

Structure of this paper

	Number of questions available	Number of questions to be attempted	Suggested working time (minutes)	Marks available	%
Section One Calculator—free	8	8	50	52	35
Section Two Calculator—assumed	14	14	100	98	65
				150	100

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the Year 12 Information Handbook 2017. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

Section One: Write answers in this Question/Answer Booklet. Answer all questions.

Show all your working clearly. Your working should be in sufficient detail to allow your answer 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.

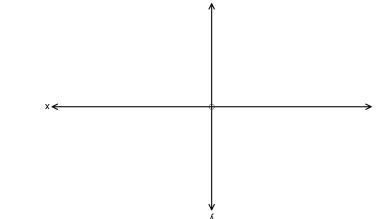
3. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.

4. 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, fail in the number of the question that you are continuing to answer at the top of the page.

5. The Formula Sheet is **not** handed in with your Question/Answer Booklet.

- (c) Find the gradient of the tangent line to the curve of $y = \cos x$ at the point where $x = \frac{\pi}{6}$. (3 marks)

- (d) Sketch the graph on the axes below. Label the stationary points. (3 marks)



- (a) Use the quotient rule to differentiate $y = \frac{\sin x}{\sin 2x}$. (Do not simplify your answer.) (2 marks)

- (b) Sketch the graph on the axes below. Label the stationary points. (3 marks)

- Question 5 (2 marks)

Question 2 (7 marks)

The discrete random variable X has a mean of 0.3, a variance of 0.61 and the following probability distribution.

X	-1	0	1
$P(X = x)$	a	b	0.5

- (a) (i) Find a and b . (2 marks)

- (ii) Find $P(X = 1 | X \geq 0)$. (1 mark)

- (b) The random variable X is transformed to the random variable Y according to the equation

$$Y = 2X - 0.1$$

- (i) Determine the expected value and the variance of the random variable Y . (2 marks)

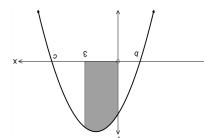
- (ii) Evaluate $P(Y < 1.9)$. (1 mark)

- (c) Explain the relationship between the standard deviation of X and the standard deviation of Y . (1 mark)

See next page
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Additional working space

Question number(s):



The graph of the function $y = x^2 + bx + c$ is shown below. If a is the area of the shaded region and the shaded area is 15 units, show that $a = 4$ and find the values of b and c .

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