

Name



THE
KING'S
SCHOOL

2018

Year 11
Assessment Task 3 (AT3)
August 2018

Mathematics Standard

General Instructions:

- Reading time – 5 minutes
- Working time 2 hours
- Write using black pen
- NESA approved calculators may be used
- A Reference Sheet is provided
- Show all necessary working in Questions 21-24

Total marks: 100

Section I 20 marks

- Attempt Questions 1-20
- Use the Multiple Choice Answer Sheet provided
- Write, using **2B lead pencil**
- Allow about 30 minutes for this section

Section II 80 marks

- Attempt Questions 21-24
- Write answers in the spaces provided
- Write, using **black pen** only
- Allow about 90 minutes for this section

Examiners' Use Only

Question	Algebra and Modelling	Data and Statistics	Financial Mathematics	Measurement	Total
1-20	1-5 / 5	6-11 /6	12-15 /4	16-20 /5	/20
21	/20				/20
22		/20			/20
23			/20		/20
24				/20	/20
Total	/25	/26	/24	/25	/100

Section I
20 marks

Attempt Questions 1-20

Use the Multiple Choice Answer Sheet provided

Write, using **2B lead pencil**

Allow about 30 minutes for this section

1 Solve the equation: $\frac{2x-4}{3} = 2$

(A) $x = 1$

(B) $x = 3$

(C) $x = 20$

(D) $x = 5$

2 Which equation represents the relationship between x and y in this table?

x	0	3	6	9	12
y	5	6	7	8	9

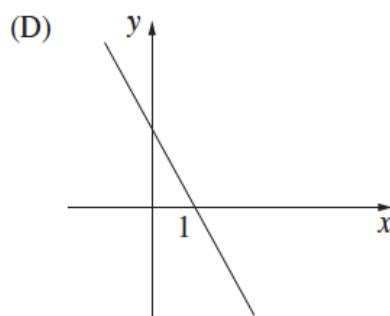
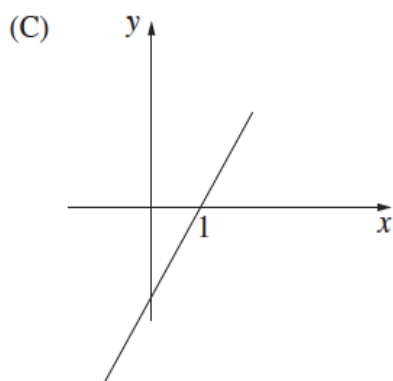
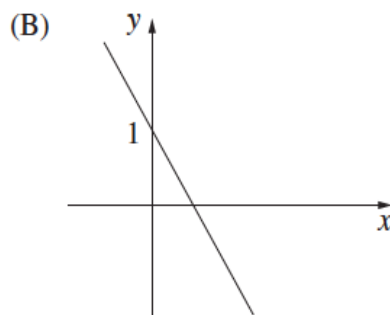
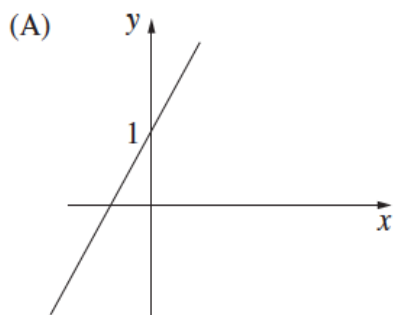
(A) $y = \frac{1}{3}x + 2$

(B) $y = \frac{x}{3} + 5$

(C) $y = \frac{x}{2} - 2$

(D) $y = \frac{1}{2}x + 3$

3 Which one of the following could be the graph of $y = x - 1$?



4 A patient is prescribed 500 mg of a painkiller. The medication available contains 100 mg in 10 mL.

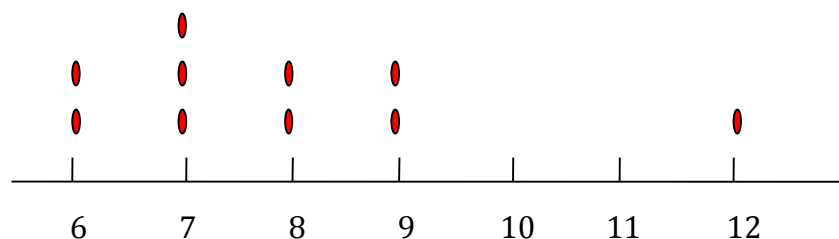
How much medication should be given to the patient?

- (A) 20 mL
- (B) 30 mL
- (C) 40 mL
- (D) 50 mL

5 When the expression $5x(3 + x^2) - 5(6x - x^7)$ is expanded and simplified, the result is:

- (A) $5x^7 + 5x^3 - 15x$
- (B) $5x^7 + 5x^3 + 45x$
- (C) $-5x^7 + 5x^3 - 15x$
- (D) $-5x^7 + 5x^2 + 45x$

- 6 The dot plot shown below gives the shoe sizes of a group of Year 9 students.



