THE KING'S SCHOOL

2012
Higher School Certificate
Trial Examination

General Mathematics

General Instructions

- Reading time – 5 minutes
- Working time – 2½ hours
- Write using black or blue pen.
  Black pen is preferred.
- Board-approved calculators may be used.
- A Formulae Sheet is provided at the back of this paper which may be detached and used throughout the paper.
- Show all necessary working in Questions 26-30.

Total marks – 100

Section I

25 marks

- Attempt Questions 1-25
- Answer on the Multiple Choice Answer Sheet provided.
- Allow about 30 minutes for this Section.

Section II

75 marks

- Attempt Questions 26-30
- Answer in the writing booklets provided.
- Start a new booklet for each question.
- Allow about 2 hours for this Section.

Disclaimer
This is a Trial HSC Examination only. Whilst it reflects and mirrors both the format and topics of the HSC Examination designed by the NSW Board of Studies for the respective sections, there is no guarantee that the content of this exam exactly replicates the actual HSC Examination.

1 Adam's normal rate of pay is $18.40 per hour, with time and a half for weekend work. Adam worked for 6 hours last Saturday. His earnings for that day are:

(A) $27.60
(B) $110.40
(C) $165.60
(D) $220.80

2 Simplify $18a - 9b - 12a - 7b$

(A) $30a - 6b$
(B) $30a + 16b$
(C) $6a - 2b$
(D) $6a - 16b$

3 An eight-sided die has the numbers 1 to 8 on its faces. What is the probability that on a single roll it lands on an even number less than 6?

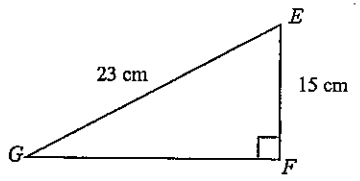
(A) $\frac{1}{8}$
(B) $\frac{1}{6}$
(C) $\frac{1}{4}$
(D) $\frac{3}{8}$

4 Six students measure their hand span. They find that the data has a mean of 14 cm and a median of 12 cm. On checking their results, they find that a mistake was made. One of the measurements was recorded as 20 cm, but the correct value should have been 14 cm.

What effect will making this correction have on the mean and median?

(A) The mean and median will both remain unchanged.
(B) The mean will remain unchanged and the median may decrease.
(C) The mean will decrease and the median may increase.
(D) The mean will decrease and the median may decrease.

5 The size of $\angle EGF$ is nearest to:



(A) 33°

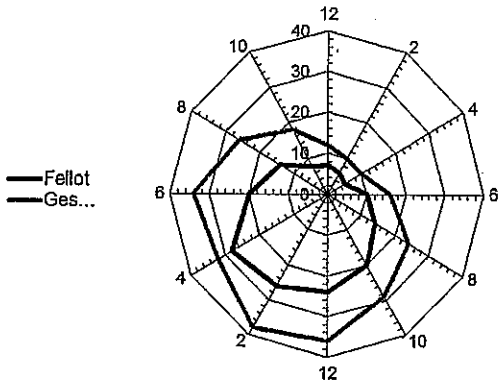
(B) 41°

(C) 49°

(D) 57°

6 The radar chart shows a comparison between the temperatures at two towns on the same day. Which statement is true about the temperatures?

Temperature Comparison Between Two Towns



(A) Ges has a greater mean and greater range.

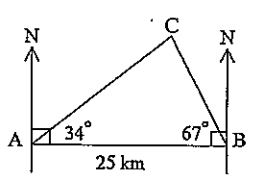
(B) Fellot has a greater mean and greater range.

(C) Ges and Fellot have the same mean and range.

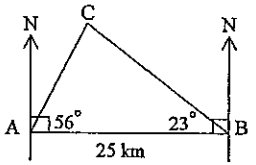
(D) Ges has a greater mean but Fellot has a greater range.

7 Anderson (A) is 25 km due west of Bright (B). Casey (C) is on a bearing of 034° from Anderson and Casey is on a bearing of 337° from Bright. Which diagram represents this information?

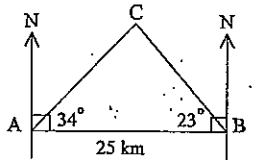
(A)



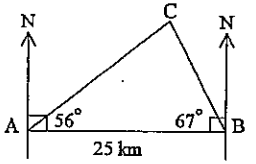
(B)



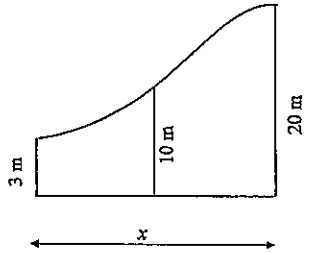
(C)



(D)



8 An irregular-shaped lawn has three perpendicular lengths 3 m, 10 m and 20 m. The distance from the centre of the base to the curved edge is 10 m. The area of the lawn is 189 m^2.



Not to scale

Using Simpson's Rule, calculate the length (x) of the base.

