ST SPYRIDON COLLEGE

Class 10A
2011
School Certificate Assessment Task 2
Half yearly Examination
Wednesday, 1 June

Mathematics

Sections A and B

Weighting (Sections A and B): **20%**

Reading time (Sections A and B): 5 minutes

Writing time (Sections A and B): 60 minutes

Marks (Sections A and B): 50

Topic examined: Geometry

Instructions
- Write on this paper
- Write using blue or black pen
- Use a pencil for all diagrams
- Calculators are allowed in Sections A and B
- Please show working
- A formulae sheet is not provided

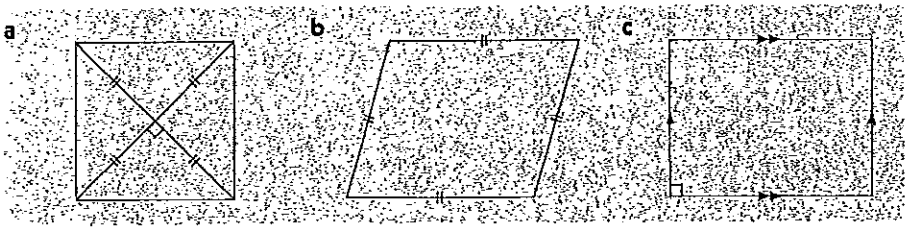
Name: _____

Section	Mark	Maximum
A		25
B		25
A + B		50

Section A

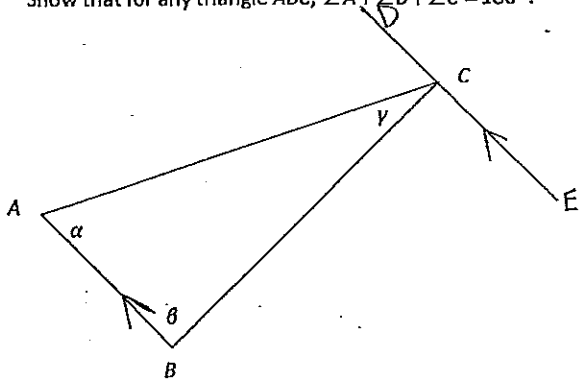
Total marks (25)
Please attempt all questions on this paper.
REMEMBER TO SHOW WORKING FOR PART MARKS
The value of each question is indicated by [ ].
Calculators ARE allowed.

1. Classify i.e. choose the best name for each of these special quadrilaterals. [3]

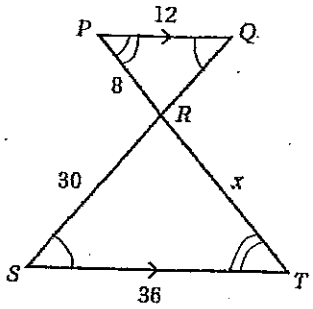


_____ _____ _____

2. Prove the angle sum of a triangle is 180° i.e. [3]
Show that for any triangle ABC, $\angle A + \angle B + \angle C = 180^\circ$.



3.



(a) Complete this five line proof to show that ΔPQR is similar to ΔTSR. [3]

Line 1 In ΔPQR and ΔTSR

Line 2 $\angle PQR = \angle TSR$ (_____)

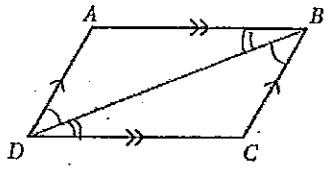
Line 3 $\angle QPR = \angle STR$ (_____)

Line 4 _____ (vertically opposite angles)

Line 5 ΔPQR is similar to ΔTSR (_____)

(b) Hence find the value of x. Reason not required. [1]

4.



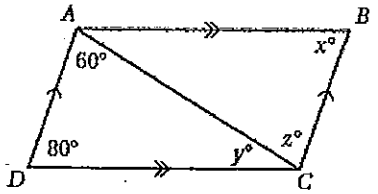
The diagram shows a parallelogram $ABCD$. Note: the opposite sides are parallel.

Prove that:

(a) $\Delta ABD \equiv \Delta CDB$ [3]

(b) $\angle BAD = \angle DCB$. [1]

5.