If the student with size 12 was excluded from the survey, this would cause

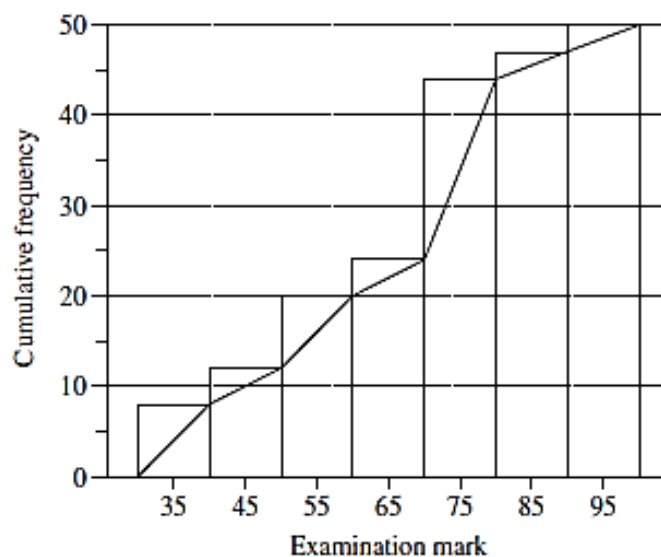
- (A) the mode to change
 - (B) the mean to increase
 - (C) the median to stay the same
 - (D) the mean to decrease
- 7 The weight (in kg) of six children is 3.75, 4.35, 6.00, 4.15, 3.75 and 2.75.
- What is the standard deviation (population) of these weights?
- (A) 0.98
 - (B) 1.07
 - (C) 1.25
 - (D) 4.13
- 8 Alexander achieved a mean of 65 and a standard deviation of 9 in his first assessment task for five subjects. In the second assessment he aims to improve his score in every subject by 5 marks.
- What would be the effect of this improvement on the mean and standard deviation?
- (A) The mean will increase and the standard deviation will remain the same.
 - (B) The mean will remain the same and the standard deviation will increase.
 - (C) The mean and the standard deviation will both remain the same.
 - (D) The mean and the standard deviation will both increase.

- 9 The scores below are the marks that Bianca scored on 10 skills tests.

13, 14, 21, 21, 26, 32, 32, 37, 38, 43

The interquartile range of the scores is:

- (A) 7
- (B) 8
- (C) 15
- (D) 16
- 10 A set of examination results is displayed in a cumulative frequency histogram and polygon (ogive).



One student's examination mark was in the 4th decile.

Which of the following could have been the student's examination mark?

- (A) 37
- (B) 57
- (C) 67
- (D) 77

11 A stratified sample of the school population is taken.

Year Level	7	8	9	10	11	12
Number of Students	160	170	175	158	120	117

The number of Year 11 students that would be included in a sample of 60 is:

- (A) 5
 - (B) 6
 - (C) 8
 - (D) 9
- 12 Homer is a permanent full-time employee and is paid \$456 per week. He receives a holiday loading of 17½% on his four weeks’ holiday pay.

His total holiday pay is:

- (A) \$79.80
 - (B) \$319.20
 - (C) \$775.20
 - (D) \$2 143.20
- 13 A wage sheet of a small business shows one employee’s details.

<i>Employee</i>	<i>Rate per hour</i>	<i>Normal hours</i>	<i>Overtime × 2</i>	<i>Wage</i>
Juanita Mikayla	\$45.00	✖	8	\$2 520

Juanita worked at an advertising agency. The number of hours she worked at a normal rate is missing.

Using the information on the wage sheet, find the value of ✖.

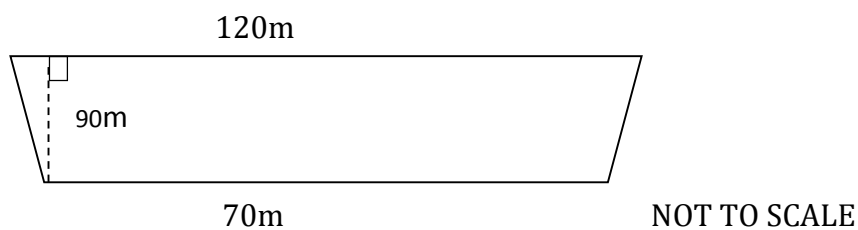
- (A) 33
- (B) 40
- (C) 43
- (D) 48

- 14** An electrician charges a total of \$285 to repair a broken light. The Goods and Services Tax (GST) of 10% was included in this total.

Which of the following statements is correct?

- (A) 90% of \$285 was the price of the repair before the GST was added.
 - (B) The total repair price included \$28.50 GST.
 - (C) The price before adding the GST is $\$285 \div 1.10$.
 - (D) The GST cannot be determined without knowing the original repair cost \$1.10.
- 15** A salesman earns \$240 per week plus \$15 commission for each item he sells. How many items does he sell to earn a total of \$2 460 in two weeks?
- (A) 66
 - (B) 132
 - (C) 148
 - (D) 164
- 16** Two towns T(47°S, 80°E) and R(47°S, 80°W) both:
- (A) lie on the same great circle
 - (B) lie on neither the same great circle nor the same small circle
 - (C) lie on the same small circle
 - (D) there is insufficient information