(A) 9 m

(B) 15 m

(C) 18 m

(D) 30 m

9 The mass of a certain bacteria is 5.6×10^{-12} grams. What is the mass of 200 million of these bacteria?

(A) 1.12×10^{-6} grams

(B) 1.12×10^{-3} grams

(C) 3.57×10^{16} grams

(D) 3.57×10^{19} grams

10 Which of the following expresses the statement: "5 less than $7p$"?

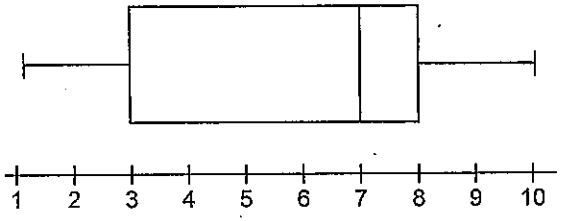
(A) $2p$

(B) $2p - 5$

(C) $5 - 7p$

(D) $7p - 5$

11 The box and whisker plot shows the scores in a diving competition. Which information cannot be read from the plot?



(A) the mean

(B) the median

(C) the range

(D) the interquartile range

12 Use the formula $l = 980\left(\frac{T}{2\pi}\right)^2$ to find the value of l to the nearest whole number when $T = 2.5$

(A) 62

(B) 155

(C) 975

(D) 15 113

13 A set of drums is priced at \$748.00 including GST. A school buys the set of drums and has the GST refunded. How much did the school pay in total?

(A) \$68.00

(B) \$673.20

(C) \$680.00

(D) \$700.00

14 Kirrily is buying a new car which has a cash price of \$35 000. She pays a deposit of \$10 000 and will pay \$550 per month for the next six years.

How much would she have saved by paying cash for the car?

(A) \$4 600

(B) \$5 400

(C) \$10 000

(D) \$14 600

15 Hugh invests \$12 000 in an account paying 4.8% pa interest, compounded monthly. What is the value of the investment after 1½ years?

(A) \$12 576

(B) \$12 864

(C) \$12 894

(D) \$27 905

16 A weighbridge is used to measure the mass of cars. The scale on the weighbridge is marked in 10 kg divisions. The mass of Yusuf's car is measured to be 1 250 kg.

What is the percentage error in this measurement?

(A) 0.2%

(B) 0.4%

(C) 0.8%

(D) 5.0%

17 The stem and leaf plot shows the results of a survey of the ages of players at the local tennis centre on a Saturday morning.

Which statement is **NOT** correct?

0	7 9
1	2 4 5 8 8 9
2	0 2 4 5 6 6 6 8
3	0 2 6 8
4	1 3 5

(A) The median of the ages is 24.

(B) The mode of the ages is 26.

(C) The range of the ages is 38.

(D) The maximum age is 45.

18 Which of the equations below would form a straight line when its graph is drawn?

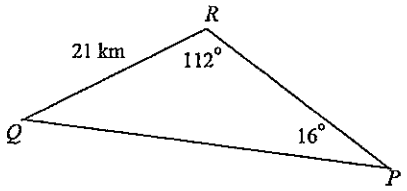
(A) $y = 12 - 4x^2$

(B) $y = 12 + 4^x$

(C) $y = 12 - 4x$

(D) $y = 12 \div \frac{4}{x}$

19 Which calculation would be correct to find the distance PQ?



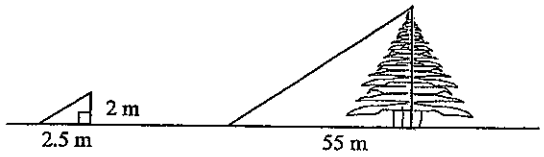
(A) $PQ^2 = \dfrac{16^2 + 21^2}{2 \times 16 \times 21 \cos 112^\circ}$

(B) $PQ^2 = 16^2 + 21^2 - 2 \times 16 \times 21 \cos 112^\circ$

(C) $PQ = \dfrac{21 \sin 112^\circ}{\sin 16^\circ}$

(D) $PQ = \dfrac{21 \sin 16^\circ}{\sin 112^\circ}$

20 To estimate the height of a tree, Tran stands a 2 metre long pole vertically. He measures the length of its shadow to be 2.5 m and the length of the shadow of the tree to be 55 m. The height of the tree is closest to:



(A) 22 m

(B) 44 m

(C) 50 m

(D) 69 m

21 Karen and Barry are discussing having a family. They agree they would like to have three children. Karen says that she would like to have two girls and a boy in any order. What is the probability that she will get her wish if they do have three children?

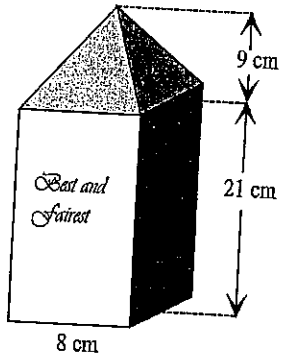
(A) $\frac{3}{8}$

(B) $\frac{1}{2}$

(C) $\frac{2}{3}$

(D) $\frac{5}{8}$

22 A trophy for a football competition is shown below. It is made of solid glass and has a square base. What volume of glass was used to make the trophy?