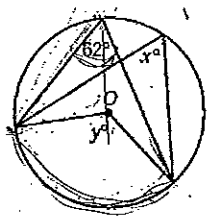


(a) Find x. Reason not required. [1]

(b) Find y. Reason not required. [1]

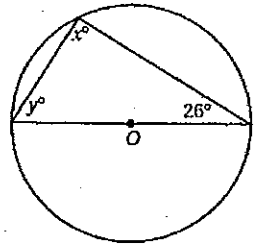
(c) Find z. Reason not required. [1]

6.



Find the value of x and y. Give reasons. [4]

7.



Find the value of x and y. Give reasons. [4]

End of Section A

Section B

Working Mathematically

Total marks (25)

Please attempt all questions on this paper.

REMEMBER TO SHOW WORKING FOR PART MARKS

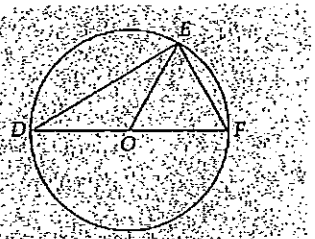
The value of each question is indicated by [ ].

Calculators ARE allowed.

8. In the space below, use geometric tools to construct three triangles that have a side of length 5 cm, a side of length 6 cm and an angle of 30° and yet are different in size. [6]

9. [4]

When you draw a line from each end of a diameter to a point on the circumference of a circle, the angle formed is called an angle in a semi-circle. Prove, using isosceles triangles, that the angle in a semi-circle is a right angle.



10. Construct a regular hexagon, in the space below. [2]

11.

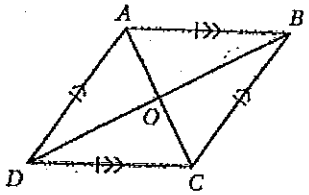
(a) Construct the perpendicular bisectors of each of the three sides of triangle *ABC*. [3]
i.e. construct the perpendicular bisectors of *AB*, *BC* and *CA*.

(b) The perpendicular bisectors you have constructed meet at a point. This point is the centre of the circle that passes through all three of the vertices of ΔABC.
Draw this circle on the diagram above. [1]

12. Write Yes (Y) or No (N) in the space provided. [4]

Properties	Square	Rectangle	Rhombus	Parallelogram
Opposite sides equal in length				
Diagonals equal in length				
Diagonals bisect each other				
Diagonals bisect angles through which they pass				

13.



The diagram above shows a rhombus *ABCD* with diagonals *AC* and *BD*.
Note: all sides of a rhombus are equal and opposite sides are parallel, as shown.

Prove that the diagonals of the rhombus bisect each other. [5]

End of Test

ST SPYRIDON COLLEGE

Class 10A
2011
School Certificate Assessment Task 2
Half yearly Examination
Wednesday, 1 June

Mathematics

Sections A and B

Weighting (Sections A and B): 20%

Reading time (Sections A and B): 5 minutes

Writing time (Sections A and B): 60 minutes

Marks (Sections A and B): 50

Topic examined: Geometry

Instructions
- Write on this paper
- Write using blue or black pen
- Use a pencil for all diagrams
- Calculators are allowed in Sections A and B
- Please show working
- A formulae sheet is not provided

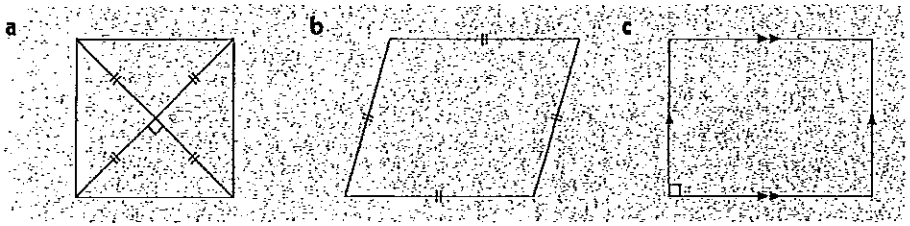
Name: _____

Section	Mark	Maximum
A		25
B		25
A + B		50

Section A

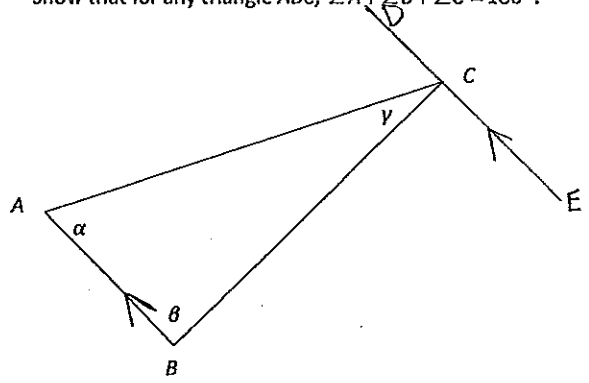
Total marks (25)
Please attempt all questions on this paper.
REMEMBER TO SHOW WORKING FOR PART MARKS
The value of each question is indicated by [ ].
Calculators ARE allowed.