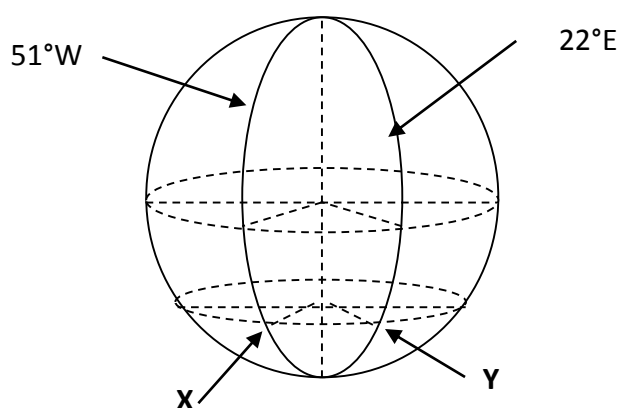
- 17 A park is trapezoidal in shape.



The area of the park is:

- (A) less than one hectare
- (B) exactly one hectare
- (C) more than one hectare
- (D) not able to be measured in hectares

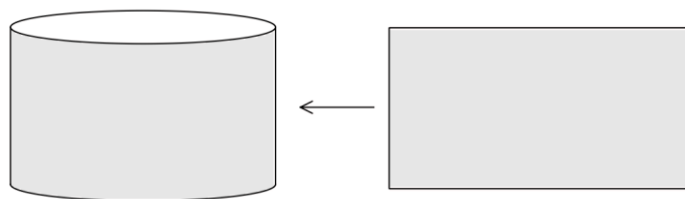
- 18



If 1° represents 4 minutes of time, find the difference in time between X and Y.

- (A) 1 hour and 56 minutes
- (B) 4 hours and 52 minutes
- (C) 7 hours and 15 minutes
- (D) 18 hours and 15 minutes

- 19** A 15 cm label fits exactly around a cylinder with no overlap, as illustrated below.



What is the radius of the cylinder, correct to one decimal place?

- (A) 2.4 cm
 - (B) 0.4 cm
 - (C) 4.8 cm
 - (D) 7.5 cm
- 20** Alex measures the length of his cricket bat and finds it to be 50 cm to the nearest cm.

What is the percentage error in his measurement?

- (A) $\pm 0.01\%$
- (B) $\pm 0.1\%$
- (C) $\pm 1\%$
- (D) $\pm 10\%$

End of Section I

Section II
60 marks

Attempt Questions 21-24
Write answers in the spaces provided
Write, using **black pen** only
Allow about 90 minutes for this section

Algebra and Modelling

Question 21 (20 marks) **Marks**

(a) Simplify $2y = \frac{y + 3}{2}$ **2**

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(b) Ibrahim drives a car and has a reaction time of 1.8 seconds.

He was travelling at 70 km/h when he saw an object on the road. He applied his brakes and stopped 18.6 m later.

Stopping Distance = {reaction time distance} + {braking distance}

(i) Find Ibrahim’s reaction distance, to the nearest metre. **1**

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(ii) Find Ibrahim’s stopping distance. **1**

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Question 21 continues on the next page

(iii) Using the braking distance formula $d = kv^2$ and the above given values, where d is the distance after the brakes were applied and v is the distance per hour, find:

(α) the value of k , correct to two significant figures. 2

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(β) the speed of a vehicle with a braking distance of 120 m. Answer to the nearest km/h. 1

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Question 21 continues on the next page

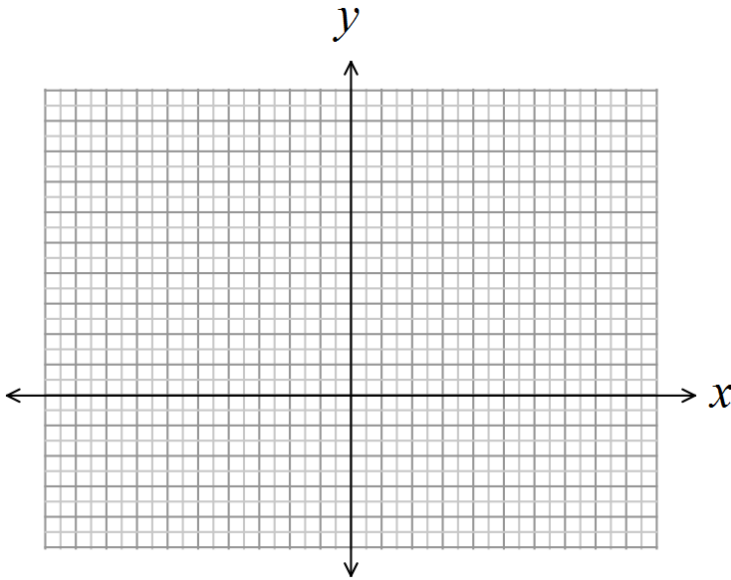
Question 21 (continued)

Marks

(c) On the graph paper provided, graph the following lines:

(i) $y = 3x + 5$ **1**

(ii) $y = x + 7$ **1**



(iii) Write down the coordinates of their point of intersection. **1**

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(d) Items with a different mass (m kg) are attached to a spring. The length of the spring (L cm) is measured for each item. The results are shown below.

m	2	5	8	11	14	17
L	41.2	55.0	68.8	82.6	96.4	110.2

(i) A linear model in the form $L = km + 32$ describes this situation. Show that the value of k is 4.6. **1**

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(ii) What is the length of the spring when no item is attached? **1**

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Question 21 continues on the next page

(iii) Calculate the mass of an item that will make the spring 78 cm long. 1

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(e) Liam needs to give his child some medicine. He uses Clark’s Rule:

$$D = \frac{kA}{70}$$

where D is the dosage in mL, k is the weight of the child in kilograms and A is the adult dosage in mL.

