![St Spyridon College logo]

ST SPYRIDON COLLEGE

Mathematics

Sections A and B

Weighting (Sections A and B): 20%
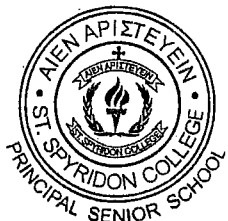
Reading time (Sections A and B): 5 minutes

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
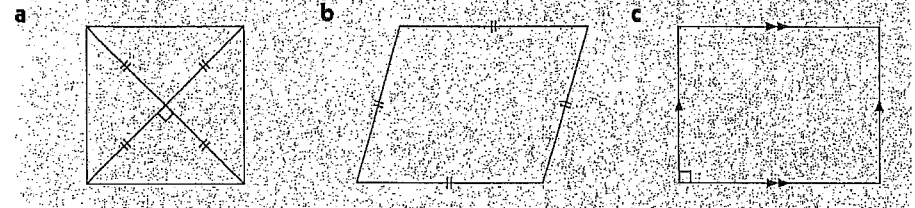- A formulae sheet is not provided

Name: _____

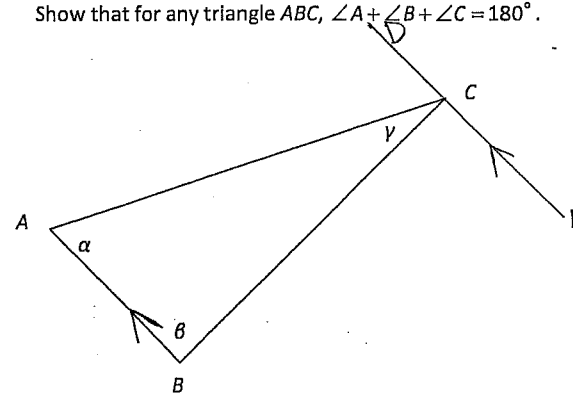| Section	Mark	Maximum
A		25
B		25
A + B		50

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]
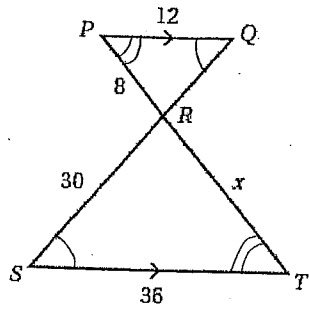

a   b   c

_____   _____   _____

2. Prove the angle sum of a triangle is $180°$ i.e.   [3]

Show that for any triangle ABC, $\angle A + \angle B + \angle C = 180°$.

3.

(a) Complete this five line proof to show that $\triangle PQR$ is similar to $\triangle TSR$. [3]
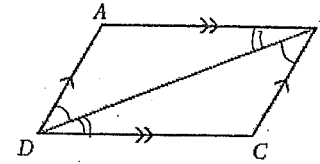
Line 1   In $\triangle PQR$ and $\triangle TSR$

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

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

Line 4   _____   (vertically opposite angles)

Line 5 $\triangle PQR$ is similar to $\triangle TSR$ (_____)

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

4.

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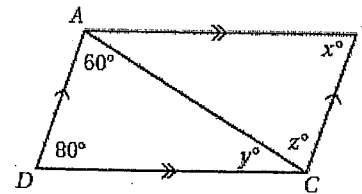
Prove that:

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

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

5.

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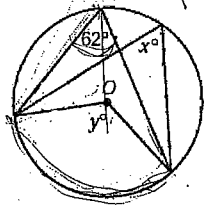
(b)   Find y. Reason not required. [1]

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

6.

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

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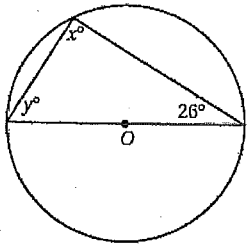Please attempt all questions on this paper.
REMEMBER TO SHOW WORKING FOR PART MARKS
The value of each question is indicated by [ ].
Calculators ARE allowed.

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

7.

