

PROVINCIAL EXAMINATION

JUNE 2022

GRADE 11

MATHEMATICS PAPER 2

TIME: 2 hours

MARKS: 100

7 pages and 2 diagram sheets

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INSTRUCTIONS AND INFORMATION

- 1. This question paper consists of 3 questions.
- 2. Answer ALL the questions.
- 3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
- 4. Answers only will NOT necessarily be awarded full marks.
- 5. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
- 6. If necessary, round off the answers to TWO decimal places, unless stated otherwise.
- 7. Write your name and class grade on the diagram sheet, detach and hand them in with your ANSWER BOOK.
- 8. Diagrams are NOT necessarily drawn to scale.
- 9. Number the answers correctly according to the numbering system used in the question paper.
- 10. Write neatly and legibly.

QUESTION 1

1.1 The points D(-1; 2), E(4; -2), F(-5; -3) are vertices of ΔDEF .

Determine:

	1.1.1	The gradient of DF	(2)
	1.1.2	If line DE is perpendicular to DF, write down the gradient of DE	(1)
	1.1.3	The equation of the line DE in the form $y = mx + c$	(3)
	1.1.4	The equation of a line parallel to DE passing through point F in the form $y =$	(3)
	1.1.5	If $G(6; y)$ is a point on DE, determine the value of y	(2)
	1.1.6	The length of DF is equal to DE. What type of triangle is ΔDEF ?	(5)
	1.1.7	The area of triangle DEF	(2)
Quadrilateral PQRS is drawn below and has the following properties:			

• RQ || SR

1.2

- The coordinates of R(-4; 1) and S(10; 3) are given
- The coordinates of Q(-7; y) and P(x; -9) are partially given



Determine:

1.2.1	What type of quadrilateral is PQRS?	(1)
1.2.2	The value of x if $RS = 15$ units	(5)
1.2.3	The co-ordinates of T, the midpoint of RS	(2)
1.2.4	The value of y	(3)
1.2.5	The coordinates of W, a point on SP such that PQRW is a rectangle	(3) [32]

QUESTION 2

2.1 In the diagram, P is a point in the first quadrant such that $5\sin(90^\circ - \theta) - 3 = 0$. R(k; 6) is a point in the second quadrant such that $P\hat{O}R = 90^\circ$.

In the diagram below:

- $P\hat{Q}R = 90^{\circ}$ and $P\hat{O}R = 90^{\circ}$
- R(k; 6) is a point in the quadrant 2
- P is a point in quadrant 1 such that $5\sin(90^\circ \theta) 3 = 0$



Determine:

2.1.1
$$\sin\theta$$

(3)

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- 2.1.2 The value of k (3)
- 2.2 Simplify fully:

2.2.1
$$\frac{\tan 315^{\circ} + \cos 300^{\circ}}{\sin 150^{\circ} + \tan 135^{\circ}}$$
 (6)

2.2.2
$$\frac{\sin(180^\circ + x)\cos(180^\circ - x).\sin 50^\circ}{\tan(315^\circ).\cos^2(360^\circ - x).\cos 140^\circ}$$
(6)

2.3 If
$$x \in [-180^\circ; 180^\circ]$$
, determine $\sin(x+10^\circ) - \cos(x-30^\circ) = 0$. (7)

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- 2.4 In the quadrilateral below:
 - $A\hat{B}C = 36^\circ$, $C\hat{B}D = 80^\circ$, $B\hat{D}C = 60^\circ$
 - Lines AB = 74 m and BC = 52 m



Calculate:

2.4.1	The value of BCD	(1)
2.4.2	The length of line CD	(2)
2.4.3	The length of diagonal AD	(4)
2.4.4	The area of quadrilateral ABCD	(4) [36]

QUESTION 3

3.1 In the sketch below, O is the centre of the circle. Chord PQ is perpendicular to OM at M.



Prove the theorem that states that the line drawn from the centre of the circle perpendicular to a chord will bisect the chord.

- 3.2 In the sketch below:
 - O is the centre of the circle
 - AB = 10 cm and is perpendicular to OC at point D
 - C is a point on the circumference of the circle
 - The radius of the circle = 13 cm



Calculate the length of line DC. (5)

3.3 Calculate the remaining area in the circle if the area of ΔOAB is excluded.

(5)

(3)

- 3.4 In the sketch below:
 - PQRS is a cyclic quadrilateral
 - Line AB is a tangent to the circle at point S
 - PQ = QR
 - PR = SR
 - PQ || SR
 - $\mathbf{B}\mathbf{\hat{S}}\mathbf{R} = x$



		[32]
3.4.3	Prove that $PS = QR$.	(3)
	angles that are equal to \hat{S}_1 .	(6)
3.4.2	Calculate the value of \hat{S}_1 in terms of x as well as the value of TWO other	
3.4.1	Determine, giving reasons, FIVE angles that are equal to BSR.	(10)

TOTAL: 100

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DIAGRAM SHEET 1

QUESTION 3



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DIAGRAM SHEET 2



