TRINITY GRAMMAR SCHOOL
MATHEMATICS DEPARTMENT

YEAR 11
2009 YEARLY EXAMINATIONS

GENERAL MATHEMATICS

Date: Monday 31st August, 2009
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
6. Write your name and teacher's name on the multiple choice sheet and the 6 answer booklets
7. Attempt **ALL** questions
8. Show all necessary working
9. **Begin** each question in Section II in a **new booklet**
10. Mark values are shown at the side of each question
11. Hand in all sections both Question paper and Answers

TOTAL MARKS – 100

Section I 22 marks

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

Section II 78 marks

- Attempt Questions 23-28
- Allow about 2 hours for this section

Section I: Multiple choice	/22
Section II: Q23 Linear Modelling and Algebra	/13
Q24: Calculations, Statistics and Probability	/13
Q25: Measurement, Area and Volume	/13
Q26: Trigonometry	/13
Q27: Ratios, Rates and Similar Figures	/13
Q28: Earning, Taxation, Savings and Investments	/13

Total = /100

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) Simplify $7 + 3(x - 2)$.

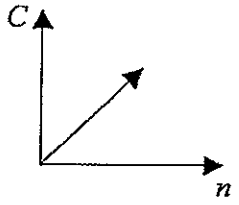
(A) $3x + 1$
(B) $3x + 13$
(C) $8x$
(D) $10x - 2$

2) Which one of the following is a correct simplification of $8a - 4b - 7a + 3b$?

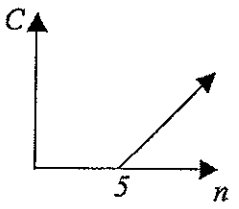
(A) $a - b$
(B) $a + 7b$
(C) $a - 7b$
(D) $a + b$

3) The cost, C, of producing textbooks is given by the formula $C = 14n + 5$. Which of the graphs drawn below best represents this equation?

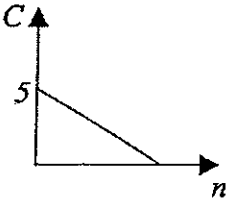
(A)



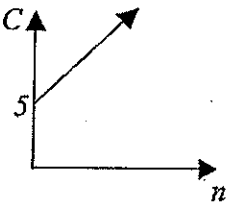
(B)



(C)



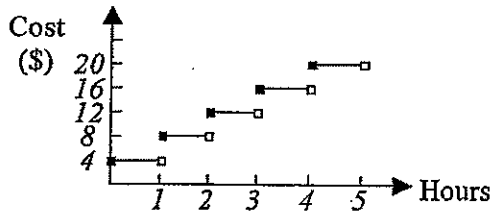
(D)



4) A rectangle has one side of length $(y + 3)$ cm while the other side is double this length. What is the perimeter of this rectangle?

(A) $(2y + 6)$ cm
(B) $(3y + 9)$ cm
(C) $(6y + 18)$ cm
(D) $(8y + 24)$ cm

5) The graph shows parking at Cinema Parking Station is charged at *$4* per hour, or part thereof, with a maximum of *$20* per day.



Lynne parks for $3\frac{1}{2}$ hours. Her parking cost will be:

(A) *$4*
(B) *$12*
(C) *$16*
(D) *$20*

6) Which packet of peanuts represents the best value?

(A) *500* g for *$3·90*
(B) *250* g for *$2·10*
(C) *360* g for *$2·70*
(D) *1·5* kg for *$11·55*

7) The number *386·956* correct to two significant figures is:

(A) *39*
(B) *386·95*
(C) *386·96*
(D) *390*

8) Wildlife authorities find that birds which die as a result of oil spills fit into three main categories:

Main Cause of Bird Deaths	Percentage
Drowned	*45%*
Hypothermia	*41%*
Poison	*14%*

If *30 000* birds die in an oil spill, how many did NOT die from poisoning?

(A) *3000*
(B) *4200*
(C) *25 800*
(D) *27 000*

9) The value of $\frac{\sqrt{3 \cdot 85}}{2 \cdot 64 + 7 \cdot 8}$ correct to two decimal places is:

(A) *0·19*
(B) *0·61*
(C) *5·32*
(D) *8·54*

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

(A) the height of Year 9 students
(B) the colour of hair of the students of a Year 12 Maths class
(C) the time taken to complete an assignment
(D) the number of cars stolen each year

11) The fishing authorities are concerned about the number of fish in a certain lake. To investigate this they use the "capture-recapture" method. They capture *70* fish, tag them and release them. The following day they return and take a sample of *20* fish from the lake, noting that *3* of these are tagged. Estimate the number of fish in the lake.

