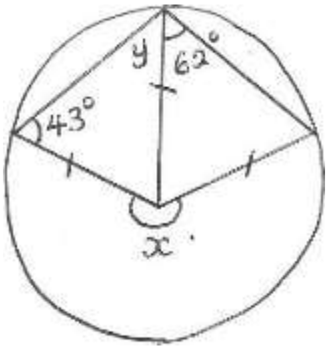
a)



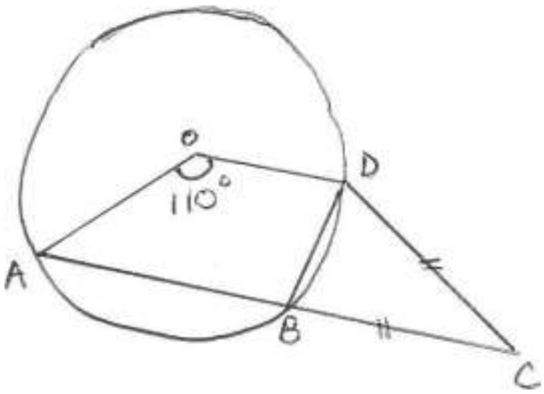
b)



c)

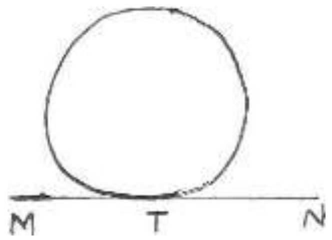


3 Lo dza-grturn beloco O Hu el cûcL and ABC ü) cc Bc = c b ACD =0°.
in (Y) DBC



TANGENT PROPERTIES

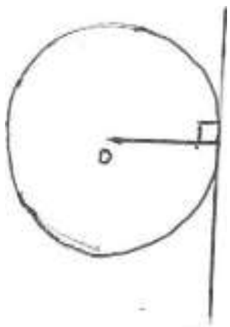
A tangent to a circle is a line that touches the circle but does not cut through the circle



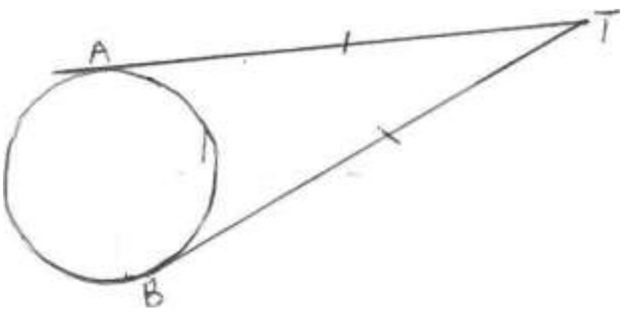
fDiiov..uog oye Elnz tongenZ proper

radius of the

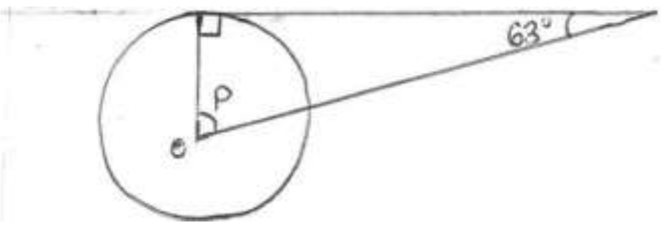
1· A -Eœnquut EC a oncL un perpe-ndanuu-lox Eo ttua the circle.
t_JicI-z from (DCLf)-t of contact with