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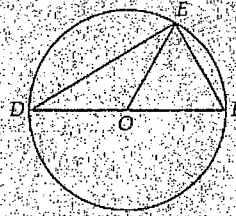
End of Section A

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
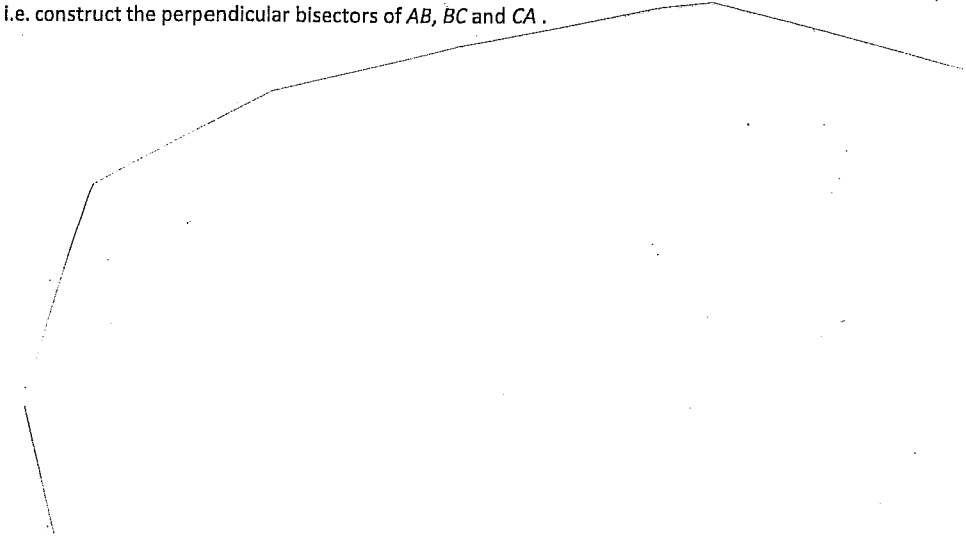the angle in a semi-circle is a
right angle.

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 $\triangle ABC$.
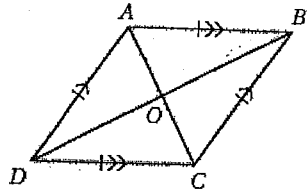Draw this circle on the diagram above.   [1]

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

Properties	Square	Rectangle	Rhombus	Parallelogram
Opposite sides equal in length				
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

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: _____ —

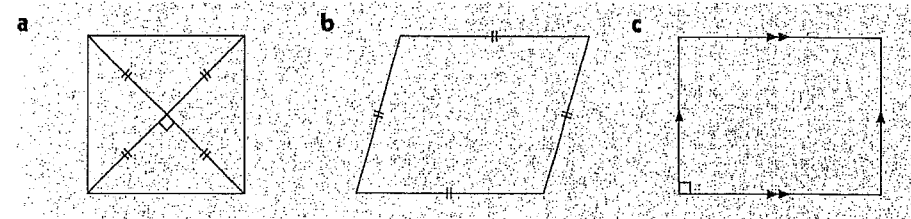| Section	Mark	Maximum
A		25
B		25
A + B		50

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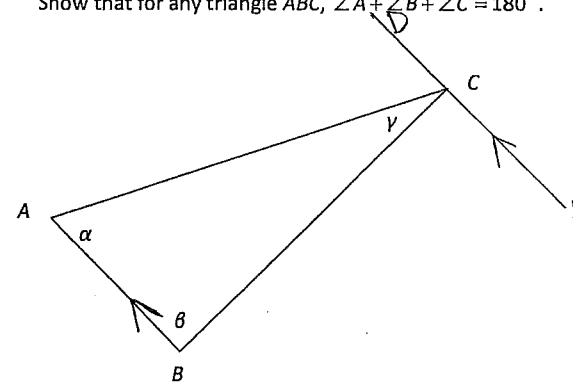The value of each question is indicated by [ ].
Calculators ARE allowed.

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

a   b   c

square   _rhombus_   _rectangle_

---

2. Prove the angle sum of a triangle is $180°$ i.e. [3]

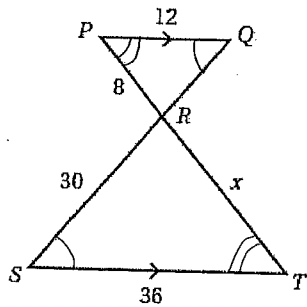Show that for any triangle ABC, $\angle A + \angle B + \angle C = 180°$.

In $\triangle ABC$
Contruct line DE || and through point C
$\angle DCA = \angle A$ (alte angl a
$\angle ECB = \angle B$ (n ii) para li
$\angle ACB = \angle C$ (given
∴ $\angle A + \angle B + \angle A = 180$
(straight angle)

3.

(a) Complete this five line proof to show that $\triangle PQR$ is similar to $\triangle TSR$.   [3]

Line 1   In $\triangle PQR$ and $\triangle TSR$

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 $\triangle PQR$ is similar to $\triangle TSR$ (equilangular, /

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

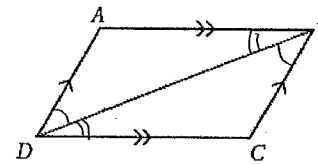$\div 1.5$

$\dfrac{36}{12} = \dfrac{x}{8}$ $36 \div 1.5 = 24$

$\div 1.5$

$\boxed{x = 24}$ units /

4.

