HILLCREST HIGH SCHOOL

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INTERNAL ASSESSMENT

GRADE 11

MATHEMATICS
Paper 2
NOVEMBER 2020

MARKS: 100
TIME: 2 hours

NAME:									
TEACHER:									
QUESTION:	1	2	3	4	5	6	7	8	TOTAL
MARKS:	16	13	13	19	6	8	18	7	100
STUDENT MARK:									
MARKER:									

This question paper consists of 18 pages.

Hillcrest High School

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 8 questions.
2. Answer ALL the questions IN THE SPACE PROVIDED.
3. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.
4. Answers only will not necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round answers off to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. A diagram sheet, for rough work, is included at the end of the question paper.
9. Number the answers correctly according to the numbering system used in this question paper.
10. Write legibly and present your work neatly.

FORMULA:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad \text{M}\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

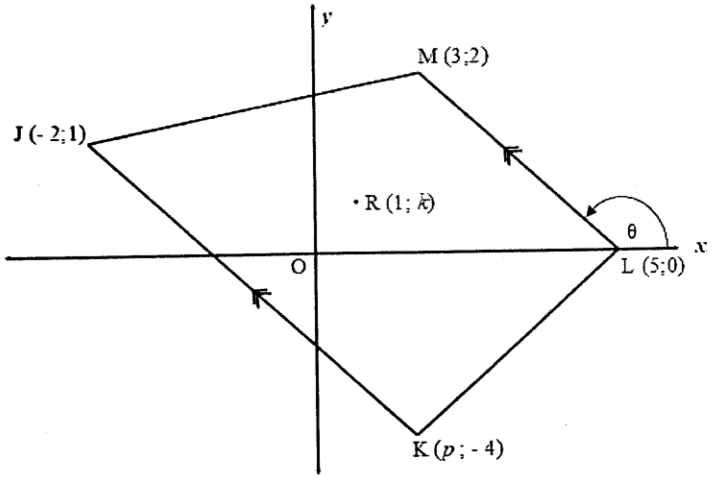
$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

$$In\ \Delta ABC: \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad a^2 = b^2 + c^2 - 2bc.\cos A$$

$$area\ \Delta ABC = \frac{1}{2}ab.\sin C$$

QUESTION 1

In the diagram below, **J(–2;1), K(p; – 4)**, L(5; 0) and M(3; 2) are vertices of trapezium JKLM. JK // ML.



1.1 Determine the gradient of ML. (2)

1.2 Show that $p = 3$. (3)

1.3 Calculate the value of θ, the inclination of ML. (3)

1.4 Q(x; y) on JK is such that MLQJ is a parallelogram, determine the coordinates of Q. (2)

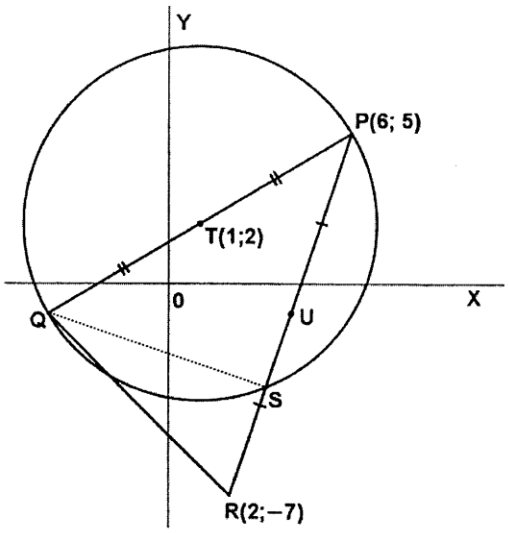
1.5 Calculate the length of ML. (2)

1.6 If points R(1; k), J and L are collinear, calculate the value of k. (4)

[16]

QUESTION 2

P(6 ; 5), Q and R(2; – 7) are the vertices of a triangle in the diagram. T(1 ; 2) and U are the midpoints of PQ and PR respectively. The circle with diameter PQ intersects PR in S.



Determine the:

2.1 coordinates of Q (2)

2.2 coordinates of U (2)

2.3 equation of TU (4)

2.4 the equation of QS. (5)

[13]

ADDITIONAL WORKING SPACE

QUESTION 3

3.1 If $sin\ 40° = q$ express each of the following in terms of q:

3.1.1 $tan\ 40°$ (3)

3.1.2 $sin\ 220°$ (3)

3.1.3 $cos\ (-400°)$ (3)

3.2 If $tan\,\theta = \frac{9}{40}$ and $cos\,\theta < 0$

Using a sketch, without a calculator, find the value of: $sin\ \theta + cos\ \theta$ (4)

[13]

