

Important note to candidates

that you do not have any unauthorized notes or other items of a non-personal nature in the examination room. If you have any unauthorized material with you, hand it to the supervisor before reading any further.

No other items may be taken into the examination room. It is your responsibility to ensure

and up to three calculators approved for use in the WACE examinations.

Special items:

- drawing instruments, templates, notes on two unfolded sheets of A4 paper,
- correction fluid/tape, eraser, ruler, highlighters,
- pens (blue/black preferred), pencils (including coloured), sharpener,
- Standard items:

To be provided by the candidate

Formula Sheet (retained from Section One)

This question/Answer Booklet

To be provided by the supervisor

Materials required/recommended for this section

Working time for this section: one hundred minutes

Reading time before commencing work: ten minutes

Time allowed for this section

DO NOT WRITE IN THIS SECTION AS IT WILL BE CUT OFF.

Student's Teacher Mr Coleman Mr Dalby

Mr De Haer Mr Nesa

As shown on your exam timetable.

Student's Name:

88

Score for this booklet

Calculator - assumed

Section Two:

MATHEMATICS METHODS UNIT 1&2

Question/Answer Booklet

Western Australian Certificate of Education
Semester One Examination, 2019



SENIOR HIGH SCHOOL
APPLÉCROSS

Additional working space.
Question Number: _____

Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Marks available	Percentage of exam
Section One: Calculator-free	8	8	50	52	35
Section Two: Calculator-assumed	13	13	100	98	65
Total			150	100	

Instructions to candidates

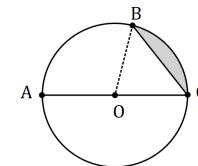
- The rules for the conduct of examinations are detailed in the *School Examination Rules* provided with your exam timetable. Sitting this examination implies that you agree to abide by these rules.
- Write your answers in this Question/Answer Booklet.
- You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
- Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
 - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
 - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question(s) that you are continuing to answer at the top of the page.
- Show all your working clearly.** Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.
- It is recommended that you **do not use pencil**, except in diagrams.
- The formula sheet and your notes are **not to be handed** in with your Question/Answer Booklet.

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(8 marks)

Question 21

- (a) The circle shown has centre O and diameter AC of length 50 cm. Determine the shaded area given that $2 \times \angle AOB = 3 \times \angle BOC$. (4 marks)



- (b) A sector of a circle has a perimeter of 112 cm and an area of 735 cm². Determine the radius of the circle. (4 marks)

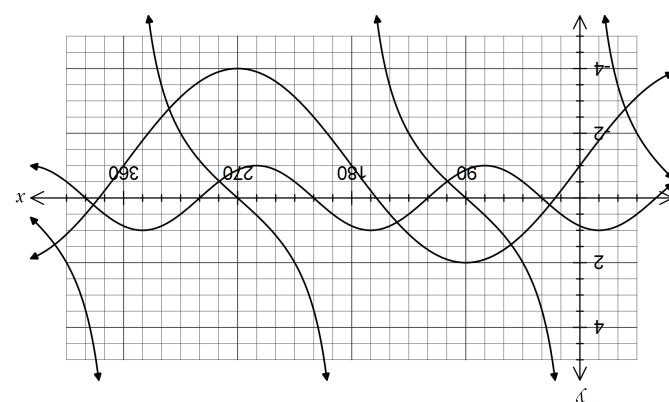
Question 20 Section Two: Calculator-assumed
55% (98 Marks)
This section has thirteen (13) questions. Answer all questions. Write your answers in the spaces provided.
Working time: 100 minutes.

(a) The points A and B have coordinates $(4, -6)$ and $(5, 8)$ respectively. If B is the midpoint of A and C, determine the coordinates of C. (3 marks)

(b) The points D and E have coordinates $(5p, -q)$ and $(2q, 3p)$ respectively, where p and q are constants. Determine the value of p and the value of q if the midpoint of D and E is at $(21, 17)$. (3 marks)

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(a) The graphs of three functions, $f(x) = a \sin(x) + b$, $g(x) = c \tan(x + d)$ and $h(x) = \cos(px + q)$ are shown below.



(b) Determine the equation of a line which is inclined at an angle of 120° to the positive x-axis and cuts the y-axis at $(0, -2)$. (2 marks)

Question 10

- (a) The variables
- C
- and
- x
- are directly proportional and when
- $x=5, C=60$
- .

(8 marks)

- (i) Determine an equation for the relationship between
- C
- and
- x
- .

(2 marks)

- (ii) State the value of
- C
- when
- $x=15$
- .