1. Classify i.e. choose the best name for each of these special quadrilaterals. [3]



square ✓ rhombus ✓ rectangle ✓

2. Prove the angle sum of a triangle is 180° i.e. [3]
Show that for any triangle ABC, $\angle A + \angle B + \angle C = 180°$.

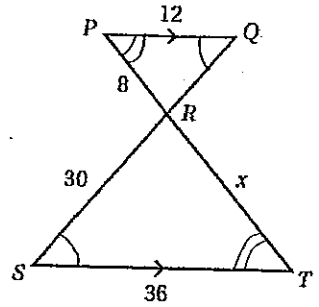


In ΔABC
Construct line DE ||
and through point C
∠DCA = ∠A (alte
∠ECB = ∠B (
∠ACB = ∠C (given
∴ ∠A + ∠B + ∠A = 18
(straight
angle)

///

6

3.



(a) Complete this five line proof to show that ΔPQR is similar to ΔTSR. [3]

Line 1 In ΔPQR and ΔTSR

Line 2 $\angle PQR = \angle TSR$ (Alternate angles and parallel lines

Line 3 $\angle QPR = \angle STR$ (Alternate angles and parallel lines

Line 4 $\angle PRQ = \angle TRS$ (vertically opposite angles)

Line 5 ΔPQR is similar to ΔTSR (equiangular)

(b) Hence find the value of x. Reason not required. [1]

$\div 1.5$

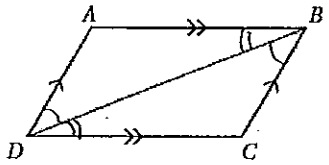
$\frac{36}{12} = \frac{x}{8}$

$\div 1.5$

$36 \div 1.5 = 24$

$x = 24$ units

4.



The diagram shows a parallelogram $ABCD$. Note: the opposite sides are parallel.

Prove that:

(a) $\Delta ABD \equiv \Delta CDB$ [3]

In ΔABD and ΔCDB,

DB is common

$\angle ADB = \angle CBD$ (alternate angles and parallel lines)

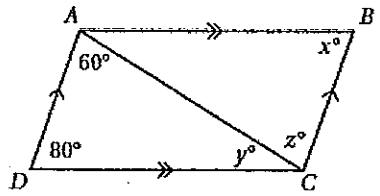
$\angle ABD = \angle CDB$ (" ")

$\therefore \Delta ABD \equiv \Delta CDB$ (AAS)

(b) $\angle BAD = \angle DCB$. [1]

Hence $\angle BAD = \angle DCB$ (matching angles of congruent triangles)

5.

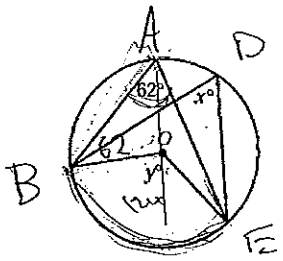


(a) Find x. Reason not required. $x = 80°$ [1]

(b) Find y. Reason not required. $y = 40°$ (180 − 140) [1]

(c) Find z. Reason not required. $z = 60°$ [1]

6.



Find the value of *x* and *y*. Give reasons. [4]

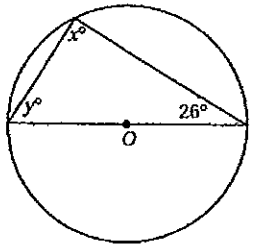
Construct line AO
AO = BO (radii)
∴ ΔAOB is isosceles
∴ ∠ABO = ∠OAB = 62° (base angles)

1° ∠AOB = 56° (angle sum)

sim

∠BAO ≠ 62°

7.



Find the value of *x* and *y*. Give reasons. [4]

∠C° = 90° (semicircle angles are 90°)

∴ y° = 180 − (90 + 26)

y° = 64° (angle sum of a triangle)

End of Section A

Section B

Working Mathematically

Total marks (25)

Please attempt all questions on this paper.