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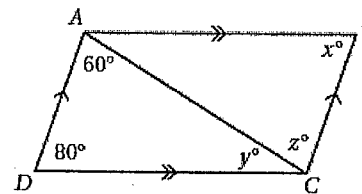
Prove that:

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

In $\triangle ABD$ and $\triangle CDB$,
DB is common
$\angle ADB = \angle CBD$ (alternate angles and parallel lines
$\angle ABD = \angle CDB$ (" ")
$\therefore \triangle ABD \equiv \triangle CDB$ (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]

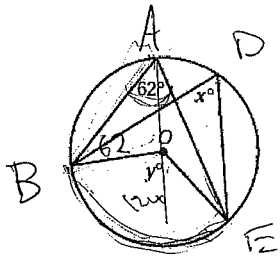(b)   Find y. Reason not required. $y = 40°$ $(180 - 140)$ [1]

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

6.

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

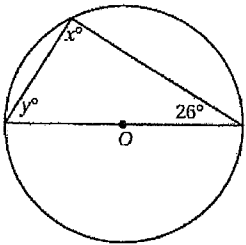$\checkmark\checkmark$ X

Construct line AO

AO = BO (radii)

$\therefore$ $\triangle$ AOB is isosceles

$\therefore$ $\angle$ABO = $\angle$OAB = 62° (base angles)

$\therefore$ $\angle$AOB = 56° (angle sum) X

sim

$\angle$BAO $\neq$ 62°

7.

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

$\checkmark\checkmark$

$x° = 90°$ (semicircle angles are 90°)

$\therefore$ $y° = 180 - (90 + 26)$

$y° = 64°$ (angle sum of a triangle)

End of Section A

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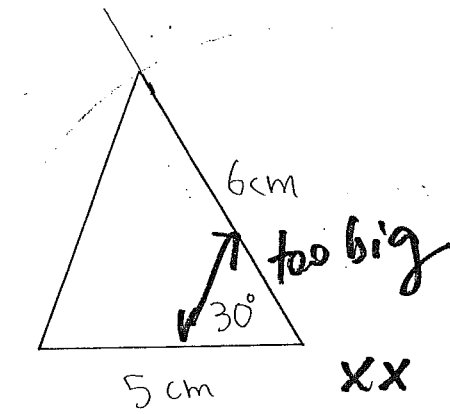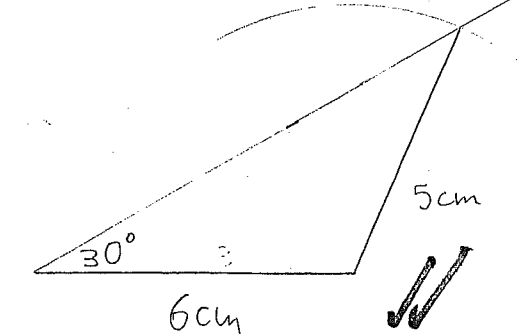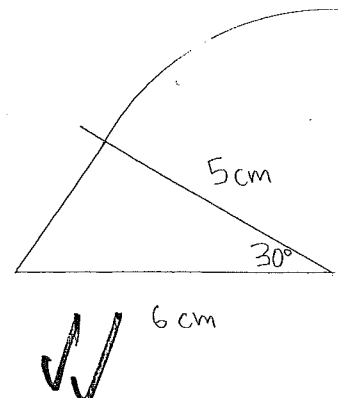Please attempt all questions on this paper.
REMEMBER TO SHOW WORKING FOR PART MARKS
The value of each question is indicated by [ ].
Calculators ARE allowed.

19

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

5cm

30°

6 cm

$\checkmark\checkmark$

5cm

30°

6cm

$\checkmark\checkmark$

6cm

30°

5 cm

too big

XX

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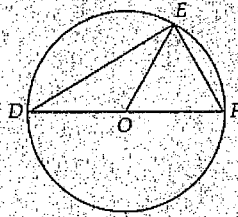
In $\triangle OEF$ and $\triangle OED$,