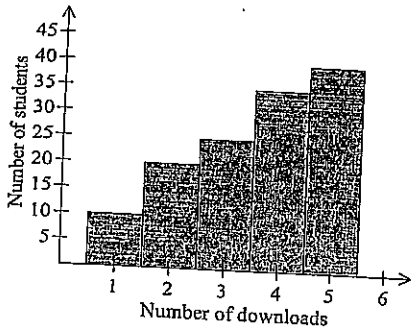
(A) 640 cm^3

(B) 1 024 cm^3

(C) 1 536 cm^3

(D) 1 920 cm^3

23 Students were surveyed about the number of downloads they did last week. The results are shown in this *cumulative* frequency histogram.



How many students completed four downloads last week?

(A) 5

(B) 10

(C) 20

(D) 35

24 The double-deck bus has 90 passengers. There are 25% more passengers on the upper deck than on the lower deck of the bus.



How many passengers are there on the upper deck?

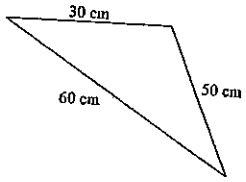
(A) 18

(B) 40

(C) 50

(D) 72

25 The following triangle has sides 30 cm, 50 cm and 60 cm.



Angle C is the largest angle. Which of the following expressions is correct for angle C?

(A) $\cos C = \dfrac{30^2 + 60^2 - 50^2}{2 \times 30 \times 60}$

(B) $\cos C = \dfrac{50^2 + 60^2 - 30^2}{2 \times 50 \times 60}$

(C) $\cos C = \dfrac{50^2 + 30^2 - 60^2}{2 \times 50 \times 60}$

(D) $\cos C = \dfrac{50^2 + 30^2 - 60^2}{2 \times 50 \times 30}$

End of Section I

Section II
Total marks (75)
Attempt Questions 26-30
Allow about 2 hours for this section

Answer in the writing booklets provided. Start a new writing booklet for each question.

START A NEW BOOKLET
Question 26 (15 marks) **Marks**

(a) Marcus has a box that contains 20 construction blocks. Of these, 5 are red, 8 are white and the remainder are blue.

(i) If Marcus chooses a single block from the full box, what is the probability that it is white? **1**

(ii) He chooses two blocks from the full box to build a tower. He places the first block on the bottom and then chooses another.

What is the probability that both blocks are blue? **2**

(b) Michelle is doing a survey on green energy. She wants to do a telephone survey on a sample of 200 people, so she goes to a post office where she can access telephone books for all of Australia.

(i) List one reason why choosing 10 telephone books at random and ringing a random sample of 20 people from each book would not guarantee a representative sample of all people in Australia? **1**

(ii) Describe one process that Michelle could use that would help to ensure that her random sample is representative of all people in Australia? **1**

(iii) One of the questions on her survey asks if people would be prepared to pay more to ensure they were using renewable energy. The results are shown below:

Yes	*No*	*Undecided*
110	50	40

What percentage of the respondents said *Yes* or were *Undecided*? **2**

Question 26 continues on the next page

(c) Angus works for the AC/DC electrical company. His annual salary is $114 400.

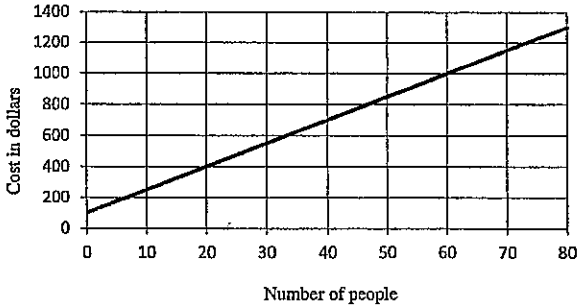
(i) What is his weekly pay? **1**

(ii) What hourly rate is this equivalent to if he works a normal 40 hour week? **1**

(iii) Bon works for the same company and is paid $50.00 per hour for a 35-hour week plus time and a half for overtime.

How many hours per week would Bon need to work to earn the same weekly amount as Angus? **3**

(d) Abbey is holding her 18th birthday party at a local restaurant. The graph below models the cost of Abbey's party at this restaurant.



(i) What is the initial cost to hire the restaurant? **1**

(ii) The gradient of the line is 15. What does this gradient represent? **1**

(iii) If the restaurant increases the cost per person, what effect will this have on the line? **1**

End of Question 26

START A NEW BOOKLET
Question 27 (15 marks) **Marks**

(a) The table below shows the value of a $1 000 investment under a range of compound interest rates for time periods from 1 to 9 years.