Liam’s child is six years old and weighs 21 kg. The adult dosage is 10 mL every morning and 10 mL every night. How many days will a 300 mL bottle of medicine last for Liam’s child? 2

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Question 21 continues on the next page

Question 21 (continued)

Marks

(f) The average rate of alcohol metabolism (breakdown) reduces a person's BAC by 0.017 units per hour. Colin has just measured his BAC and it is 0.193.

(i) How many hours and minutes must elapse before he is below the 0.05 limit and can legally drive again?

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(ii) How long must pass for his BAC to reach zero?

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(g) Solve the equation $\frac{15 - y}{3} = 10 - \frac{50 - 2y}{4}$

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End of Question 21

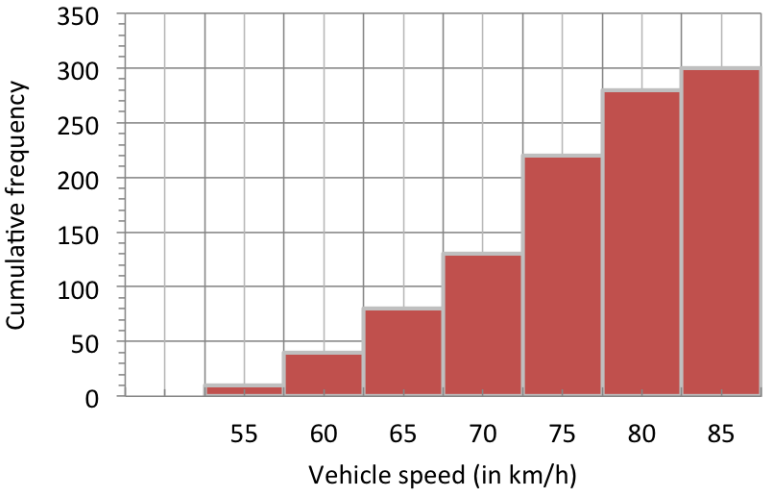
Question 22 (20 marks)

Marks

(a) Police recorded the speed of cars passing a checkpoint. The results were recorded in groups with class centres of 55, 60, 65, ... up to 85. The results are shown on the cumulative frequency graph below.

(i) Draw the cumulative frequency polygon (ogive) on the graph below.

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(ii) How many cars passed the checkpoint during this period?

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(iii) What is the median speed?

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(iv) What is the interquartile range of the speeds?

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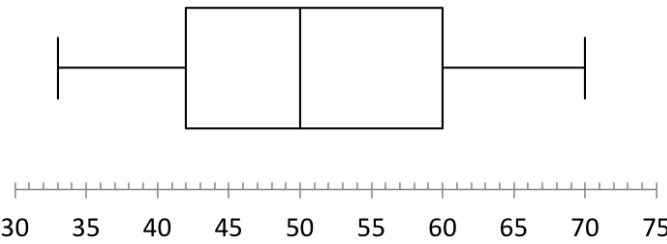
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Question 22 continues on the next page

Question 22 (continued)

Marks

- (b) Soonju picked 300 apples from an orchard. Each apple was weighed in grams. The box-and-whisker plot below shows the weights of these apples.



- (i) What is the range? **1**
-
- (ii) Determine the median weight. **1**
-
- (iii) What is the weight of the smallest apple? **1**
-
- (iv) How many apples from those picked weighed less than 42 g? **1**
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Question 22 continues on the next page

Question 22 (continued)

Marks

(c) The sales figures for a new produce in Shop A and Shop B over 8 days are shown below.

Shop A	20	95	145	75	36	45	30	252
Shop B	56	82	73	74	63	64	90	115

(i) Find the interquartile range for each set of data. **2**

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(ii) Find the mean and median for each set of data. **2**

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(iii) Which is the better measure, from part (ii), for the centre of this data? Explain your answer. **2**

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(d) The mean of five scores is 6. What is the missing score if four of the scores are 3, 5, 5 and 7? **1**

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Question 22 continues on the next page

Question 22 (continued)

Marks

- (e) The stem and leaf plot below displays the distribution of pulse rate, measured in beats per minute, of 20 students before and after exercise.

Before Exercise								Pulse Rate	After Exercise							
				9	8	7	7	6								
9	7	6	5	3	3	2	0	7								
			5	3	2	2	1	8	0	1	1	4	6	7	7	9
							0	9	2	3	6	8	9			
							3	10	0	3	9					
							1	11	3	4						
								12	0							
								13								
								14	4							

- (i) Find the median pulse of the students after exercise. 1

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- (ii) After exercise, one of the students had a heart rate of 144 beats per minute.

Is this student's measurement an outlier for this set of data? Justify your answer with calculations.