2 rancyenb external eqruaz



1Fu;cL ScîL Lcc&eLUd

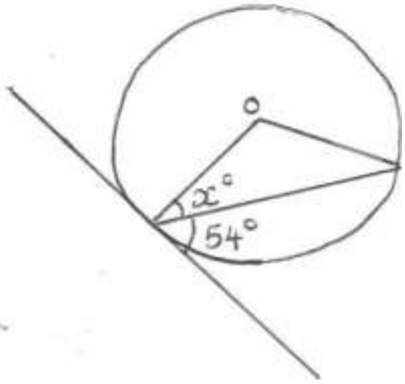


$P + 63 + 90° = 180°$

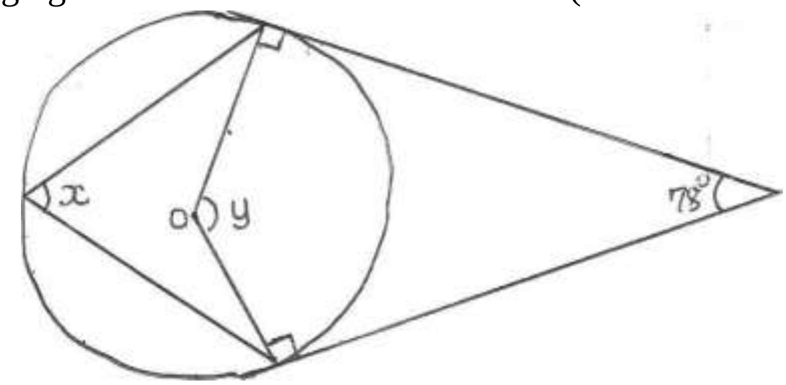
$P + 153° = 180°$

$P = 27°$

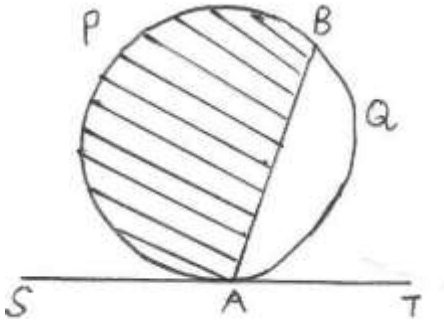
2. Find the size of angle x.

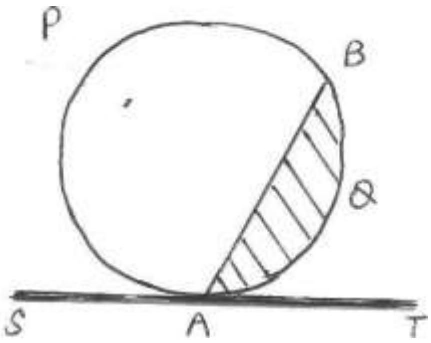


3. Find the size of angle x and y.



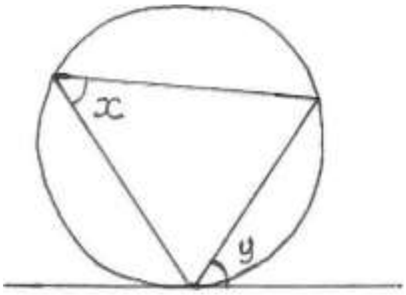
ALTERNATE SEGMENT



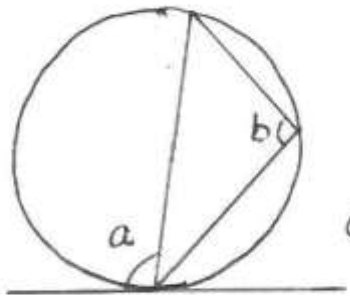


In both figures SAT a tangent to the circle NJ A .
The ennrd ɟ AB divides Eh- e into 2 segments. U
alternate segment the DL-nætc to angle TAB ie it is
CDcL other side of angle TAB .
B p B b on thi A13 from the alternate cegnunt
guncLcuH,y Ccgrn-uuC A 6 B v' Co

I f Dv s€ra-ugh,c L-ÅL c_ErcL and from the pone % Co c; du-a-on) thL tnngbblu c.tortl mæbCS thL tangent eqacu to ttu angle uh to a-LternoL

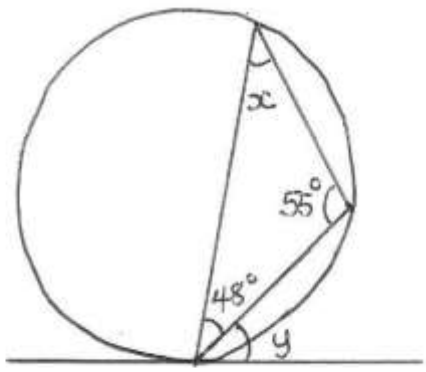


$x = y$



$a = b$

Find the angle m go maÄce4.



DC 55 ⁰= lnCu-jor anglz sum of
(L triangle)
+ 103° =ICC
=77 0

oc (a-ng(ß ach-DC d mcvuo w Ufl a tangent CD qui-
DC to •thx onglß u;the

Try thx nnm»u- bets u'.

F (ÄcL thx marked .