QUESTION 4

4.1 Simplify the following expression: $\frac{\sin(90°+x).\tan(180°-x).\cos(-x)}{\cos(90°-x)}$ (5)

4.2 Simplify completely, without the use of a calculator: $\frac{\cos(-60°)+\tan 135°}{\tan 315°+\cos 660°}$ (5)

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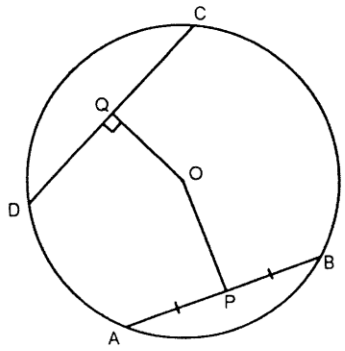
QUESTION 6

6.1 Complete **the statements** below by filling in the missing word(s) so that the statement is CORRECT:

6.1.1 **The line** from the centre of a circle perpendicular to the chord ..... (1)

6.1.2 Angles subtended by the same / equal chords in a circle are ..... (1)

6.2 AB and CD are two chords of a circle centre O. $OQ \perp DC$ and P is the midpoint of AB. OQ is 4 units, OP is 3 units and AB is 8 units.



Calculate the lengths of:

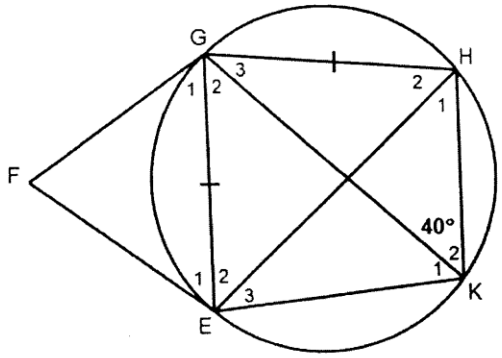
6.2.1 radius OA (3)

6.2.2 chord DC (3)

[8]

QUESTION 7

7.1 In the diagram below the tangents from E and G meet at F. $\hat{K}_2 = 40°$ and $EG = GH$.

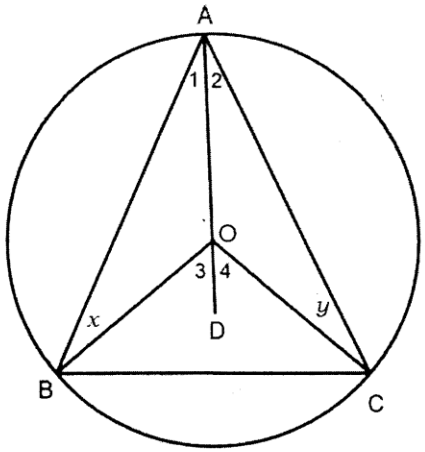


Determine, with reasons, the size of:

7.1.1 $\hat{H}_2$ (2)

7.1.2 $\hat{F}$ (4)

7.2 Points A, B and C lie on the circumference of circle centre O. AO, BO, CO and AOD are drawn. $\hat{B} = x$ and $\hat{C} = y$.



Determine each of the following, in terms of x and y, with reasons:

7.2.1 $\hat{A}_1$ (2)

7.2.2 $\hat{O}_3$ (2)

7.2.3 $\hat{A}_2$ (2)

7.2.4 $\hat{O}_4$ (2)

7.2.5 $B\hat{O}C$ (no reasons necessary) (2)

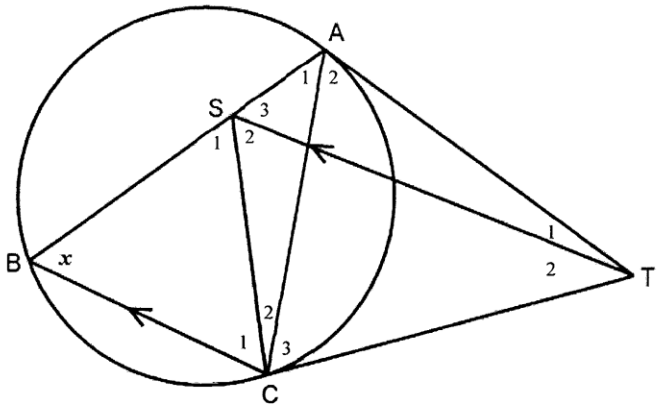
7.2.6 $B\hat{A}C$ (no reasons necessary) (2)

[18]

ADDITIONAL WORKING SPACE

QUESTION 8

In the figure below TA and TC are tangents. ST // BC. $\hat{B} = x$



Prove that:

8.1 ASCT is a cyclic quadrilateral (4)

8.2 ΔSBC is an isosceles triangle (3)