Term	*Compound Interest Rate (p.a.)*						
(Years)	*5.0%*	*5.5%*	*6.0%*	*6.5%*	*7.0%*	*7.5%*	*8.0%*
1	$1,050.00	$1,055.00	$1,060.00	$1,065.00	$1,070.00	$1,075.00	$1,080.00
2	$1,102.50	$1,113.03	$1,123.60	$1,134.23	$1,144.90	$1,155.63	$1,166.40
3	$1,157.63	$1,174.24	$1,191.02	$1,207.95	$1,225.04	$1,242.30	$1,259.71
4	$1,215.51	$1,238.82	$1,262.48	$1,286.47	$1,310.80	$1,335.47	$1,360.49
5	$1,276.28	$1,306.96	$1,338.23	$1,370.09	$1,402.55	$1,435.63	$1,469.33
6	$1,340.10	$1,378.84	$1,418.52	$1,459.14	$1,500.73	$1,543.30	$1,586.87
7	$1,407.10	$1,454.68	$1,503.63	$1,553.99	$1,605.78	$1,659.05	$1,713.82
8	$1,477.46	$1,534.69	$1,593.85	$1,655.00	$1,718.19	$1,783.48	$1,850.93
9	$1,551.33	$1,619.09	$1,689.48	$1,762.57	$1,838.46	$1,917.24	$1,999.00

(i) What is the value of $5 000 invested at 7% pa compound interest for 5 years? 1

(ii) For how long would $5 000 need to be invested at 6.5% pa to grow to $6 850.45? 1

(iii) What compound interest rate would see $40 000 grow to $58 187.20 in 7 years? 1

(b) A trucking company has 15 trucks, six of which are Mercuries and nine of which are Hacks. The Mercuries have a record of breaking down on 4% of their jobs and the Hacks have a record of breaking down on 6% of their jobs. Each day, drivers are randomly allocated to a truck for their job for that day.

(i) Mike arrived first for work one morning and all of the trucks were available. What is the probability that he was allocated a Mercury and it had a break down? 2

(ii) Kerrie arrived for work on another day to find two of the Mercuries and three of the Hacks already gone. What is the probability that she had no break downs on her job that day? 2

(c) Simplify fully $\frac{w^8}{3w^2} \times w^6$ 1

Question 27 continues on the next page

Question 27 (continued) **Marks**

(d) The formula below is used by Scott, who is a computer technician, to work out the cost he should charge his customers for a callout:

$$C = 60TD + \frac{3P}{2}$$

C = The charge for the callout.
T = The time taken for the job (in hours).
D = The difficulty level of the job (1, 1.25 or 1.5).
P = The cost in dollars of any parts used.

(i) Rewrite this formula with T as the subject. 2

(ii) What would he charge for a job which took three hours, had a difficulty level of 1.5 and used parts valued at $65.00? 1

(iii) Scott completed a job for which he charged $607.50 but forgot to record the time it took. If the job had a difficulty level of 1.25 and used parts valued at $80.00, calculate the time that it took for the job. 2

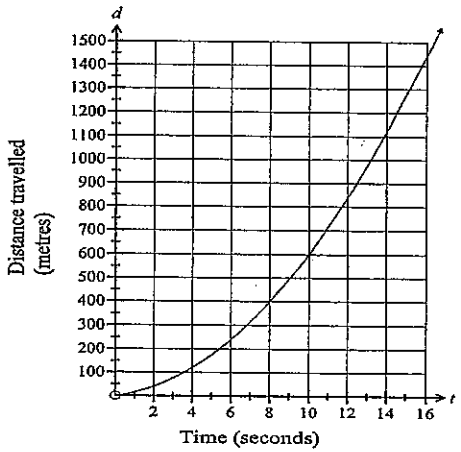
(e) Solve the equation $3(a - 1) = 2a + 27$, showing all necessary working. 2

End of Question 27

START A NEW BOOKLET

Question 28 (15 marks) — **Marks**

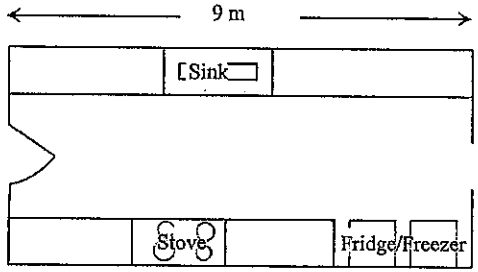
(a) The graph shows the horizontal distance (d metres) travelled by an aeroplane after a time (t seconds) as it accelerates along a runway.



(i) How many seconds does it take for the aeroplane to travel 600 m? **1**

(ii) The equation that describes the graph is $d = 10t + 5t^2$. How far had the aeroplane travelled when it stopped accelerating after 20 seconds? **1**

(b) The scale drawing of a kitchen renovation is shown below.



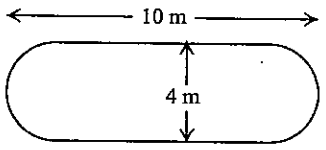
(i) What is the scale used on the drawing? Do not include any units of measurements in your answer. **1**

(ii) What is the area of the entire kitchen (in square metres)? **2**

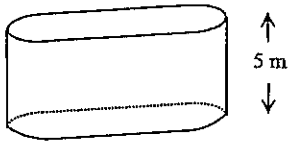
Question 28 continues on the next page

Question 28 (continued) — **Marks**

(c) A tank to hold drinking water has a uniform cross section as shown below.



