Christ Church Grammar School

**2020**
TEST 3

# MATHEMATICS METHODS Year 11

**Section Two:**
**Calculator-assumed**

Your name _____

Teacher name _____

## Time and marks available for this section

| | |
|---|---|
| Reading time before commencing work: | 2 minutes |
| Working time for this section: | 15 minutes |
| Marks available: | 14 marks |

## Materials required/recommended for this section

***To be provided by the supervisor***
This Question/Answer Booklet
Formula Sheet (retained from Section One)

***To be provided by the candidate***
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: drawing instruments, templates, and up to three calculators approved for use in the WACE examinations

## Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

## Instructions to candidates

1. The rules of conduct of the CCGS assessments are detailed in the Reporting and Assessment Policy. Sitting this assessment implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer Booklet using blue/black pen. Do not use erasable or gel pen.

3. Answer all questions.

4. You must be careful to confine your response to the specific question asked and to follow any instructions that are specified to a particular question.

5. Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

6. **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.

7. It is recommended that **you do not use pencil**, except in diagrams.

**See next page**



**Additional working space**

Question number: _____

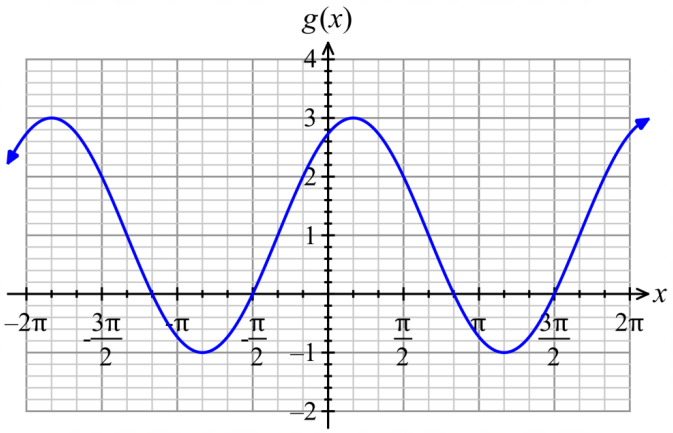
**Additional working space**

Question number: _____



**Question 6** **(3 marks)**

Determine the equation of the trigonometric function, $g(x)$, shown below in terms of a sine function.




**Question 7** **(2 marks)**

The length of a string in musical instruments varies inversely to the frequency of the vibrations. This generates the sound or pitch of the note.

If an 11-inch string has a frequency of 400 cycles per second, then determine the frequency of a bass guitar which uses 30-inch strings.

**See next page**

**Question 8** **(4 marks)**

$A$ and $B$ are both acute angles with $\cos(B) = \frac{8}{17}$ and $\sin(A) = \frac{4}{5}$.

Determine the exact value of $\sin(A + B)$.

**See next page**



**Question 9** **(5 marks)**

In a particular city in South Africa it is known that the outdoor temperature ranges from a low of $3°C$ to a high of $23°C$ each day. Scientists measure the outdoor temperature throughout the day and discover that it can be modelled by a sine function. The temperature midpoint occurs at 10 am and at 10 pm with the temperature peaking in the afternoon.

(a) Determine an equation of this function where $t$ represents the time, in hours, after 10 am and $T$ represents the outdoor temperature in $°C$. (3 marks)

(b) When the outdoor temperature falls below 10°C heating systems are used. Determine the times, to the nearest minute, at which heating systems are in use. (2 marks)

**End of questions**