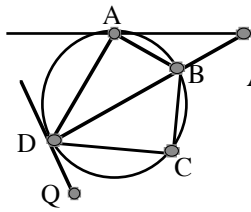
Study 09 Date:

Circle Geometry

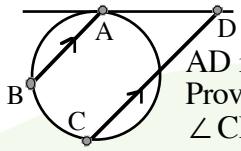
1 a The inscribed circle of Δ ABC touches BC, CA, AB at X, Y, Z respectively.
If $\angle B = 64°$, $\angle C = 52°$ find $\angle XYZ$, $\angle XZY$

b



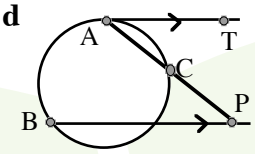
AP, DQ are tangents and BD is a diameter.
$\angle BAP = x°$ and $\angle BPA = y°$,
find a relationship between x and y

c



AD is a tangent.
Prove that
$\angle CDA = \angle ACB$

d



AT is a tangent.
ACP is a straight line.
Prove $\angle ABP = \angle ACB$

Problems

2 Jane drinks a large bottle of apple juice in 5 days. Jane and Helen together drink a bottle of apple juice in 4 days. How long would it take Helen alone to drink a bottle of apple juice?

3 Tanya takes 3 hours in walking to a certain place and riding back. She would have saved one hour in riding both ways. How long would it take to walk both ways?

Statistics

4 For many years, HSC students sitting 2 unit subjects were given a result showing a mark and a percentile band. Marks for 2 unit subjects approximated a normal curve with a median of 60 and a standard deviation of $12 \cdot 5$. The following table shows the number of standard deviations from the median of the percentiles in a normal distribution.

percentile	1%	10%	20%	30%	40%	50%	60%	70%	80%	90%	99%
standard devs.	$-2 \cdot 37$	$-1 \cdot 28$	$-0 \cdot 84$	$-0 \cdot 52$	$-0 \cdot 25$	0	$0 \cdot 25$	$0 \cdot 52$	$0 \cdot 84$	$1 \cdot 28$	$2 \cdot 37$
scaled mark		44						67			

The percentile of 10% corresponds to a mark of $60 - 1 \cdot 28 \times 12 \cdot 5 = 44$ etc

a Does each percentile band have the same number of students?

b Calculate the remaining marks needed to complete the table above

c What percentage of students scored a scaled mark between :

i 57 and 63 **ii** 63 and 67 **iii** 57 and 67 **iv** 54 and 67 **v** greater than 71

d Approximately what percentage of students are awarded scaled marks **i** ≥ 90 **ii** ≤ 30

e There is a belief that 50% is the'pass mark'. What percentage'pass' 2 unit subjects in the HSC?

f It is thought that too many are 'failing' by scoring less than 50. Someone suggests that the mean be increased to 65 and the standard deviation reduced to 10.
Calculate the new scaled marks in the table above.

Study 09 Answers

1 **a** $\angle XYZ = 58°,\ \angle XZY = 64°$ **b** $x = \frac{1}{2}(90° - y)$

c Extend DA to P
join AC - join BC
$\angle D = \angle PAB$ corresponding angles
and $\angle PAB = \angle ACB$ $\angle$ in alt. segment
$\therefore \angle CDA = \angle ACB$

d Join AB and BC
extend TA to Q
now $\angle ABP = \angle QAB$ alt $\angle$ ll lines
and $\angle ACB = \angle QAB$ $\angle$ in alt. segment
$\therefore \angle ABP = \angle ACB$

OR

$\angle ABC = \angle TAP = a$ say
(because $\angle$ at tangent $= \angle$ in alt. seg. of ΔABC)
let $\angle CBP = q$ say
now $\angle APB = q$ (alt.$\angle$, AT ll BP)
so $\angle ACB = a + q$ (ext. $\angle$ of ΔCPB)
$= \angle ABP$