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- (iii) Compare and contrast the distribution of pulse rates, using the measures of spread and location. 2

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End of Question 22

Financial Maths

(a) Chloe earns a gross wage of \$78 000 per annum. She receives 17.5% of four weeks' normal pay as holiday loading.

(i) What is Chloe's holiday loading? **1**

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(ii) Chloe has booked an overseas flight for her annual holiday and will be paid four weeks' normal pay and her holiday loading.

What is Chloe's gross holiday pay? **2**

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(iii) What percentage of Chloe's holiday pay is the holiday loading? Answer correct to the nearest whole number. **1**

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Question 23 continues on the next page

Question 23 (continued)

Marks

- (b) Zara earns a taxable income of \$89 700 from her job at an accounting firm. She also has a second job that pays \$600 gross income per month.

Zara paid \$23 620 tax from both jobs.

- (i) What is Zara's total annual taxable income from both jobs? Assume she has no allowable tax deductions.

1

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- (ii) Use the table below to calculate the amount of tax payable on her income from both jobs.

2

Taxable Income	Tax Payable
0 - \$18 200	Nil
\$18 201 - \$37 000	Nil + 19 cents for each \$1 over \$18 200
\$37 001 - \$80 000	\$3572 + 32.5 cents for each \$1 over \$37 000
\$80 001 - \$180 000	\$17 547 + 37 cents for each \$1 over \$80 000
\$180 001 and over	\$54 547 + 45 cents for each \$1 over \$180 000

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- (iii) Does Zara receive a tax refund? Justify your answer.

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Question 23 continues on the next page

(c) Arthur works for two book stores, *Low Cost Books* and *Best Books* as detailed below:

- *Low Cost Books*
from 3:00 pm to 9:30 pm on Thursday evenings
- *Best Books*
from 9:00 am to 11:00 am on a Saturday; and
from 11:00 am to 5:00 pm on Sundays

The rates paid by each employer are listed below.

Low Cost Books		Best Books	
Time	Rate per hour (\$)	Casual Rates	
for the first 4 hours per day	8.00	Weekdays	\$7.50 per hour
for the next 4 hours per day	8.60	Saturday	time and a half
over 8 hours per day	10.60	Sunday	double time
Uniform Allowance for all employees			
\$2.50 per hour			

(i) What are Arthur’s weekly earnings from *Low Cost Books*? 2

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(ii) What are his total earnings for one week? 2

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Question 23 continues on the next page

Question 23 (continued)

Marks

(d) Hilary receives a gross yearly salary of \$82 500. She pays 32% of her gross weekly salary in PAYE tax. Taking 52 weeks in a year, calculate:

(i) Hilary's gross weekly salary. **1**

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(ii) Hilary's net weekly salary. **1**

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Each week Hilary contributes to a superannuation fund. She contributes 5% of her gross yearly salary and her employer matches this.

Calculate:

(iii) the amount Hilary contributes to her fund in one year **1**

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(iv) the total amount of contributions made to Hilary's superannuation fund over twelve years (Assume she is on the same salary for twelve years.) **1**

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(e) Madeline works a 40-hour week at a fixed hourly rate. She receives a holiday loading that is 17½% of four weeks' wages. Her holiday loading last year was \$602.

What is her hourly rate of pay? **2**

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Question 23 continues on the next page

Question 23 (continued)

Marks

- (f) Ellie is paid a retainer of \$350 per week and a commission of 5% on all sales. Last week she earned \$875.

What was the value of her sales last week?

2

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End of Question 23

Question 24 (20 marks)

Marks

- (a) The city of Casablanca in Morocco is located 34°N , 8°W .

Johannesburg, in South Africa, is found 60° to the south and 36° to the west of Casablanca.

What are the coordinates of Johannesburg?

1

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- (b) Nazim and Frank travel on a container ship from Perth (32°S , 116°E) + 8 UTC to Buenos Aires (34°S , 58°W) -4 UTC.

They leave Perth at 0700 Saturday, 1 December 2018, and travel 12 500 km at an average speed of 20 km/h.

- (i) What is the local time, day and date in Buenos Aires when they leave Perth?

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- (ii) How long is the journey?

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- (iii) What is the local time and date in Buenos Aires when they arrive?

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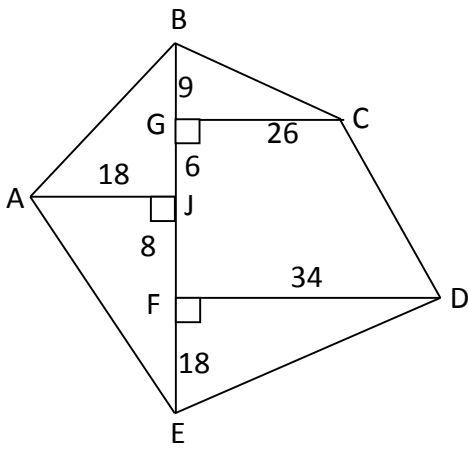
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Question 24 continues on the next page

Question 24 (continued)

Marks

- (c) A surveyor measured the following offsets on a block of land. All measurements are in metres.