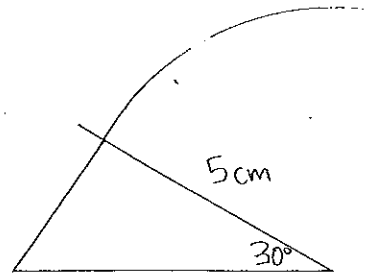
REMEMBER TO SHOW WORKING FOR PART MARKS

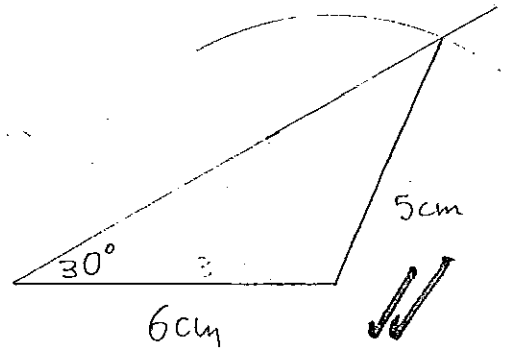
The value of each question is indicated by [ ].

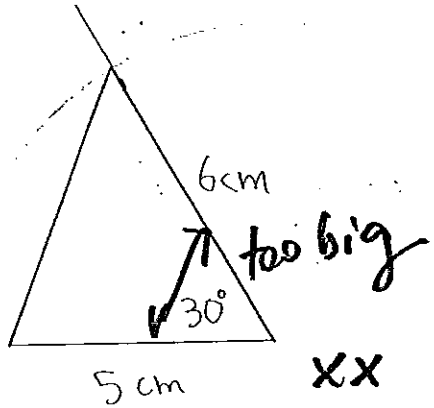
Calculators ARE allowed.

19

8. In the space below, use geometric tools to **construct three** triangles that have a side of length 5 cm, a side of length 6 cm and an angle of 30° and yet are different in size. [6]



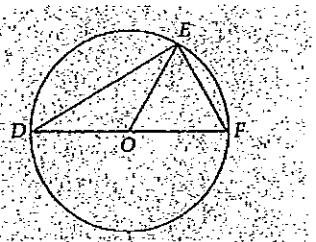




4

9. [4]

When you draw a line from each end of a diameter to a point on the circumference of a circle, the angle formed is called an angle in a semi-circle. Prove, using isosceles triangles, that the angle in a semi-circle is a right angle.



In $\triangle OEF$ and $\triangle OED$,

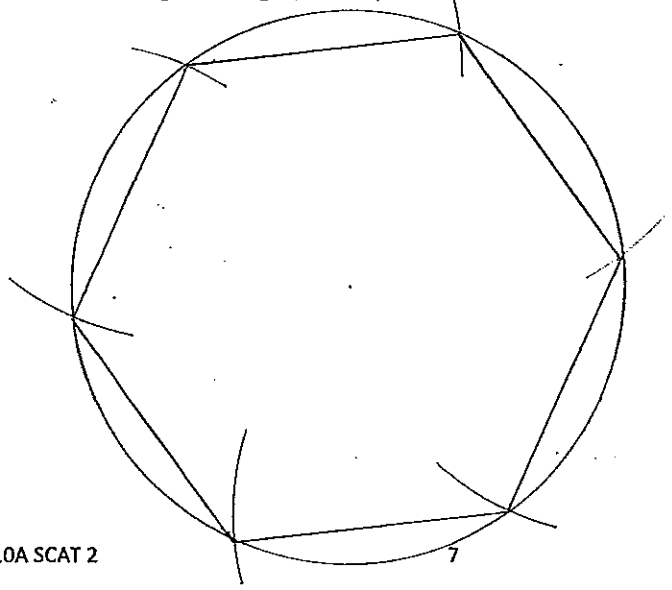
$OE = OF$ (radii)

$\therefore \triangle OEF$ is isosceles (two sides equal)

$OE = OD$ (radii)