$OE = OF$ (radii)
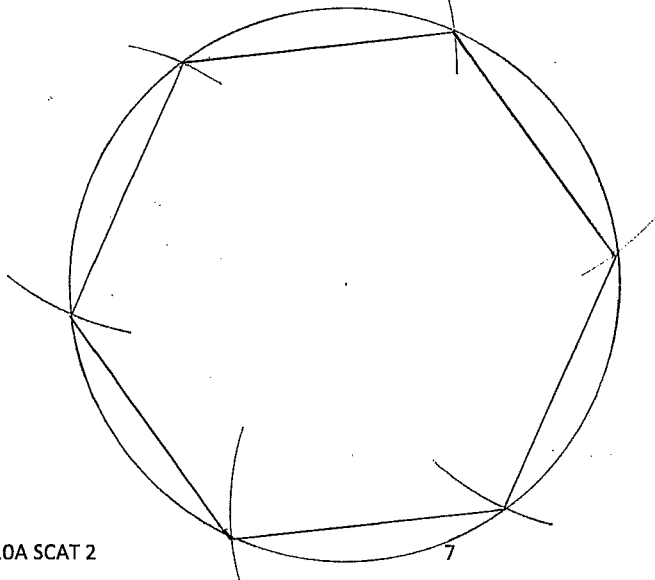
$\therefore \triangle OEF$ is isosceles (two sides equal)

$OE = OD$ (radii)

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

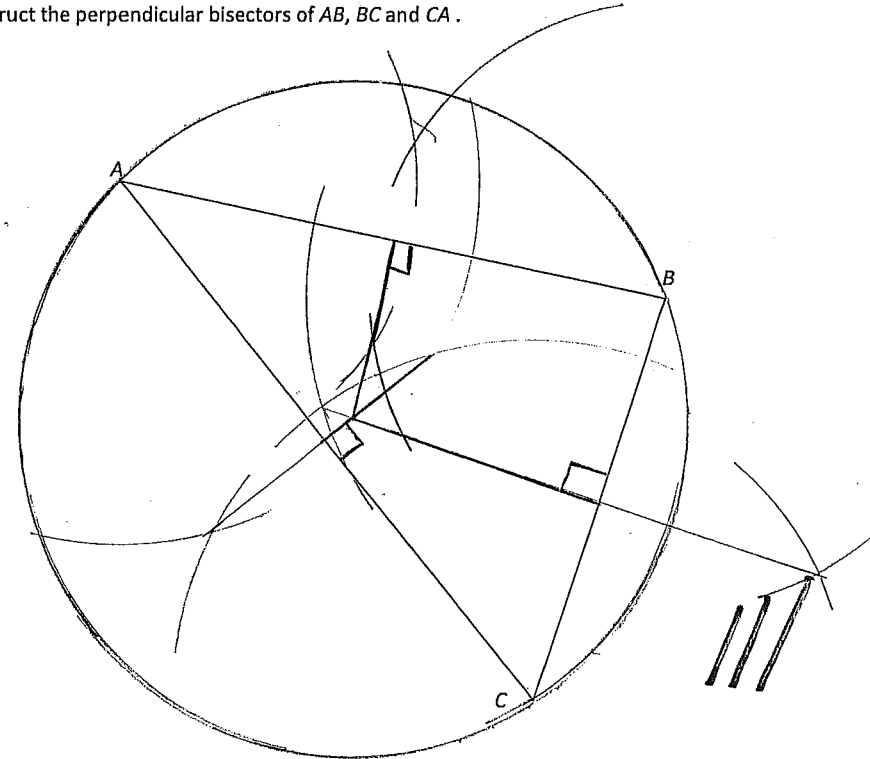**10.** Construct a **regular hexagon**, in the space below. [2]

11.

(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 $\triangle ABC$.
Draw this circle on the diagram above. [1]

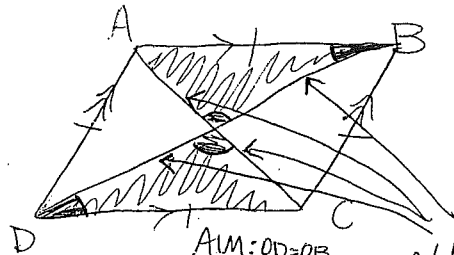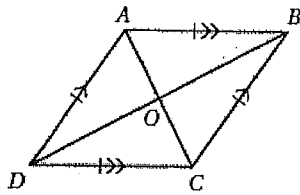
12. Write Yes (Y) or No (N) in the space provided. [4]

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

13.

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

AIM: OD=OB 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 = BAC (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)

~~the $\triangle DOC$ and BOC~~
~~$\angle CBO = \angle CDO$ (base angles of isosceles triangle equal)~~
~~DC = CB (given) and~~
~~OC is common~~

End of Test

~~$\therefore \triangle DOC \equiv \triangle BOC$ &~~
~~Similarly $\triangle AOD = \triangle AOB$~~

2011