(1 mark)

- (b) The time,
- t
- minutes, that a car takes to travel one kilometre at a constant speed of
- $s \text{ kmh}^{-1}$
- is given by the formula
- $\frac{k}{s}$
- .

- (i) Determine the value of the constant
- k
- , given that when
- $s=40, t=90$
- .

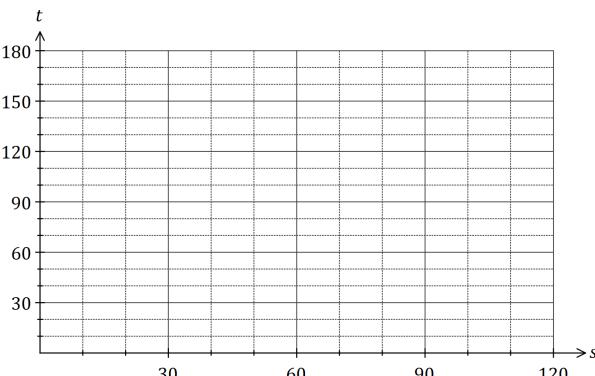
(1 mark)

- (ii) Determine the value of
- t
- when
- $s=30$
- .

(1 mark)

- (iii) On the axes below, draw a graph to show how
- s
- varies with
- t
- .

(3 marks)

**Question 19**

- (a) The equation of the axis of symmetry for the graph of
- $y=3x^2+6x+7$
- is
- $x=k$
- . Determine the value of
- k
- , using a method that does not refer to the graph of the parabola.

(2 marks)

- (b) A parabola with equation
- $y=ax^2+bx+c$
- has a turning point at
- $(6, -5)$
- and passes through the point
- $(-2, -37)$
- . Determine the value of
- a
- , the value of
- b
- and the value of
- c
- .

(3 marks)

- (c) Determine the value of the discriminant for the quadratic equation
- $16x^2-24x+9=0$
- and use it to explain how many solutions the equation
- $(x+1)(16x^2-24x+9)=0$
- will have.

(3 marks)

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Question 12

(8 marks)

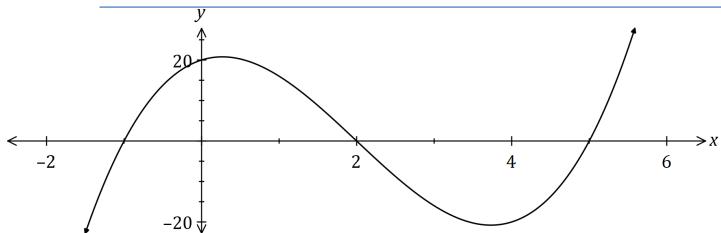
(a) A function is given by $f(x) = \frac{3}{x+1} + 2$.

(i) State the natural domain and corresponding range of f . (2 marks)

(ii) The graph of $f(x)$ is dilated vertically by a scale factor of 2. Determine the coordinates of the y -axis intercept. (2 marks)

(iii) The graph of $f(x)$ is translated 3 units to the right. Determine the equation of the translated function. (1 mark)

(b) The graph of the cubic function $y = g(x)$ is shown below. Determine $g(10)$. (3 marks)

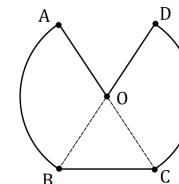


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Question 17

(7 marks)

In shape $OABCD$ below, $\angle AOB = 126^\circ$ and AC, BD are diameters of the circle with centre O and radius 35 cm.



(a) Calculate the perimeter of $OABCD$. (4 marks)

(b) Calculate the area of $OABCD$. (3 marks)

Question 14

(a) Convert, giving an exact answer

(i) 16° to radians.

(8 marks)

(1 mark)

(ii) 0.4 radians to degrees.

(1 mark)

(b) Calculate, to the nearest degree, the acute angle between the line $y=1.5x-4$ and the line $y=-0.5x+4$.

(3 marks)

(c) The sides adjacent to the right-angle in a right triangle have lengths 65 cm and 72 cm.

If the smallest angle in the triangle is α , determine an exact value for(i) $\tan \alpha$.

(1 mark)

(ii) $\sin(90^\circ - \alpha)$.

(2 marks)

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Question 15An obtuse angled triangle ABC has $a=36$ cm, $c=52$ cm and an area of 748 cm², given the length of b is the longest length of a side of triangle ABC.

(a) Sketch a triangle to show this information.

(1 mark)

(b) Determine the size of $\angle B$.

(2 marks)

(c) Show that $b \approx 79$ cm.

(2 marks)

(d) Show that $\angle C \approx 32^\circ$.

(2 marks)