(A) *93*
(B) *210*
(C) *467*
(D) *4200*

12) A family of four spends the following amounts on the given food items in one week:

MEAT	*$45*
FRUIT & VEGETABLES	*$35*
GROCERIES	*$65*
MILK & DAIRY	*$18*
OTHER	*$17*

Nick would like to display the above information on a sector graph. What size angle is needed to represent milk and dairy?

(A) *9°*
(B) *10°*
(C) *18°*
(D) *36°*

13) Alex works in a shop where the normal weekday rate of pay is *$12* per hour. On Saturdays she is paid time-and-a-half. How much did Alex earn in a week in which she worked for seven hours on Thursday and three hours on Saturday?

(A) *$84*
(B) *$120*
(C) *$138*
(D) *$180*

14) A real estate agent sells a house for *$400 000*. From the selling price he earns *$10 000* for his services. Which term is used to describe the money he earns?

(A) Commission
(B) Income Tax
(C) Royalty
(D) Superannuation

15) A Visacard has an annual interest rate of *16%*. What would be the equivalent DAILY interest rate to 3 significant figures?

(A) *0·000438%*
(B) *0·0438%*
(C) *0·044%*
(D) *0·160%*

16) Yolla wants to invest *$8000* for *12* years. Which of the following provides the best financial return for her?

(A) Simple interest at *12%* p.a.
(B) Interest compounded annually at *12%* p.a.
(C) Interest compounded quarterly at *12%* p.a.
(D) Interest compounded monthly at *12%* p.a.

17) Petrol costs *84·5* cents per litre. Isabella fills her car with petrol and it takes *45·5* litres. The cost of this petrol is approximately:

(A) *3875* cents
(B) *$38·45*
(C) *$3845*
(D) *$3844*

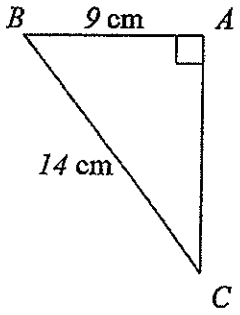
18) A leaking tap wastes *2* mL of water every *10* minutes. What is the rate of leakage in litres per hour?

(A) *0·012*
(B) *12*
(C) *120*
(D) *1200*

19) A rectangular room is *3800* mm wide and *6500* mm long. The area of carpet required to completely cover this floor is:

(A) $2{\cdot}47 \times 10^4$ cm^2
(B) *24 700* m^2
(C) *24·7* m^2
(D) *20·6* m^2

20) In the figure angle $A = 90°$, $AB = 9$ cm and $BC = 14$ cm. Find angle C to the nearest degree.



(A) 40°
(B) 50°
(C) 80°
(D) 90°

21) Samantha and Eric are playing a board game. In their turn, each player rolls a single die. Samantha needs a *6* to finish the game and win. The chance of Samantha rolling a *6* could best be described as:

(A) impossible
(B) unlikely
(C) even
(D) probable

22) A coin is tossed three times. What is the probability that on the second toss it is a head?

(A) $\frac{1}{8}$
(B) $\frac{1}{4}$
(C) $\frac{1}{3}$
(D) $\frac{1}{2}$

End of Section I

Section II

78 Marks

Attempt Questions 23-28

Allow about 2 hours for this section

Answer each question in a SEPARATE writing booklet. Extra writing booklets are available.

All necessary working should be shown in every question.

Question 23 (13 Marks) Use a separate writing booklet. **Marks**

a) Simplify $\frac{2xy}{5} \times \frac{5x^2}{y}$. 2

b) Solve the equation $\frac{3a-5}{4} = 10$. 2

c) The formula for converting kilometres k to miles M is $M = \frac{5k}{8}$.

