TRINITY GRAMMAR SCHOOL
MATHEMATICS DEPARTMENT

YEAR 11
2010 YEARLY EXAMINATION

GENERAL MATHEMATICS

DATE: 23 AUGUST, 2010
ASSESSMENT TASK WEIGHTING: 40%

General Instructions:

1. **Reading time- 5 minutes**
2. **Working time- TWO AND A HALF HOURS**
3. **Write using black or blue pen**
4. **Board approved calculators may be used**
5. **A formulae sheet is provided at the end of the examination booklet**
6. **Write your name and teacher's name on the multiple choice sheet and the 6 answer booklets provided**
7. **Attempt ALL questions**
8. **Show all necessary working**
9. **Begin each question in Section II in a NEW BOOKLET**
10. **Hand in all sections as well as the question booklet**

TOTAL MARKS- 100

Section I 22 marks

- **Attempt Questions 1-22**
- **Allow about 30 minutes for this section**

Section II 78 marks

- **Attempt Questions 1-22**
- **Allow about 2 hours for this section**

Section I: Multiple choice	/22
Section II:	
Question 23:	/13
Question 24:	/13
Question 25:	/13
Question 26:	/13
Question 27:	/13
Question 28:	/13

Section I

22 marks
Attempt Questions 1–22
Allow about 30 minutes for this section

Use the multiple choice answer sheet for Questions 1–22.

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1 What is the value of 0.003 028 correct to three significant figures?

A 0.003
B 0.003 02
C 0.003 03
D 303

2 What is the missing value in the cumulative frequency table?

x	f	cf
23	2	2
25	□	11
27	14	25
29	8	33

A 2
B 9
C 11
D 12

3 Which job pays the most per week?

A Job A: \$55 000 per annum
B Job B: \$4550 per month
C Job C: \$1050 per week
D Job D: \$2100 per fortnight

4 The simple interest earned on \$900 invested for 2 years at 10% p.a. is

A \$45

B \$90

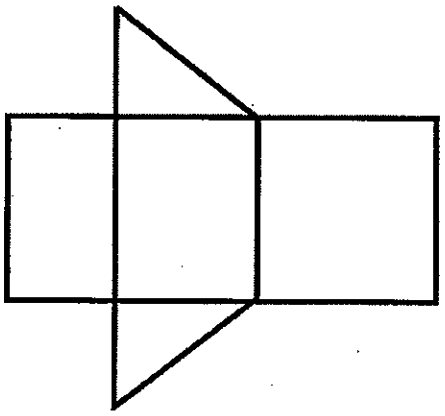
C \$150

D \$180

5 An MP3 player which costs \$100 is increased in price by 25% in December. In the January sales, the MP3 is reduced by 25%. The sale price is:

A \$93.75
B \$100
C \$119.75
D \$150

6 When this net is folded, which one of the shapes below will it make?



A A triangular pyramid
B A rectangular prism
C A triangular prism
D A rectangular pyramid.

7 Which of the following statements is true for this data set?

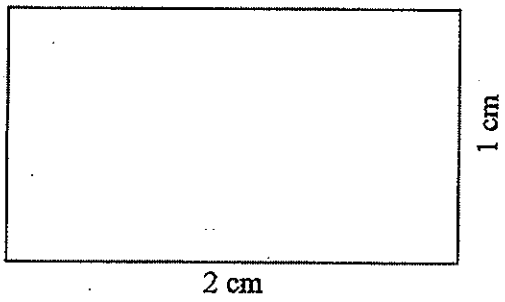
$$\{ 1, 3, 0, 2, 4, 7, 4 \}$$

A The mean is 3 and the median is 3.
B The median is 2 and the mean is 3.
C The mode is 4 and the median is 2.
D The mode is 4 and the mean is 3.5.

8 Tim's height is 183 cm. Find the percentage error of this measurement, correct to three decimal places.

A 0.270
B 0.273
C 0.005
D 0.500

9 What is the exact length of the diagonal of this rectangle?



NOT TO SCALE

A $\sqrt{5}$ cm
B 2.4 cm
C 3 cm
D 5 cm

10 Which one of the following is an example of discrete data?

A The length of the human arm
B The number of goals scored in soccer games
C The time taken by runners over 100 m
D The capacity of swimming pools

11 From a normal pack of 52 playing cards, one card is to be selected at random. Find the probability that the card selected is a diamond.