2 In 20 days J + H drink 5 bottles
but in 20 days J drinks 4 bottles
$\therefore$ Helen drinks 1 bottle in 20 days

3 Tanya takes 4 hours to walk both ways

4 **a** Yes

b 30, 44, 50, 54, 57, 60, 63, 67, 71, 76, 90

c **i** 20% **ii** 10% **iii** 30% **iv** 40% **v** 20%

d **i** 1% **ii** 1%

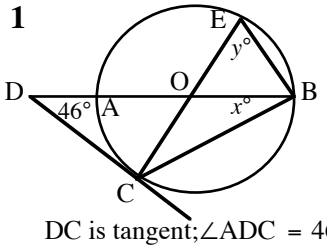
e 80% score 50 or more

f 41, 52, 57, 60, 63, 65, 67, 71, 74, 78, 79

Study 10 **Date:**

Circles:

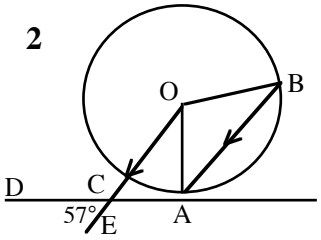
1



DC is tangent; $\angle ADC = 46°$

Find $\angle OBC$, $\angle OEB$

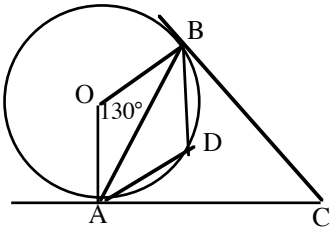
2



DA is tangent.

OC ∥ BA Find $\angle AOB$

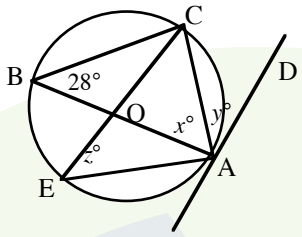
3



AC is tangent; $AC = BC$

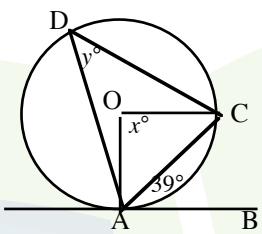
Find $\angle ACB$, $\angle ADB$

4



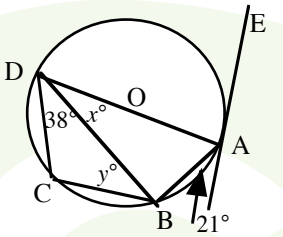
AD is tangent. Find x, y, z

5



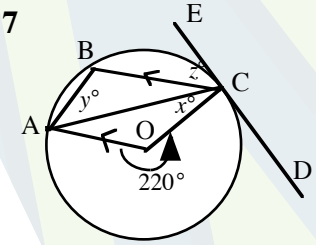
AB is tangent. Find x, y

6



AE is tangent. Find x, y

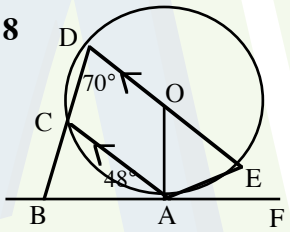
7



DE is tangent, OA ∥ CB

Find $O\hat{C}A$, $B\hat{A}C$, $E\hat{C}B$

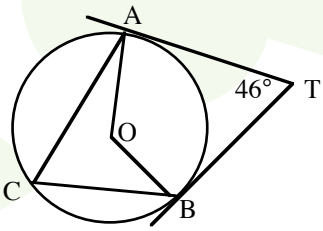
8



BF is tangent ; AC ∥ ED

Find $\angle AOD$, $\angle EAF$, $\angle ABC$

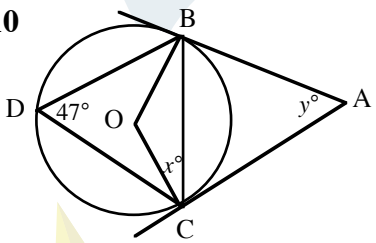
9



TA, TB are tangents.