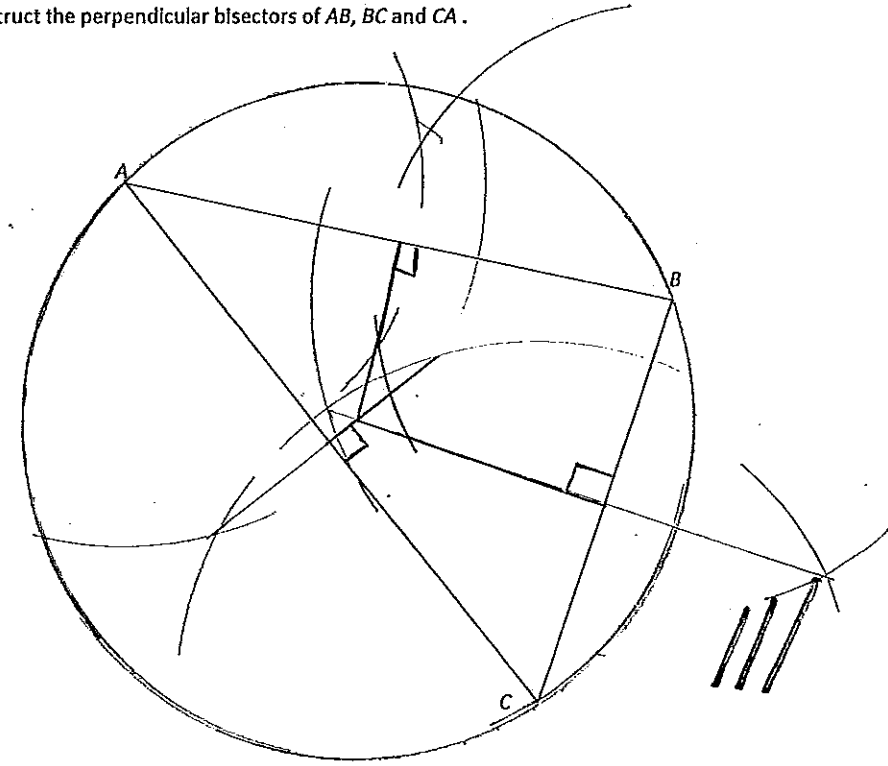
$\therefore \triangle OED$ is isosceles (two sides equal)

10. Construct a regular hexagon, in the space below. [2]



11. [3]

(a) Construct the perpendicular bisectors of each of the three sides of triangle ABC.
i.e. construct the perpendicular bisectors of AB, BC and CA.

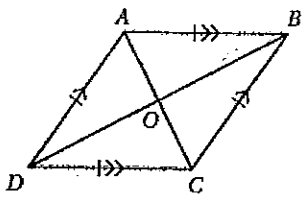


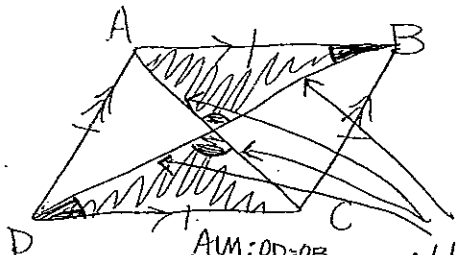
(b) The perpendicular bisectors you have constructed meet at a point. This point is the centre of the circle that passes through all three of the vertices of $\triangle ABC$.
Draw this circle on the diagram above. [1]

12. Write Yes (Y) or No (N) in the space provided. [4]

Properties	Square	Rectangle	Rhombus	Parallelogram
Opposite sides equal in length	Y	Y	Y	Y
Diagonals equal in length	Y	Y	Y	Y
Diagonals bisect each other	Y	Y	Y	Y
Diagonals bisect angles through which they pass	Y	N	Y	N

13.





AIM: OD=OB AND OA=OC

The diagram above shows a rhombus *ABCD* with diagonals *AC* and *BD*.
Note: all sides of a rhombus are equal and opposite sides are parallel, as shown.

all sides presen

Prove that the diagonals of the rhombus bisect each other. [5]

In $\triangle AOB$ and $\triangle COD$

$\angle AOB = \angle COD$ (vert opp)

$\angle OAB = \angle OCD$ (alternate angles and parallel lines)

$DC = BA$ (given)

~~$\angle OBA = \angle ODC$ (// //)~~

$\therefore \triangle AOB \equiv \triangle COD$ (AAS)

Similarly $\triangle AOD \equiv \triangle COB$

~~$\triangle DCB$~~ $DC = CB$ (given)

$\therefore \triangle DCB$ is isosceles (two equal sides)

~~In $\triangle DOC$ and $\triangle BOC$,~~

~~$\angle CBO = \angle CDO$ (base angles of isosceles triangle are equal)~~

~~$DC = CB$ (given)~~

~~OC is common~~

~~$\therefore \triangle DOC \equiv \triangle BOC$~~

~~Similarly $\triangle AOD \equiv \triangle AOB$~~

Q.E.D

End of Test