Note:

- BG = 9 m
- GJ = 6 m
- JF = 8 m
- FE = 18 m
- GC = 26 m
- AJ = 18 m
- FD = 34 m

- (i) Farmer John is putting a fence between C and D. What is the length of CD? 2

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- (ii) Calculate the area of figure ABCDE, correct to the nearest m^2 . 2

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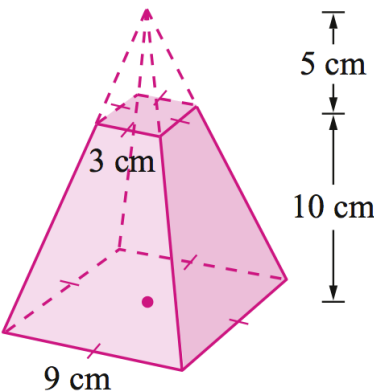
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Question 24 continues on the next page

Question 24 (continued)

Marks

- (d) A clay model is made in the shaded shape below, with dimensions as shown.



What is the volume of this model?

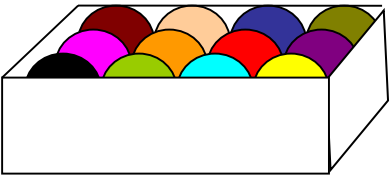
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- (e) An open box is made to exactly contain 12 balls, each of radius 4 cm. They are placed in three rows of four, as shown in the diagram below.



What is the volume of air in the box containing the balls, giving your answer correct to three decimal places?

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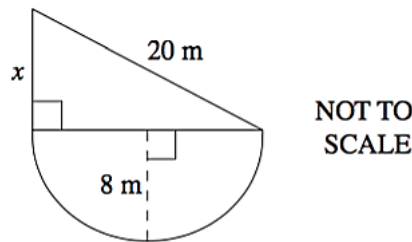
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Question 24 continues on the next page

Question 24 (continued)

Marks

- (f) James has just finished building an outdoor recreation patio. It consists of a right-angled triangle and a curved section in the shape of a semi-circle.



- (i) What is the value of x ? Answer correct to the nearest whole number. **1**

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- (ii) Find the total area of the recreation patio. Answer correct to the nearest square metre. **2**

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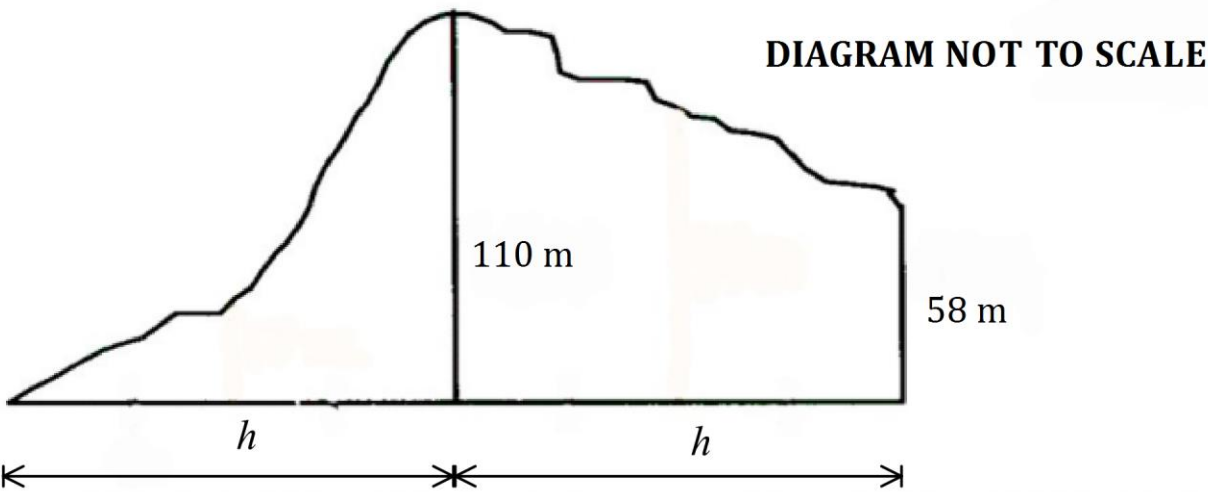
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Question 24 continues on the next page

Question 24 (continued)

Marks

- (g) Melike's block of land is an irregular shape as drawn below. The block of land has an area of 11 070 m².



Trapezoidal Rule $A \approx \frac{h}{2} (d_f + d_l)$

- (i) Using two applications of the trapezoidal rule, write an equation for the area of Melike's land. 2

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- (ii) By solving your equation, find the value of h . 1

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End of Assessment Task

Name _____



**Year 11 Mathematics Standard
Assessment Task 3 (AT3)
August 2018
MULTIPLE CHOICE ANSWER SHEET**

Select the alternative A, B, C or D that best answers the question and indicate your choice by filling in the appropriate response oval, completely.