A $\frac{1}{13}$
B $\frac{2}{13}$
C $\frac{1}{4}$
D $\frac{3}{4}$

12 2 cm to 7 m is the same as:

A 100 : 1
B 1 : 35
C 1 : 350
D 35 : 1

13 Simplify the expression $8d(3-e)-12ed$.

A $24d-4de$
B $8d-20de$
C $24d-20de$
D $24d+20de$

14 A bag of apples contains five green apples and fourteen red apples. If an apple is chosen at random, the probability of it being green is:

A $\frac{5}{19}$

B $\frac{5}{14}$

C $\frac{1}{2}$

D $\frac{14}{19}$

15 If $S = 2\pi r(r + h)$, find S when $r = 4.6$ and $h = 8.9$.

A 20.1π
B 89.1π
C 124.2π
D 376.6π

16 Calculate the interquartile range for the data set shown in the stem-and-leaf plot.

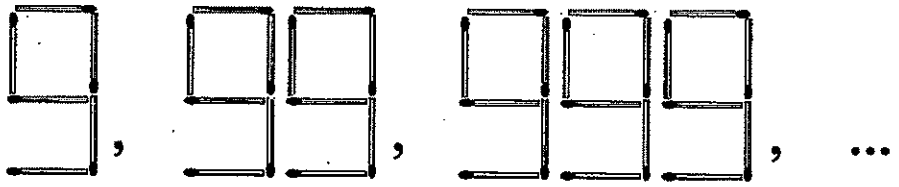
Stem	Leaf
6	2
7	3 8
8	5 5 6 7
9	4
10	2 5 8

A 24
B 78
C 85
D 102

17 A can of tuna weighs 340 g, measured to the nearest 10 g.
Within what range does the weight lie?

A 330 g to 350 g
B 335 g to 345 g
C 339.5 g to 340.5 g
D 340 g to 350 g

18 Consider this pattern of nines made with matchsticks.



How many matchsticks would be required to make 8 nines?

A 9
B 27
C 36
D 48

19 Solve $5 - 2a = 5a - 2$.

A $a = -2$
B $a = -1$
C $a = 1$
D $a = 2$

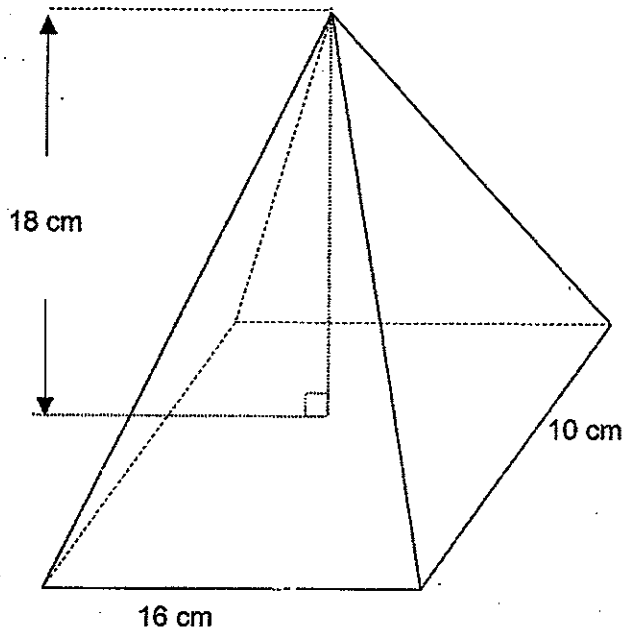
20 Convert 400 mm^2 to cm^2.

A 4 cm^2
B 40 cm^2
C 400 cm^2
D 4000 cm^2

21 Angie invests \$45 000 in a fund paying 6% pa compound interest, compounding quarterly. The amount that her investment grows to after 4 years is:

A \$56 811
B \$47 761
C \$114 316
D \$57 104

22 Find the volume of the rectangular pyramid shown below.



A $3840\ cm^2$

B $468\ cm^2$

C $960\ cm^2$

D $2880\ cm^2$

End of Section I

Section II

60 marks
Allow about 1.5 hours for this section

All necessary working should be shown in every question.

Marks

Question 23 (13 marks) Start a new writing booklet.

(a) Below are a surveyor's notebook entries for the survey of a field.
All measurements are in metres.