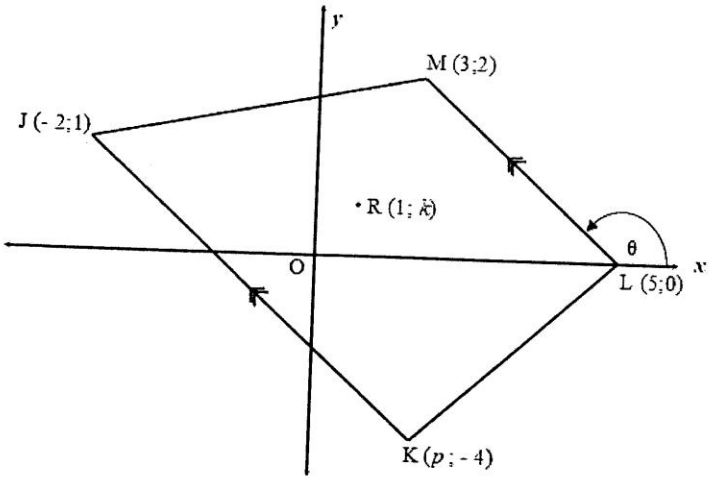
[7]

TOTAL: 100 marks

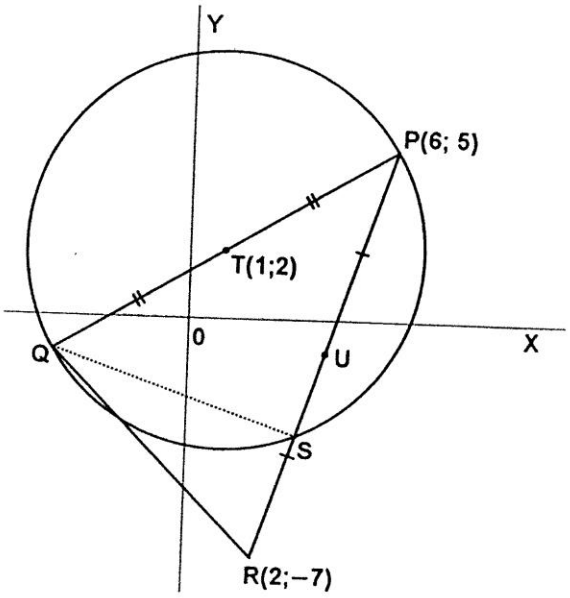
ADDITIONAL WORKING SPACE

Grade 11 Mathematics Examination
DIAGRAM SHEET

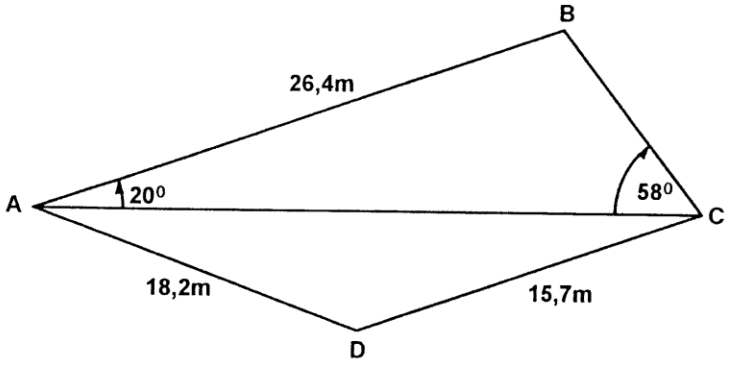
QUESTION 1



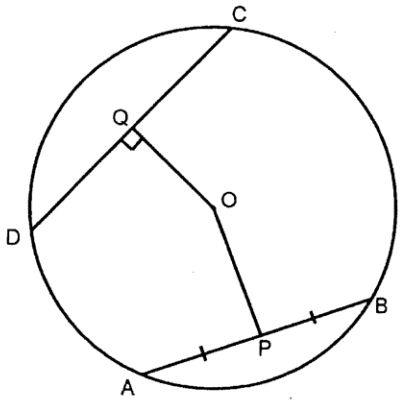
QUESTION 2



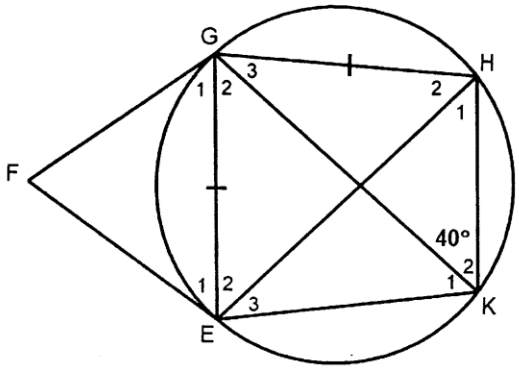
QUESTION 5



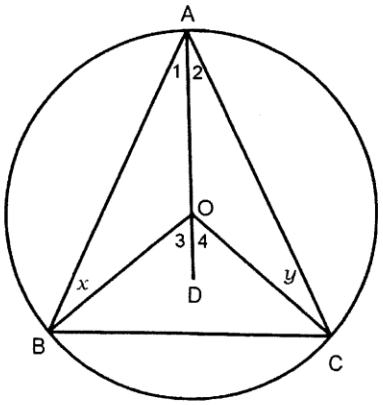
QUESTION 6.2



QUESTION 7.1



QUESTION 7.2



QUESTION 8