Cross Section



Tank

(i) Show that the area of the cross section is 36.6 m^2 (to the nearest tenth of a m^2). **2**

(ii) Find the capacity of the tank in litres, in scientific notation correct to two significant figures. One cubic metre holds 1 000 litres. **2**

(d) A Health Survey calculated the Body Mass Index (BMI) for 200 adult men and women.

The results are displayed in the two-way table shown below.

	Men	*Women*	*Totals*
Normal	33	40	73
Overweight	42	36	77
Obese	25	24	49
Totals	100	100	200

(i) How many men were classified as overweight? **1**

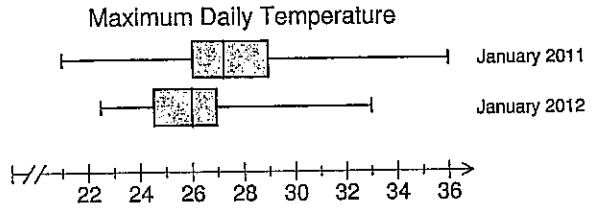
(ii) The women's results are to be displayed in a sector graph. Calculate the size of the angle that would represent women with a normal BMI. **1**

(iii) If a person is selected at random from the obese group, find the probability that the person selected is male. **1**

Question 28 continues on the next page

Question 28 (continued) **Marks**

(e) The box-and-whisker plots below show the maximum daily temperature for Sydney in January 2011 and January 2012.



(i) How many days in January 2011 had a temperature of 26° or less? 1

(ii) With reference to the box-and-whisker plots, comment on the statement "January 2011 was hotter than January 2012". 2

End of Question 28

START A NEW BOOKLET
Question 29 (15 marks)

(a) Jimmy, Cate, Bernard and Wendy were all musical stars in their own right, but now they are joining together for a new tour. They will each play a set individually befo finishing with a set together.

(i) To avoid any ego issues each night they agree to change the order that they w play their four individual sets. (eg, one night could be JCBW and then CBJW

How many nights would they need to play on the tour so that they could com every possible arrangement of sets?

(ii) The tour was a success and they got to like working together. They all like singing duets so they decide to put out an album which features the four of th singing duets. **A duet is formed using two singers only.**

If they want to include a duet from each possible pair drawn from the foursor how many duets will be on the album?

(b) From a region of a tropical forest, 60 rare birds were captured, tagged and released

Sometime later, 80 birds were recaptured from the same region and it was found th 15 of these birds had previously been tagged.

Use the 'capture-recapture' method to give an estimate of the number of rare birds this region of the forest.

(c) The field book entry for an offset survey is shown below. All measurements are i metres.

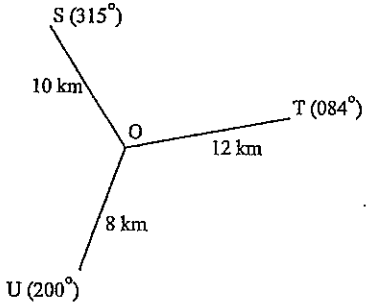
	E		
	140		
	100	32	D
C	55 90		
	30	32	B
	0		
	A		

(i) Draw a neat sketch of the surveyed land. Mark the interval and offset measurements on your diagram.

(ii) What is the area of the surveyed land?

Question 29 continues on the next page

(d) A radial survey of a field produced the diagram below.



(i) Show by calculation that $\angle$ SOT is 129° 1

(ii) Find the area of the triangular section TOS to the nearest square kilometre. 1

(iii) Find the length of the boundary ST correct to one decimal place. 2

(e) Kayleigh earns a salary of $78 520 and also earns $250 in interest. She has allowable tax deductions of $3 400. She has had $690 per fortnight taken out in PAYG instalments.

(i) Calculate Kayleigh's taxable income. 1

(ii) Use the table below to calculate the tax due for the year. 1

Taxable income	*Tax on this income*
$1 – $6,000	Nil
$6,001 – $35,000	15c for each $1 over $6,000
$35,001 – $80,000	$4,350 plus 30c for each $1 over $35,000
$80,001 – $180,000	$17,850 plus 38c for each $1 over $80,000
$180,001 and over	$55,850 plus 45c for each $1 over $180,000

(iii) Find the tax refund (or bill) that Kayleigh will have when she submits her tax return. 1

End of Question 29

START A NEW BOOKLET
Question 30 (15 marks) Marks

(a) On Monday 10 April there were 1 000 bacteria in a culture. The number of bacteria increased at a rate of 15% per day. The number of bacteria, B, present in the culture n days after Monday can be represented by the formula $B = 1\,000(1.15)^n$.

(i) How many bacteria were present on Thursday 13 April? 1

(ii) On what date did the number of bacteria triple? Show all working. 2

(b) The resistance, R ohms, of a steel wire varies inversely with the square of its diameter, d millimetres.

The resistance is 8.75 ohms when the diameter is 0.4 millimetres.