	B	
	96	
E 24	64	
	42	44 D
C 30	26	
	0	
	A	

(i) Sketch a diagram of the field. **1**

(ii) Find the area of the piece of land whose corners are A, B, E and C. **2**

(iii) Fertiliser is to be spread over the area of the piece of land ABEC calculated above.
Fertiliser costs \$2.50/m^2, plus \$75/hour machinery hire to spread the fertiliser.
It is estimated that it will take 4 hours to spread the fertiliser.
Find the total cost of fertilising this area. **2**

(b) In a large lake, 1800 fish were caught, tagged and released.
Some time later, a much larger sample of 50 000 fish was taken.
In the second sample, 1350 tagged fish were found.

Find an estimate, correct to the nearest hundred, for the fish population of the lake. **2**

Marks

Question 23 (continued)

(c) Two siblings, Katrina and Evan each receive a gift from their grandparents of $4 000.

(i) Katrina invests the money in a 2 year fixed term investment account paying 6% pa interest compounding six monthly. If she withdraws the money after the two years, how much interest will she have earned? (Answer to nearest dollar.)

2

Evan purchases 1000 shares in a company at a price of $4.00 per share. The shares have an annual dividend yield of 5%. Brokerage costs are a one off payment of 1% of the purchase price. After two years, the shares are sold at $4.90. Calculate the total earnings over the two years, after costs.(To nearest dollar.)

2

(ii) What rate of simple interest on a 2 year fixed term investment account would have paid the same earnings as Katrina received from her investment (part (i))?

2

End of Question 23

Marks

Question 24 (13 marks) Start a new writing booklet.

(a) The marks (out of 100) in a recent Biology test are displayed in the stem-and-leaf plot below.

Stem	Leaf							
2	1	3	4	6				
3	5	6						
4	1	1	3	5	5	6	6	8
5	3	5	7	7	7	7		
6	1	4	4	5	5	6	7	
7	0	□						

(i) One digit is missing. Given that the range of the marks is 51, determine the missing digit (in the box)

1

(ii) Determine the median mark.

1

(iii) Find the inter-quartile range (IQR).

2

(iv) Construct a box-and-whisker plot of the above data.

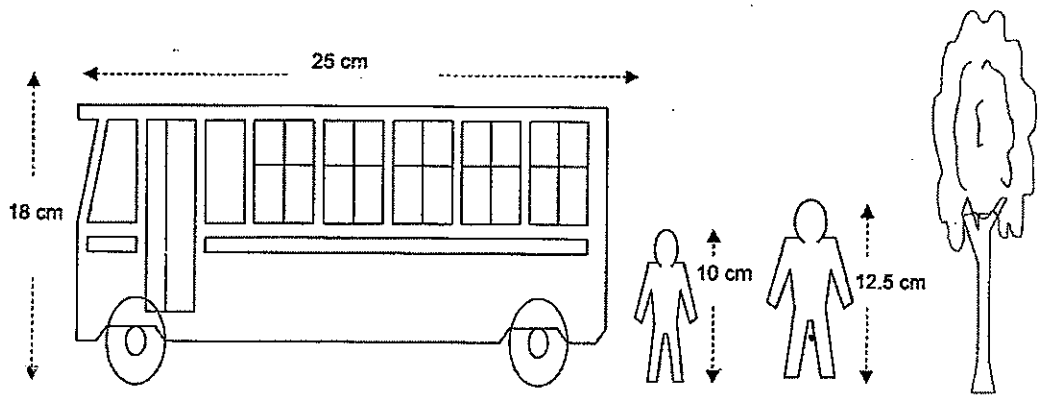
3

(v) What percentage of scores are 41 or higher?

1

(b) A hose is used to fill a rectangular tank measuring 144 cm by 50 cm by 30 cm. Find the time taken to fill the tank if water flows from the hose at a rate of 12 litres per minute. (Hint: 1 m^3 = 1000 L) **2**

(c) While on holidays, Andrea takes a photograph of her two brothers standing by the bus. Some of the dimensions on the photograph are shown.



(i) If the taller brother's height is really 150 cm, find the scale of the photograph.

1

(ii) Find the shorter brother's real height.

1

(iii) If the tree had a real height of 4.5 metres, what would be it's height in the photograph?

1

End of Question 24

Marks

Question 25 (13 marks) Start a new writing booklet.

(a) A cylindrical can has a diameter of 6.5 cm and a height of 11 cm. The curved surface area of the can is covered completely with a label, without any overlapping.

Find the

(i) circumference of the base of the can. **1**

(ii) area of the label. **1**

(iii) volume of the can. **2**

(b) Big Bruce works on a construction site. He works a 38-hour week. His rate of pay is $26.40 per hour. He also receives a dust allowance of 40 cents per hour.