Find $\angle AOB$, $\angle ACB$

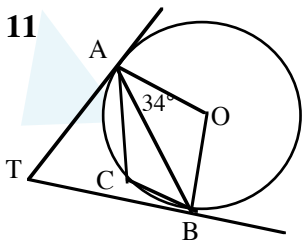
10



AB, AC are tangents.

Find $\angle OCB$, $\angle BAC$

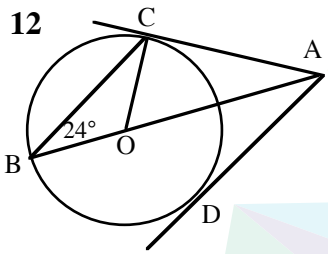
11



TA, TB are tangents.

Find $\angle ATB$, $\angle ACB$

12



AC, AD are tangents.

Find $\angle AOC$, $\angle DAC$

13 Statistics ... organise these scores into a frequency distribution table (42 scores) :

7 , 9 , 8 , 10 , 8 , 6 , 5 7 , 9 , 6 , 5 , 9 , 8 , 10

4 , 6 , 9 , 8 , 6 , 6 , 3 4 , 7 , 10 , 4 , 10 , 3 , 8

9 , 2 , 6 , 8 , 4 , 7 , 9 6 , 3 , 8 , 10 , 7 , 9 , 6

Calculate : **a** Range **b** Mode **c** Median **d** Mean

f Draw a frequency histogram and polygon

Study 10

Answers

Geometry of the Circle

1 $x = 22°$, $y = 68°$

2 $114°$

3 $\angle ACB = 50°$, $\angle ADB = 115°$

4 $x = 62$
$y = z = 28$

5 $x = 78$
$y = 39$

6 $x = 21$
$y = 31$

7 $x = 20$
$y = z = 50$

8 $\angle AOD = 138°$
$\angle EAF = 21°$
$\angle ABC = 62°$

9 $\angle AOB = 134°$
$\angle ACB = 67°$

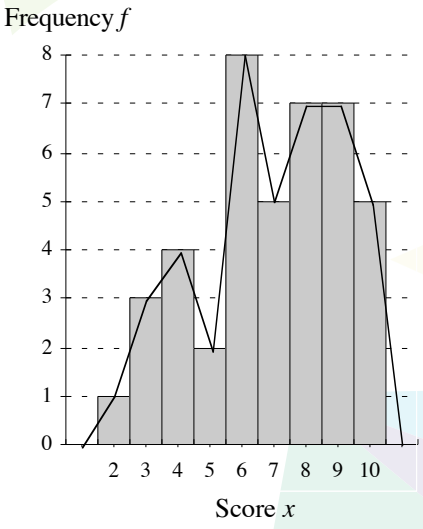
10 $x = 43$
$y = 86$

11 $\angle ATB = 68°$
$\angle ACB = 124°$

12 $\angle AOC = 48°$
$\angle DAC = 84°$

13 Statistics :

Score x	Tally	Frequency f	Cum Freq	$f \times x$
2	I	1	1	2
3	III	3	4	9
4	IIII	4	8	16
5	II	2	10	10
6	𝍸 III	8	18	48
7	𝍸	5	23	35
8	𝍸 II	7	30	56
9	𝍸 II	7	37	63
10	𝍸	5	42	50
		42		289

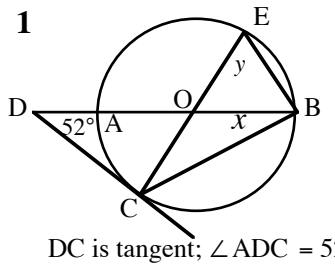


a Range = 8 **b** Mode = 6 **c** Median = 7 **d** Mean = $6\frac{37}{42}$

Home Study 10

Date:

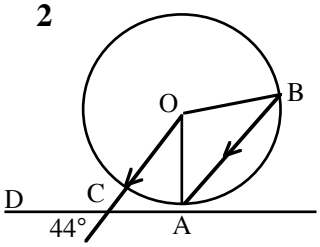
1



DC is tangent; ∠ADC = 52°

Find ∠OBC , ∠OEB

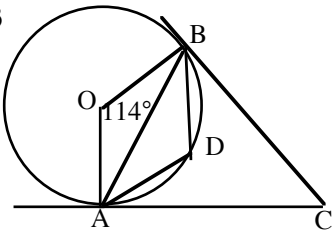
2



DA is a tangent

OC ∥ BA Find ∠AOB

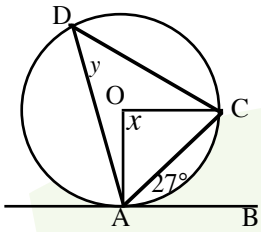
3



AC is a tangent

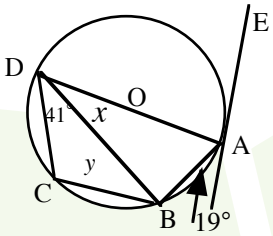
AC = BC Find ∠ACB , ∠ADB

4



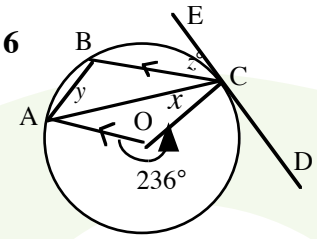
AB is tangent. Find x, y

5



AE is tangent. Find x, y

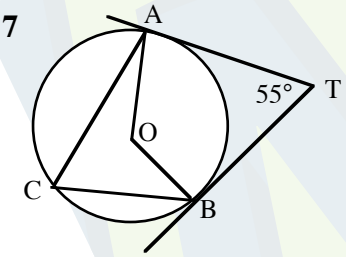
6



DE is tangent, OA ∥ CB

Find ∠OCA, ∠BAC, ∠ECB

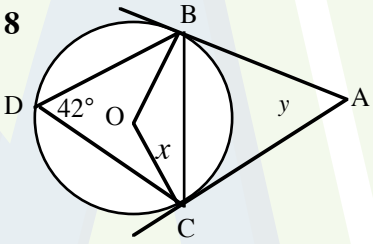
7



TA, TB are tangents.

Find ∠AOB, ∠ACB

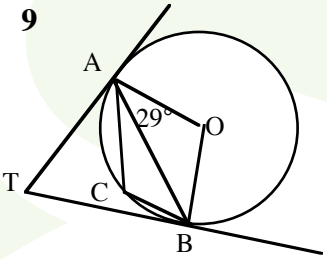
8



AB, AC are tangents.

Find ∠OCB, ∠BAC

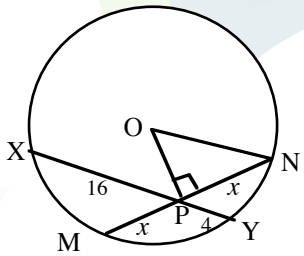
9



TA, TB are tangents.

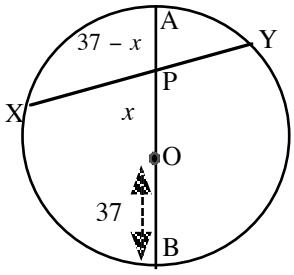
Find ∠ATB, ∠ACB

10



O is the centre of the circle of radius 17 cm.
OPN is a right angle. XP =16 cm, PY=4cm
Find the lengths of PN and OP

11



A point P moves within a circle centre O of radius 37 cm
and XY is any chord drawn through P so that XP.PY = 1225.
Find the length of OP. hint: use the diagram provided