(i) Find the value of the constant of variation, k. 2

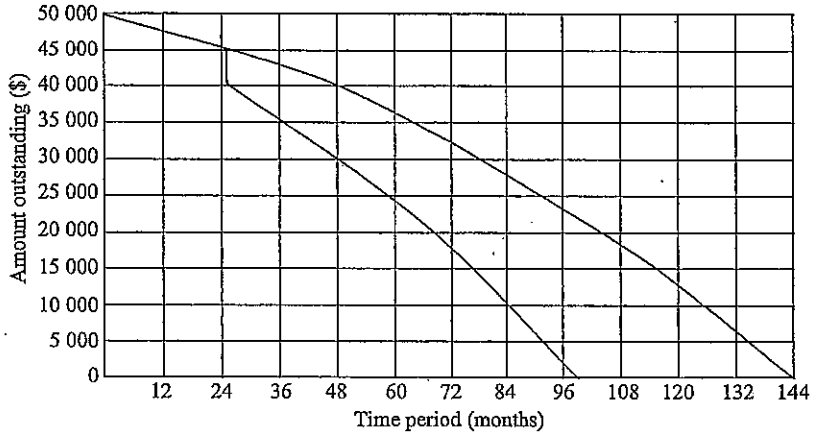
(ii) Find the resistance when the diameter of the wire is 0.75 millimetres. Give your answer correct to two decimal places. 2

Question 30 continues on the next page

(c) Meesha and Jarrod each borrowed $50 000 at the same time. They each make regular monthly loan repayments of $600.

Meesha pays off her loan in 99 months and Jarrod pays off his loan in 144 months.

The graph shows the comparison of the amounts outstanding for Meesha's loan and Jarrod's loan over these time periods.



(i) Using the graph, why did Meesha take a shorter time to pay off her loan than Jarrod? 1

(ii) How much less than Jarrod did Meesha owe on her loan after four years? 1

(iii) How much extra interest did Jarrod pay than Meesha over the period of their loans? 3

(d) Sissy is saving for an overseas holiday in three years time. She has opened a savings account which pays interest of 0.2% per fortnight, compounded fortnightly. Sissy wants to save $12 000. Her parents decide to help her out when she first opens the bank account and they deposit $3 200 in her account.

Calculate how much she will have to invest fortnightly to achieve her goal of $12 000. 3

End of Examination Paper

Student Number

THE KING'S SCHOOL

2012
Higher School Certificate
Trial Examination

General Mathematics

Question	Algebra	Data	Financial	Measurement	Probability	Total
1-25	2, 10, 12, 18 / 4	4, 6, 11, 17, 23 / 5	1, 13, 14, 15 / 4	5, 7, 8, 9, 16, 19, 20, 22, 24, 25 /10	3, 21 /2	/25
26		(b) / 4	(c) / 5 (d) / 3		(a) / 3	/15
27	(c) / 1 (d) / 5 (e) / 2		(a) / 3		(b) / 4	/15
28	(a) /2	(d) / 3 (e) / 3		(b) / 3 (c) / 4		/15
29			(e) / 3	(b) / 2 (c) / 4 (d) / 4	(a) / 2	/15
30	(a) / 3 (b) / 4		(c) / 5 (d) / 3			/15
Total	/21	/15	/26	/27	/11	/100

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1-25	2, 10, 12, 18 / 4	4, 6, 11, 17, 23 / 5	1, 13, 14, 15 / 4	5, 7, 8, 9, 16, 19, 20, 22, 24, 25 /10	3, 21 /2	/25
26		(b) / 4	(c) / 5 (d) / 3		(a) / 3	/15
27	(c) / 1 (d) / 5 (e) / 2		(a) / 3		(b) / 4	/15
28	(a) /2	(d) / 3 (e) / 3		(b) / 3 (c) / 4		/15
29			(e) / 3	(b) / 2 (c) / 4 (d) / 4	(a) / 2	/15
30	(a) / 3 (b) / 4		(c) / 5 (d) / 3			/15
Total	/21	/15	/26	/27	/11	/100

MC Soln CenTrial 2012.

1. C $18.40 \times 9 = 165.6$
2. D $6a - 16b$
3. C) $2/8 = 1/4$
4. D
5. B $\sin\theta = 15/23$, $\theta = 41°$
6. A
7. D
8. C $189 = \frac{1}{3}\{23 + 4 \times 10^3\}$, $567 = n \times 63$, $9 = n$, $x = 9 \times 2 = 18$
9. B
10. D
11. A
12. B
13. C. $110\% = 748$, $10\% = 748 \div 11$, $10\% = 68$, $748 - 68 = 680$
14. D Borrows = 25000, Repays = $550 \times 12 \times 6 = 39600$, Save = 14600
15. C. $12000(1.004)^{18}$, 12894.01
16. B $5/250 \times 100 = 0.4\%$
17. A.
18. C.
19. C. $\frac{PQ}{\sin 112} = \frac{21}{\sin 16}$, $PQ = \frac{21 \sin 112}{\sin 16}$
20. B. $\frac{x}{2} = \frac{55}{2.5}$, $x = \frac{55}{2.5} \times 2$, $x = 44$
21. A.
22. C. $8 \times 8 \times 21 + \frac{1}{3} \times 8 \times 8 \times 9$, $= 1536$
23. B. $35 - 25 = 10$
24. C. bot top: $2c + 2c + 0.25c = 90$, $2.25c = 90$, $c = 40$, Top $= 40 + 40 \times 0.25$, Top $= 50$
25. D.