(i) Calculate Bruce's gross weekly pay. **2**

(ii) Bruce is taking his annual four weeks holiday next month. He is entitled to a holiday loading of 17.5% of his normal pay. Assuming that your answer to part (i) is Bruce's normal pay, calculate his total holiday pay. **2**

(c) Heidi is travelling to the United States from Australia to attend a business conference. Heidi's costs are:

- conference registration US$800
- accommodation US$1000
- airfare US$2500

(i) Calculate the total cost in US$ of attending the business conference. **1**

(ii) Calculate the total cost in AUS$ of attending the business conference, given that the current rate of exchange is AUS$1 = US$0.918. **2**

(iii) Heidi wishes to change AUS$500 into US$. Calculate the amount Heidi receives if a fee of US$5 plus 1% per US$ is levied. **2**

Note: *US$ is referring to United States dollars and AUS$ is referring to **Australian dollars.***

End of Question 25

Marks

Question 26 (13 marks) Start a new writing booklet.

(a) A coin is tossed and a die is rolled.

(i) Find the probability of getting a head and a 5. **1**

(ii) Find the probability of getting a tail and an even number. **1**

(iii) Find the probability of a head and a number less than 3. **1**

(b) Mrs Wisely's bank pays 7.8% p.a. compounding monthly on all fixed term deposits.

(i) Show that 7.8% p.a. is equal to 0.65% monthly. **1**

(ii) Mrs Wisely invests $1950 in a fixed term deposit for 18 months. Calculate the value of the investment at the end of the 18 months. **1**

(iii) How much interest does Mrs Wisely earn on this investment? **1**

(c) Last year, Anne's gross weekly pay was $920 and she received $520 in bank interest for the year. Her allowable tax deductions amounted to $1230.

(i) What was Anne's taxable income? **1**

(ii) Using the table below, determine the amount of tax that Anne had to pay. **2**

Taxable income ($)	**Tax payable**
$0 – $10 000	Nil
$10 001 – $28 000	Nil plus 25 cents for each $1 over $10 000
$28 001 – $50 000	$4500 plus 30 cents for each $1 over $28 000
$50 001 – $100 000	$11 100 plus 40 cents for each $1 over $50 000
over $100 000	$31 100 plus 60 cents for each $1 over $100 000

(iii) Every taxpayer in Australia with a taxable income over $14 000 is also required to pay a Medicare levy. The Medicare levy for this tax year is 1.75% of the taxable income. How much was Anne's Medicare levy? **2**

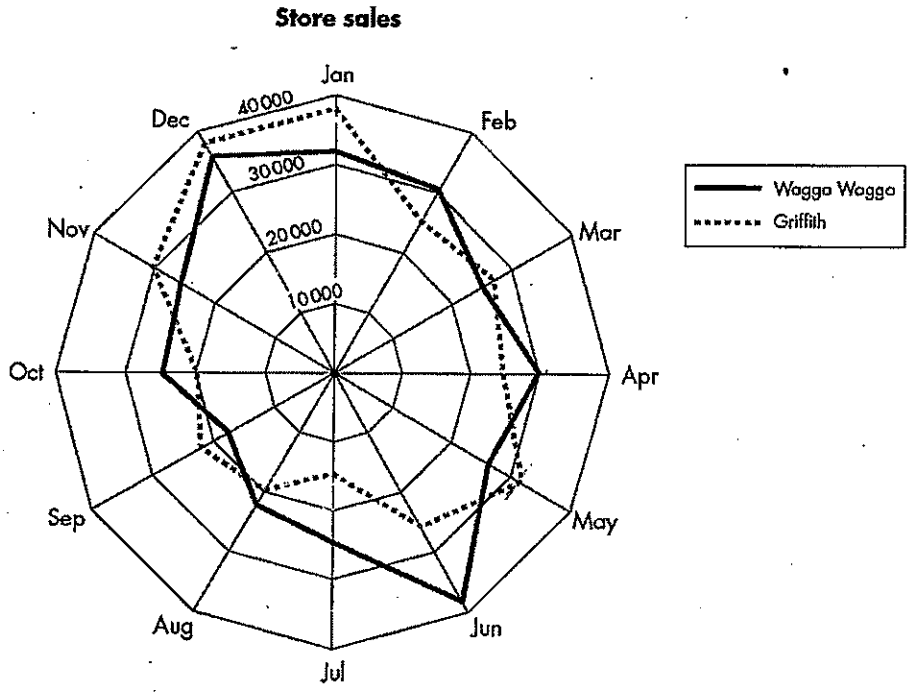
(iv) Each week, the PAYG (pay as you go) tax deducted from Anne's pay was $255.25. How much will Anne's tax refund be? **2**

End of Question 26

Marks

Question 27 (13 marks) Start a new writing booklet.

