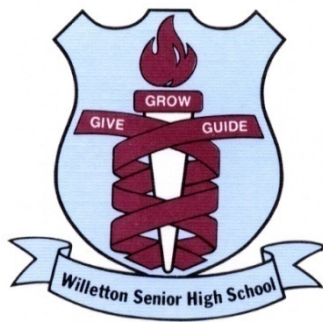


# MATHEMATICS METHODS

## YEAR 11 UNIT 1

### TEST 1

2021



### Section 1

NON CALCULATOR

REVISION PAPER

TIME: 30 mins

MARKS: 40 marks

**STUDENT'S NAME:** \_\_\_\_\_

**CIRCLE YOUR  
TEACHER'S NAME:**

Mrs Kalotay

Ms Leow

Mr Riemer

Mrs Scoles

Ms Thompson

Ms Tsen

Mr Whiteley

- Show all necessary working in order to obtain full marks.
- A formula sheet will be provided.

**Question 1****(9 marks)**

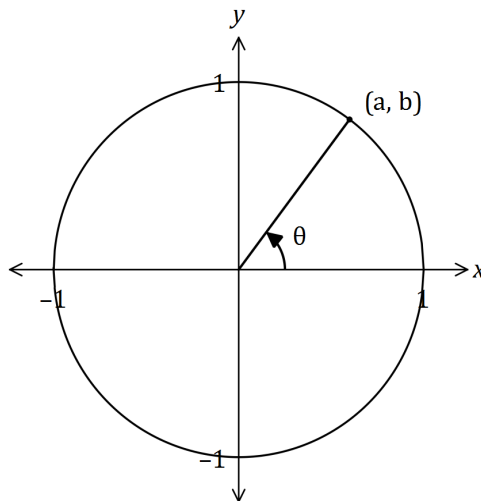
(a) Determine all possible values over the given domain, for each of the following.

(i)  $\sin(\theta) = 1$   $-360^\circ \leq \theta \leq 360^\circ$  (1 mark)

(ii)  $\cos(\theta) = -0.5$   $-360^\circ \leq \theta \leq 360^\circ$  (2 marks)

(iii)  $\tan(\theta) = -\frac{1}{\sqrt{3}}$   $-2\pi \leq \theta \leq 2\pi$  (3 marks)

(b) Using the unit circle shown, determine the following in terms of  $a$  and/or  $b$ , given that  $\theta$  is an acute angle measured in degrees.



(i)  $\sin(\theta)$  (1 mark)

(ii)  $\cos(180 - \theta)$  (1 mark)

(iii)  $\tan(90 + \theta)$  (1 mark)

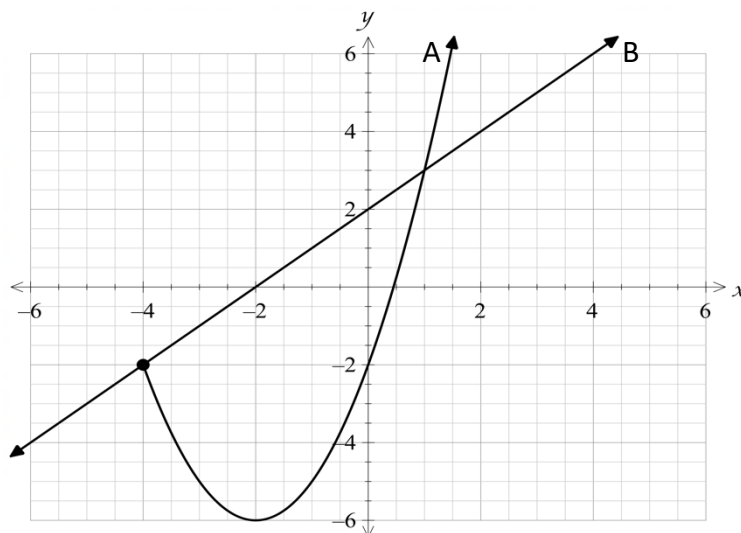
**Question 3****(9 marks)**

Consider the following two graphs, A and B.

(a) For the graph of A, state

(i) the domain. (1 mark)

(ii) the range. (1 mark)



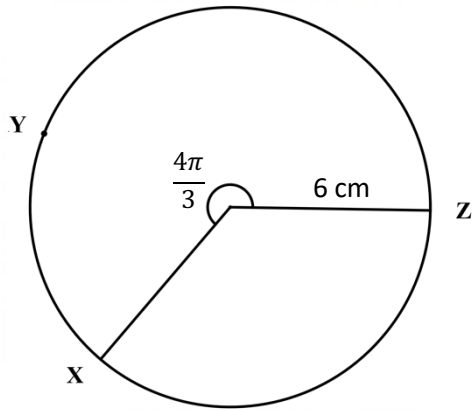
(b) For the graph of B, state

(i) its equation (1 mark)

(ii) the angle of inclination and show how it can be derived from the equation. (2 marks)

**Question 5****(5 marks)**

Consider the following circle with a radius of 6 cm and a central angle of  $\frac{4\pi}{3}$ .



Find the length of the following as an exact value in its simplest form.

(a) The major arc XYZ.

(2 marks)

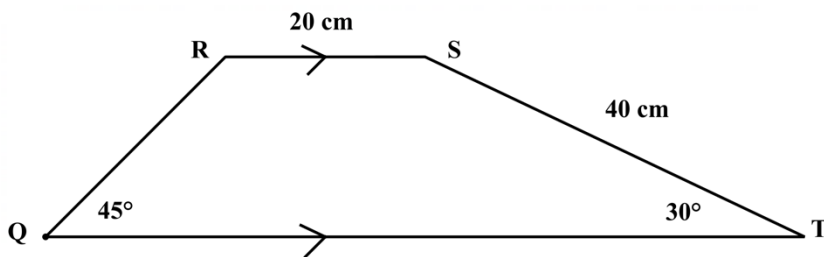
(b) The chord XZ.