A	B	C	D
5	6	8	6

026

a) i) $P(W) = 8/20 = 2/5$ OR ANY CNE. Award 1 for correct answer or CNE.

ii) $P(B,B) = 7/20 \times 6/19 = 21/190$ Award 2 for correct answer or CNE.

Award 1 for
- evidence of reduction in numerator but incorrect ans.

or
- evidence of reduction in denominator but incorrect ans.

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b) i) Award 1 for any acceptable answer.

ii) Award 1 for any acceptable answer.

iii) $\frac{110+40}{200} \times 100 = 75\%$ Award 2 for correct answer must be %

Award 1 for correct fraction with no % calculation.

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c) i) $\frac{114\,400}{52} = \$2200$ Award 1 for correct answer.

ii) $\$2200 \div 40 = \$55$ Award 1 for correct answer or correct CFDA (must show working for CFDA & be correctly rounded to 2 dp's).

iii) Bon = 50 × 35
= 1750
Diff = 2200 − 1750
= $450
No of hours = 450 ÷ 75
= 6 hours extra
Total hours 35 + 6
= 41 hours

Award 3 for correct answer.
Award 2 for 1 error in calc
Award 1 for 2 errors in calc
Award 0 for 3 errors or more

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d) (i) $100. Award 1 for correct answer.

(ii) The cost per person. Award 1 for correct answer.

(iii) It will become steeper. Award 1 for correct answer.

Q27

a) 1402.55 × 5 = $7012.75 — Award 1 for correct ans.

(i) 6850.45 ÷ 5 = 1370.09 — Award 1 for correct ans.

∴ 5 years

(ii) 58187.20 ÷ 40 = 1454.68 — Award 1 for correct ans

∴ 5.5%

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b) $P(M) = \frac{6}{15} \times \frac{4}{100}$

$= \frac{2}{125}$

$= 0.016$

Award 2 for correct answer or CNE

Award 1 for evidence of either $\frac{6}{15} \times$ incorrect or incorrect $\times \frac{6}{100}$

Award 0 for 2 or more errors

(i) $P(\text{no breakdown}) = \frac{4}{10} \times \frac{96}{100} + \frac{6}{10} \times \frac{94}{100}$

$= \frac{237}{250}$

$= 0.949$

Award 2 for correct ans or CNE

Award 1 for calc of either mercury or Hack not breaking down.

Award 0 for 2 or more errors.

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c) $\frac{w^{14}}{3w^2} = \frac{w^{12}}{3}$ or $\frac{1}{3}w^{12}$

Award 1 for correct answer must be fully simplified

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d) (i) $\left(C - \frac{3D}{2}\right) \div 60D = T$

(ii) $C = 60 \times 3 \times 1.5 + \frac{3 \times 65}{2}$

$C = \$367.50$

Award 2 for correct answer or CNE.

Award 1 for 1 correct step

Award 1 for correct answer must be 2 dp's.

(iii) $607.50 = 60 \times 1.25 \times T + \frac{3 \times 80}{2}$

$607.50 = 75T + 120$

$6.5h. = T$

Award 2 for correct answ

Award 1 for correct sub with 1 error.

Award 0 for 2 or more errors.

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e) $3a - 3 = 2a + 27$

$a = 30$

Award 2 for correct answer.

Award 1 for 1 error. ie in expansion or solving.

Award 0 for 2 or more errors.

Q28.

(a) (i) 1100

(ii) 10 seconds — Award 1 for correct answer.

(iii) $d = 10 \times 20 + 5 \times 20^2$

$d = 2200$ metres — Award 1 for correct answer.

(b) 9cm = 9m — Award 1 for correct answer.

(c) (i) 1 cm = 100 cm

1 : 100

(ii) 9×4.2 ← Allow 4.2 → 4.5.

$= 37.8 m^2$ ← Allow 37.8 → 40.5 m^2

Award 2 for correct answer.

Award 1 for measurement but incorrect calc

OR incorrect measurement but evidence of correct calc.

(c) (i) 6 × 4 rectangle, 4 × 4 semicircle

$6 \times 4 + \pi \times 2^2$

$A = 6 \times 4 + \pi \times 2^2$

$A = 36.57$

$A = 36.6 m^2$

Award 2 for correct answer showing required calculations

Award 1 for 1 error ie incorrect radius or length of rectangle.

Award 0 for 2 or more errors

(ii) $V = 36.6 \times 5$

$V = 183 m^3$

$V = 183 \times 1000$

$= 183\,000$ Litres

$= 1.8 \times 10^5$ Litres

Award 2 for correct answer.