					<i>Examiner's Use Only</i>
1	☐ A	☐ B	☐ C	☐ D	
2	☐ A	☐ B	☐ C	☐ D	
3	☐ A	☐ B	☐ C	☐ D	
4	☐ A	☐ B	☐ C	☐ D	
5	☐ A	☐ B	☐ C	☐ D	Algebra and Modelling / 5
6	☐ A	☐ B	☐ C	☐ D	
7	☐ A	☐ B	☐ C	☐ D	
8	☐ A	☐ B	☐ C	☐ D	
9	☐ A	☐ B	☐ C	☐ D	
10	☐ A	☐ B	☐ C	☐ D	
11	☐ A	☐ B	☐ C	☐ D	Data and Statistics / 6
12	☐ A	☐ B	☐ C	☐ D	
13	☐ A	☐ B	☐ C	☐ D	
14	☐ A	☐ B	☐ C	☐ D	
15	☐ A	☐ B	☐ C	☐ D	Financial Mathematics / 4
16	☐ A	☐ B	☐ C	☐ D	
17	☐ A	☐ B	☐ C	☐ D	
18	☐ A	☐ B	☐ C	☐ D	
19	☐ A	☐ B	☐ C	☐ D	
20	☐ A	☐ B	☐ C	☐ D	Measurement / 5
					Total /20

Yr 11 PAT 3 STANDARD 2018

1. D 2. B 3. C 4. D 5. A 6. D 7. A 8. A
9. D 10. B 11. C 12. D 13. B 14. C 15. B 16. C
17. A 18. B 19. A 20. C

Question 21

(a) $4y = y + 3$ ✓
 $3y = 3$ ✓
 $y = 1$ ✓

bi) $\frac{70 \times 1000 \times 1.8}{60 \times 60} = 35m$ ✓

ii) $35 + 18.6 = 53.6m$ ✓

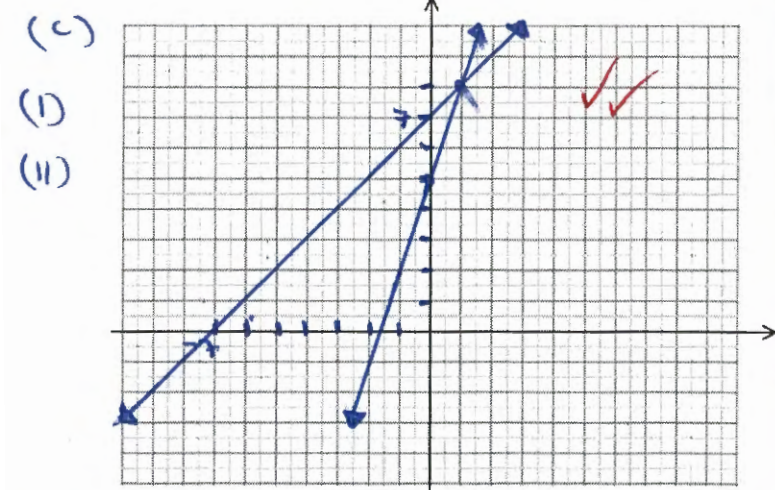
iii) (a) $18.6 = k(70)^2$
 $k = 0.00379...$ ✓
 $= 0.0038$ (2 sig figs) ✓

(b) $120 = 0.0038v^2$ (e.c.)

$v = \sqrt{31578.94}$

$= 177.7...$

$= 178 \text{ km/hr}$ ✓



(iii) $(1, 8)$ ✓

d i) $41.2 = kx + 32$
 $9.2 = 2k$
 $k = 4.6$ ✓

ii) $L = km + 32$ ($m=0$)
 $L = 32$
 32 cm ✓

iii) $L = 4.6m + 32$
 $78 = 4.6m + 32$
 $46 = 4.6m$
 $m = 10$ ✓

(c) $D = \frac{21 \times 20}{70}$

$= 6 \text{ mL}$ ✓

$300 \div 6 = 50 \text{ days}$ ✓

fi) $\frac{0.193 - 0.05}{0.017}$

$= 8.41 \text{ hrs}$

$(8 \text{ hrs } 25 \text{ mins})$ ✓

ii) $\frac{0.193}{0.017} = 11.35 \text{ hr}$
 $11 \text{ hrs } 21 \text{ mins}$ ✓

g) $\frac{4(15-y)}{2} = 40 - (50-2y)$

$4(15-y) = 120 - 3(50-2y)$

$60 - 4y = 120 - 150 + 6y$

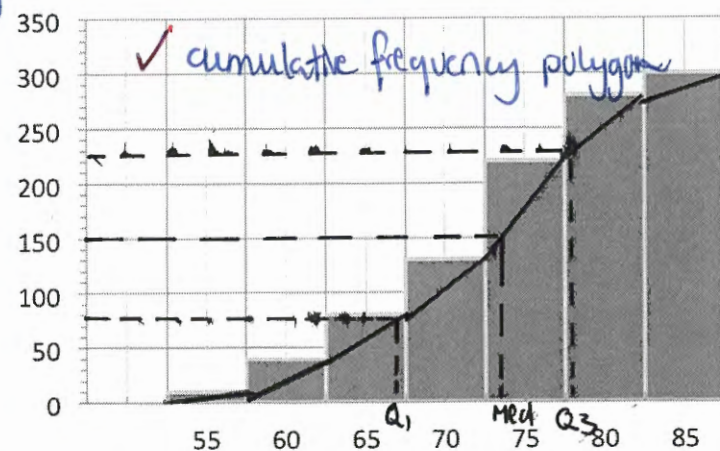
$90 - 4y = 6y$

$90 = 10y$

$y = 9$ ✓

Question 22

(a)