12 Statistics: Organise these scores into a frequency distribution table (45 scores)

0, 7, 3, 6, 9	4, 9, 3, 1, 5	6, 2, 4, 7, 1
7, 2, 6, 6, 3	8, 4, 1, 2, 6	4, 3, 7, 8, 0
9, 5, 8, 4, 2	2, 4, 6, 5, 1	0, 8, 3, 5, 9

Calculate: **a** Range **b** Mode **c** Median **d** Mean

f Draw a frequency histogram and polygon

Geometry of the Circle

1 $x = 19°$
$y = 71°$

2 $\angle AOB = 88°$

3 $\angle ACB = 66°$
$\angle ADB = 123°$

4 $x = 54°$
$y = 27°$

5 $x = 19°$
$y = 30°$

6 $x = 28°$
$y = 34°$
$z = 34°$

7 $\angle AOB = 125°$
$\angle ACB = 62 \cdot 5°$

8 $x = 48°$
$y = 96°$

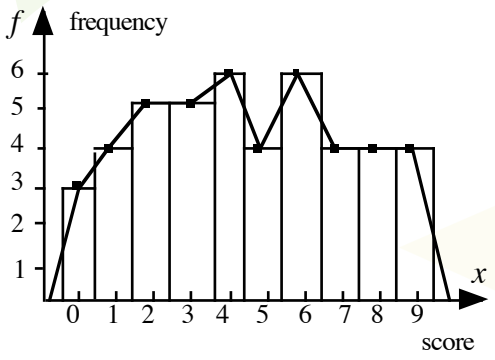
9 $\angle ATB = 58°$
$\angle ACB = 119°$

10 PN = 8 cm , OP = 15 cm

11 OP = 12

12 Statistics :

Score x	Tally	Freq. f	Cum.Freq.	f x x
0	III	3	3	0
1	IIII	4	7	4
2	𝍸	5	12	10
3	𝍸	5	17	15
4	𝍸 I	6	23	24
5	IIII	4	27	20
6	𝍸 I	6	33	36
7	IIII	4	37	28
8	IIII	4	41	32
9	IIII	4	45	36
		$\sum f = 45 = n$		$\sum xf = 205$



FREQUENCY HISTOGRAM

a Range = 9 **b** Modes = 4 and 6 **c** Median = (23rd score) 4 **d** Mean $= \frac{205}{45} = 4\frac{5}{9}$

Master Coaching Pledge

Master Coaching Keys to Learning:

The following charter has been produced to prepare you the pursuit of excellence that leads to a life-time of rewards and fulfillment. This is a partnership agreement that allows both parties to mutually benefit from your time at Master Coaching

At the coaching session:

1. Smile, relax, you are focused and in control
2. Concentrate, visualize, execute: claim the reward
3. Assume success. Our members should approach each test in life enthusiastically; every challenge presents an opportunity to demonstrate your prowess. Relish but don't underestimate the magnitude of the test, instead focus your thoughts towards a positive outcome, a chance to excel; a time to enjoy your moment in the sun.

Master Coaching Pledge

Master Coaching Pledge

- that your welfare is the paramount consideration in everything that we do
- to be diligent in our preparations which directs our actions in support of you
- show care and give encouragement to you in your striving for excellence
- to personalise all our efforts to your specific needs in all areas
- to encourage you to dare to dream, and to expect that dreams do come true

My Commitment to Master Coaching

- to be honest in all my dealings and
- to accept their accolades and focus my efforts on achieving the zenith in all my endeavours
- to appreciate my cohorts and support them in any way possible
- to live the dream, strive for excellence in everything that I do
- visualise my ultimate success

Christian Avent

CHRISTIAN AVENT
B.Ed. NCAS Principal

Robert A Ollis

ROBERT A. OLLIS
B.Sc., Dip.Ed., M.Sc.
Founder, Master Coaching

Your complete satisfaction is the focus of everything we do.