Award 1 for 1 error

Award 0 for 2 or more errors

(d) (i) 42 — Award 1 for correct answer.

(ii) $\frac{40}{100} \times 360 = 144°$ — Award 1 for correct answer.

(iii) $P(Ob, Male) = \frac{25}{49}$ — Award 1 for correct or CNE.

(e) (i) $31 \times 0.25 = 7.75$. — Award 1 for correct answer

(ii) Two relevant comments are required for the award of 2 marks.

29

a) i) 41.
$4 \times 3 \times 2 \times 1 = 24$

Award 1 for correct answer.

ii) 6

JB	CB	BW
JW	CW	
JC		

Award 1 for correct answer.

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b) $\frac{15}{80} \times 100 = 18.75\%$

$18.75\% = 60$

$1\% = 16/5$

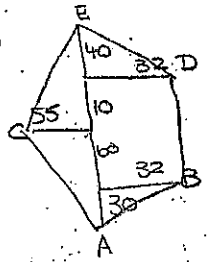
$100\% = 320$

Award 2 for correct answer

Award 1 for progress toward correct answer. NB many diff methods acceptable

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c) i)



Award 2 for correct answer
Award 1 for 1 error
Award 0 for 2 or more errors.

ii) $\triangle ACE = \frac{1}{2} \times 55 \times 140$
$= 3850 m^2$

$70 \times 32 = 2240$

$\frac{1}{2} \times 70 \times 32$
$= 1120$

$Tot = 7210 m^2$

Award 2 for correct answer. Note CFDA with workin
Award 1 for 1 error in calc
Award 0 for 2 or more errors.

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d) i) $84 + (360 - 315) = 129°$ Award 1 for correct answer.

ii) $A_{TOB} = \frac{1}{2} \times 10 \times 12 \times \sin 129$
$= 46.63$
$= 47 km^2$

Award 1 for correct answer correctly rounded.

iii) $ST^2 = 10^2 + 12^2 - 2 \times 10 \times 12 \cos 129$
$ST = 19.9 km$
$= 41.2 km$

Award 2 for correct answer ignore rounding.

Award 1 for a calculation with one error only. Eg no √ or one sub error but correct answer from incorrect sub.
Award 0 for 2 or more errors

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e) i) Tax income = 78 520 + 250 − 3400
= 75 370

Award 1 for correct ans.

ii) Tax = 4350 + (75370 − 35000) × 0.30
= 16461

Award 1 for correct answer. Note CFDA.

iii) Tax payable = 690 × 26
= 17940 prepaid

Refund = 17940 − 16461
= $1479

Award 1 for correct answer

Q30

9) i) $B = 1000(1.15)^{3}$ — Award 1 for correct answer.

$B = 1520.875$

$B = 1521$

ii) $3000 = 1000(1.15)^{n}$ — Award 2 for correct date with calc. Award 1 for correct n but not date. OR correct answer with no calc. OR attempt to solve for n.

$3 = 1.15^{n}$

$n = 10$

$1.15^{10} = 4$ (too big)

$n = 8$

$1.15^{8} = 3.059$

on the 8th day.

Date = 18th April

b i) $R = k/d^2$ — Award 2 for correct answer. Award 1 for correct expression of R with error in solving. OR correct solving of incorrect expression (provided expression is not substantially easier). Award 0 for 2 or more errors.

When $R = 8.75$, $d = 0.4$.

$8.75 = k/0.4^2$

$8.75 \times 0.4^2 = k$

$1.4 = k$

(ii) $d = 0.75$ — Award 2 for correct answer with correct rounding. Award 1 for incorrectly rounded correct answer OR one error in calculation.

$R = \frac{1.4}{0.75^2}$

$R = 2.4889$

$R = 2.49$

c (i) She made a lump sum payment ≈ 25 months — Award 1 for correct answer.

(ii) $10,000 less — Award 1 for correct answer.

(iii) Meesha = 99×600 — Award 3 for correct answer. Award 2 for 1 error in calc or one ommission. Award 1 for 2 or more errors. Award 0 for 3 or more errors.

$= 59400$

Int. $= 9400$

Jarrad $= 144 \times 600$

$= 86400$

Int. $= 36400$

Diff Int $= 36400 - 9400$

d) [illegible] — Award 1 for correct answer. Award 0 for incorrect answer or no answer.

$d = 28$, $r = 14$.

SA [illegible]

SA [illegible]

e) 3 years = 78 payments.

Parents $= 3200(1.002)^{78}$ — Award 3 for correct answer. Award 2 for correct calc without inclusion of parents contribution. OR one consistent error eg n or r incorrect. OR incorrect annuity formula with all other calculations correct. Award 1 for 2 or more errors or some progress towards correct answer. Award 0 for little or no progress.

$= 3739.66$

Needs $= 12000 - 3739.66$

$= \$8260.34$

$8260.34 = M\left\{\frac{1.002^{78} - 1}{0.002}\right\}$

$8260.34 = M\{84.322\}$

$97.96 = M$