Use this formula to convert:

i) 16 kilometres to miles. 1

ii) 40 miles to kilometres. 1

d) The equation of a straight line is given by $y = \frac{1}{2}x - 3$. Find the value of the gradient and y-intercept. 2

e) Write the equation of the linear relationship represented by the table below. 2

x	-1	0	1
y	2	4	6

Question 23 continued

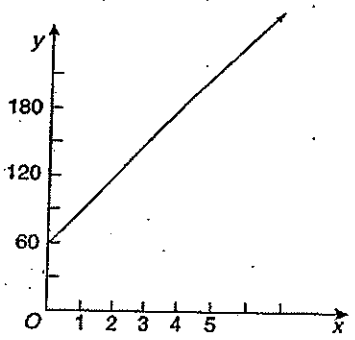
Marks

f) Simplify the expression: $3a - 2 + a - 4 =$

2

g) Find the gradient of the line drawn below.

1



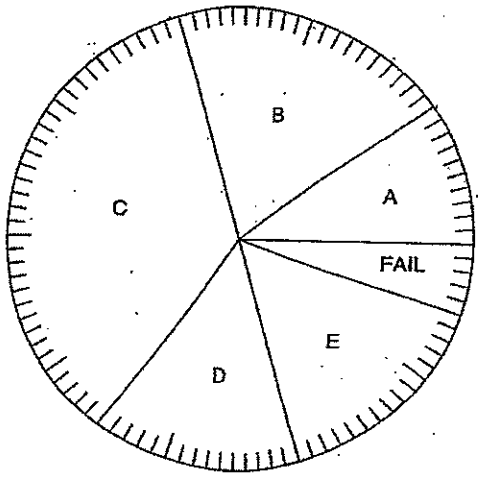
End of question 23.

Question 24 (13 Marks) Use a Separate writing booklet. **Marks**

a) Increase \$150 by 20%. **2**

b) Angela answered $\frac{3}{5}$ of the questions in her maths test correctly. How many questions were in the test if she answered 48 questions correctly? **2**

c) In a certain Geography Skills Test candidates were given the grades A, B, C, D, E or Fail. The sector graph below, which is divided into 100 parts, shows the distribution of 240 candidates in this skills test.



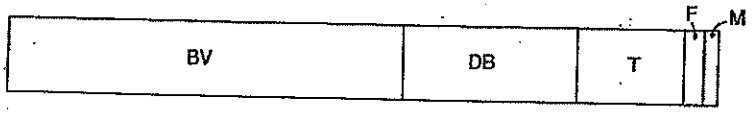
i) What percentage of candidates failed? **1**

ii) How many candidates were given a grade E? **1**

iii) What is the probability that a candidate, selected at random, was given either a grade A or a grade B? **1**

Marks

d) The bar graph below shows the percentage of brick veneer (BV), double brick (DB), timber (T), fibro (F) and mud brick (M) houses built in one year.



i) What percentage of houses built was timber? **1**

ii) If there were 21 400 new houses built in that year, how many of them were timber? **1**

e) The menu at a restaurant has 3 entrees, 5 main courses and 2 desserts. How many combinations are possible? **1**

f) A bag contains 4 red, 5 blue and 6 green counters. Find the probability of choosing a counter that is:

i) Red **1**

ii) Blue or green **1**

iii) Not blue **1**

End of question 24

Question 25 (13 Marks) Use a Separate writing booklet. **Marks**

a) Convert 10.2 cm to millimetres. **1**

b) Convert $6m^2$ to cm^2. **1**

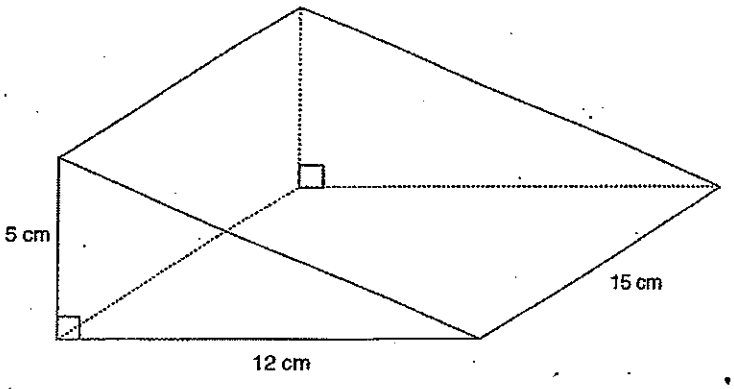
c) The volume of a cube is $125cm^2$. What is the length of one of the sides? **1**

d) A circular water tank has a diameter of 6 metres and contains water to a uniform depth of 1.8 metres.