(i) 300 cars ✓

(ii) 74 km (accept ± 1) ✓

(iv) $78 - 67 = 11 \text{ km/hr}$ (accept 9 to 13) ✓

(b)(i) 37g ✓

(ii) 50g ✓

(iii) 33g ✓

(iv) 75 ✓

Question 22

(c) i) A: $120 - 33 = 87$ ✓
 B: $86 - 63.5 = 22.5$ ✓

ii) A $\bar{x} = 87.25$ Med = 60 ✓
 B $\bar{x} = 77.125$ Med = 73.5 ✓

iii) Median ✓
 Removes outliers ✓

d) $6 = \frac{3+5+5+7+2}{5}$

$30 = x + 20$
 $x = 10$ ✓

e) $\frac{93+96}{2} = 94.5$ ✓

ii) $Q_u = 106 + 1.5 \times 19.5$ ✓ $Q_u = 106$
 $= 132.25$ $Q_L = 86.5$
 $\therefore 144$ is an outlier ✓ $IQR = 19.5$

iii) Range before = 44
 Range after = 64
 Median Before = 76.5
 Median After = 94.5

✓✓
 $\therefore$ Higher median
 and wider
 range
 before
 exercise

Question 23

ai) $\frac{78000 \times 4}{52} \times 0.175 = \1050 ✓

ii) $(1500 \times 4) + 1050 = \7050 (e.c) ✓

iii) $\frac{1050}{7050} \times 100 = 15\%$ ✓ (e.c)

bi) $89700 + 12 \times 600 = \96900 ✓

ii) $17547 + (96900 - 80000) \times 0.37$ ✓
 $= \$23800$ ✓

iii) $23800 - 23620 = 180$
 owes \$180 ✓

(c) i) $(4 \times 8) + (2.5 \times 8.6) + (2.5 \times 6.5)$ ✓
 $= \$69.75$ ✓

ii) $69.75 + (1.5 \times 7.5 \times 2) + (2 \times 7.6 \times 6)$ ✓
 $= \$182.25$ ✓ (e.c)

di) $\frac{82500}{52} = \$1586.54$ ✓

ii) $\frac{82500 \times 0.68}{52} = \1078.85 ✓

(or alternatively) $26400 \div 52 = 507.69$
 $1586.54 - 507.69$
 $= \$1078.85$

iii) $\frac{5}{100} \times 82500 = \4125 ✓

iv) $4125 \times 12 \times 2 = \99000 ✓

e) $602 = 0.175 \times 4n$ ✓
 $3440 = 4n$
 $n = 860$

$860 \div 4 = \$21.50$ hr ✓

f) $875 = 350 + 0.05x$ ✓
 $525 = 0.05x$
 $x = 10500$ sales ✓

Question 24

(a) $(26^{\circ}\text{S}, 44^{\circ}\text{W})$

(b) i) 7am Saturday - 12 hours = 7pm Friday ✓

ii) $S = d/t$

$$T = \frac{12500}{20}$$

$$= 625 \text{ hrs} \checkmark$$

iii) 625 hrs = 26 days and 1 hour

= 7pm Friday + 26 days and 1 hour

= 8pm 26th December ✓(e.c)

bi) $CD = \sqrt{14^2 + 8^2}$

$$= 16.12 \text{ m} \checkmark$$

ii) $\Delta ABC = \frac{1}{2} \times 18 \times 41$
 $= 369$

$$\Delta BGC = \frac{1}{2} \times 9 \times 26$$
$$= 117$$

$$\Delta FED = \frac{1}{2} \times 18 \times 34$$
$$= 307$$

$\triangle GCED$

$$= \frac{1}{2} (26 + 34)$$

$$= 420$$

$$\therefore \text{Area} = 1212 \text{ m}^2$$

(d) $V = (\frac{1}{3} \times 9 \times 9 \times 15) - (\frac{1}{3} \times 9 \times 5)$

$$= 390 \text{ cm}^3 \checkmark$$

e) $V_{\text{AIR REMAINING}} = (32 \times 24 \times 8) - (12 \times \frac{4}{3} \times \pi \times 4)$
 $= 2927.009 \text{ cm}^3 \checkmark$

(f) i) $x^2 = 20^2 - 16^2$

$$= 144$$

$$= 12 \text{ m}^2 \checkmark$$

ii) $A = \frac{1}{2} \times \pi \times r^2 + \frac{1}{2} bh$

$$= \frac{1}{2} \times \pi \times 8^2 + \frac{1}{2} \times 16 \times 12$$

$$= 196.53 \dots \checkmark$$

$$= 197 \text{ m} \checkmark$$

(g) i) $11070 = \frac{1}{2} (0 + 110) + \frac{1}{2} (110 + 58) \checkmark$

$$11070 = 55h + 84h \quad \checkmark \text{ either}$$

$$11070 = 139h$$

ii) $11070 = 139h$

$$\therefore h = 79.6 \text{ m} \checkmark \quad \text{(e.c)}$$