(3 marks)

**Question 6**

**(9 marks)**

Consider the trapezium  $QRST$  shown below, with  $\angle Q = 45^\circ$ ,  $\angle T = 30^\circ$ ,  $RS = 20 \text{ cm}$  and  $ST = 40 \text{ cm}$ .



(a) Determine the exact length of

(i)  $QR$

(3 marks)

(ii)  $QT$

(3 marks)

(b) Show that the exact area of the trapezium is,  $200 (3 + \sqrt{3}) \text{ cm}^2$ .

(3 marks)

**1. (1, 2, 2, = 5 Marks)**

(a) Complete the next row of Pascal's Triangle.

1	Row 0
1 1	Row 1
1 2 1	Row 2
1 3 3 1	Row 3
1 4 6 4 1	Row 4
1 5 10 10 5 1	Row 5
1 6 15 20 15 6 1	Row 6
1 7 21 35 35 21 7 1	Row 7
	Row 8

Use Pascal's Triangle to answer the following questions.

(b) Expand and simplify  $(x - 2)^6$ .

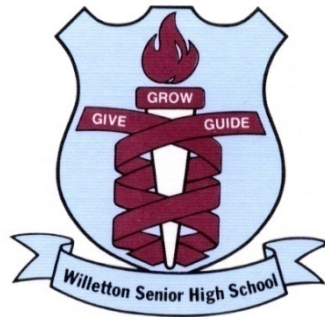
(c) Factorise  $a^5 - 5a^4b + 10a^3b^2 - 10a^2b^3 + 5ab^4 - b^5$ .

# MATHEMATICS METHODS

## YEAR 11 UNIT 1

### TEST 1

2021



### Section 2

CALCULATOR ASSUMED

TIME: 20 mins

MARKS: 20 marks

**STUDENT'S NAME:** \_\_\_\_\_

**CIRCLE YOUR  
TEACHER'S NAME:**

Mrs Kalotay

Ms Leow

Mr Riemer

Mrs Scoles

Ms Thompson

Ms Tsen

Mr Whiteley

- Show all necessary working in order to obtain full marks as marks will be allocated for specific working.
- A formula sheet will be provided.
- One single sided A4 page of notes is permitted

**Question 7****(4 marks)**

A metallurgist calculates that the length ( $L$ ) of a metal rod is dependent on the temperature ( $t$ ) of the metal. She found that at  $10^{\circ}\text{C}$  the metal rod was 15.2 metres long, but at  $20^{\circ}\text{C}$  it was 15.3 metres.

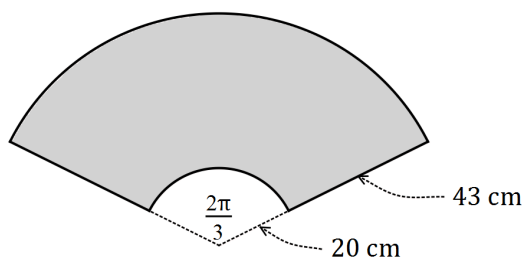
(a) Determine an equation for the length of the metal rod, given its temperature. (2 marks)

(b) The metallurgist recorded the length of the metal rod to be 30.6 metres at  $40^{\circ}\text{C}$ . Show that this length was recorded incorrectly. (1 mark)

(c) Determine with reasoning, if this situation is an example of direct proportion. (1 mark)

**Question 8****(3 marks)**

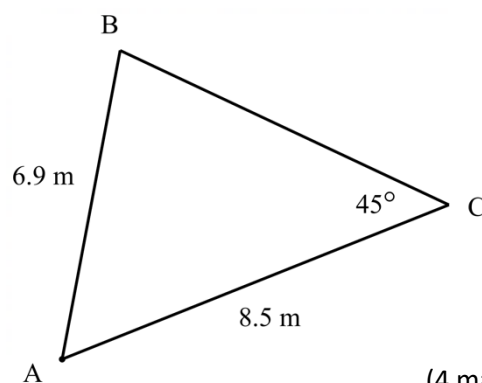
A windscreen wiper on a car is 43 cm long and rotates through one-third of a circle with the radii of the inner arc being 20 cm, as shown below. Determine the area of the shaded region.





**Question 9****(6 marks)**

Consider  $\Delta ABC$  with  $AC = 8.5 \text{ m}$ ,  $AB = 6.9 \text{ m}$  and  $\angle ACB = 45^\circ$ , as shown below.



- (a) Determine the size of  $\angle BAC$ .

**(4 marks)**

- (b) Determine the possible values for the area of  $\Delta ABC$ .

**(2 marks)**

**Question 10**

**(7 marks)**

- (a) Find the size of the acute angle between the lines  $5x - 3y = 4$  and  $y - 3x = -6$ . (4 marks)

- (b) A third line intersects the line  $y - 3x = -6$ , at an angle of  $50^\circ$ . If all three lines intersect at the same point, determine an equation for the third line.

(3 marks)

**7. (2, 2, 2 = 6 Marks)**

Some patients in a speech clinic are nominated for a special training programme. They fall into the following categories

	<b>4 years and under</b>	<b>Between 4 and 12 years</b>	<b>12 years and over</b>
<b>Hearing Impaired</b>	6	12	8
<b>Hearing Un-Impaired</b>	8	7	7

**6 Patients are to be selected.**

How many different selections are possible if:-

- (a) There must be two from each age group.
- (b) The programme is suitable only for children under 12 years of age.
- (c) Irrespective of age, there must be equal numbers of hearing impaired and hearing-unimpaired subjects.

END OF TEST