(a) The monthly sales figures for Auntie Lou's dress shops in CENTRO MALLS at Wagga Wagga and Griffith are shown on this radar chart.



(i) What sales did the Wagga Wagga store record for April? **1**

(ii) What were the sales at the Griffith store for the months of May and September? **2**

(iii) In which month(s) did each store record its highest sales? **2**

Marks

Question 27 (continued)

(b) Big Nev's all-purpose cleaner is mixed in various concentrations with water.

Big Nev's ALL-purpose cleaner

	cleaner : water
stoves	1 : 4
wall cleaning	3 : 10
carpet shampoo	1 : 12
furniture	2 : 15
floor scrubbing	1 : 20

(i) Mario mixed 15 mL of cleaner with 60 mL of water.
What was he cleaning? **1**

(ii) What could Lee clean with 10 mL of cleaner mixed with 75 mL of water? **1**

(iii) Anthony used 10 mL of cleaner when he mixed a solution to shampoo his carpet.
How much water must he use? **1**

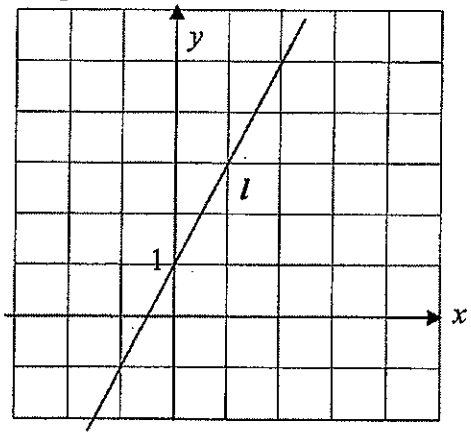
(c) Given that $A = \frac{Y}{B}$, find A when $Y = 300$ and $B = 3{\cdot}81 \times 10^{-4}$.
Express your answer in scientific notation correct to 2 significant figures. **1**

(d) Solve the equation: $2(y-1) = y + 6$. **2**

(e) If $V = \frac{h}{2(r+h)}$, find h if $r = 8$ and $V = 0.1$ **2**

Question 28 (13 marks) Start a new writing booklet.

(a) On the grid below each square = 1 unit.



(i) What is the gradient of the line l? **1**

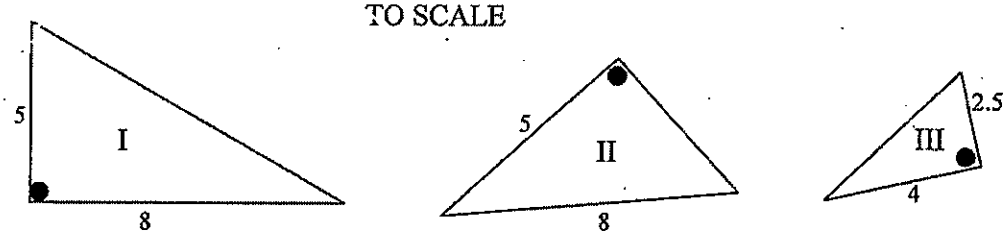
(ii) What is the y-intercept? **1**

(iii) What is the equation of the line l? **2**

(iv) When x is -6 what would the value of y be? **1**

(b) (i) Which 2 triangles (see I, II and III) are similar and why?

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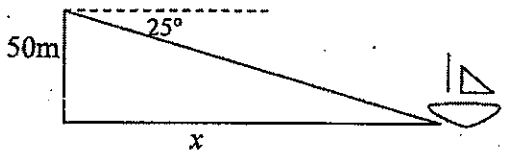
2

(c) (i) Luke looks at a map where 1cm represents 40km? What scale is this? **1**

(ii) He measures the distance he intends to drive and finds the map is 36mm. What distance will that be? **1**

(iii) When he leaves home he travels east 5km then north 12km. Draw a diagram for Luke's journey. How far from home is he? **1**

(d) Andrew stands on a cliff 50m high and looks down at an angle of 25° to a boat. How far is the boat from the base of the cliff?



NOT DRAWN
TO SCALE

3

END OF PAPER