i) What is the volume of water in the tank correct to 1 decimal place? **3**

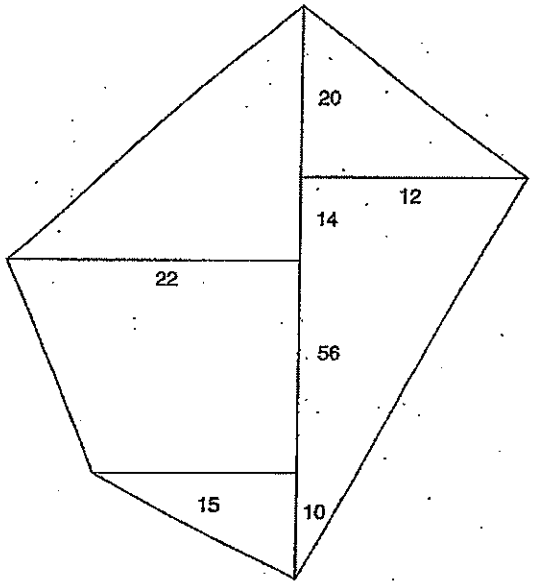
ii) How many litres of water are in the tank? **1**

e) Calculate the surface area of the triangular prism. **3**



Marks

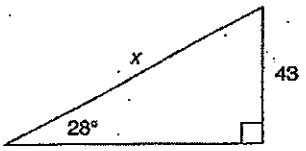
f) The diagram below shows the sketch of a field not drawn to scale.
Find the area of the field. **3**



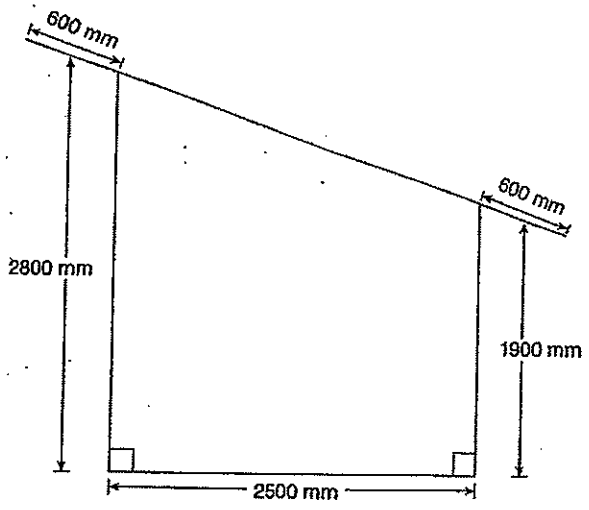
End of question 25

Question 26 (13 Marks) Use a Separate writing booklet. **Marks**

a) Find the value of x correct to 1 decimal place. **2**



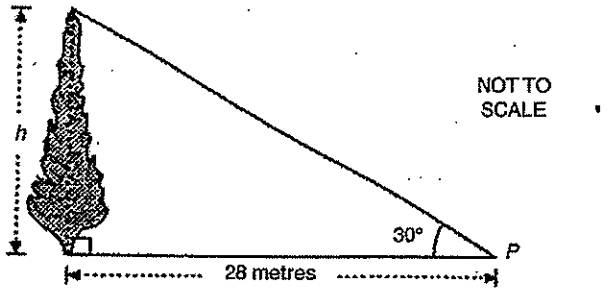
b) The sketch shows the end view of a garage. (Not drawn to scale)



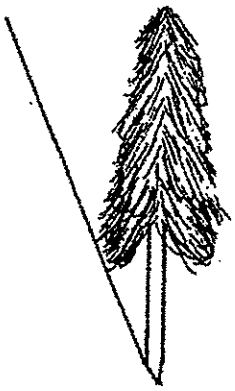
Find the total length of the sloping roof. **3**

Marks

c) The angle of elevation of the top of a tree from a point P on the ground is 30°. The point P is 28 metres from the base of the tree. Find the height of the tree correct to 1 decimal place. **2**



d) A tree is 30 metres tall and is growing on a hill slope inclined at 25° to the vertical.

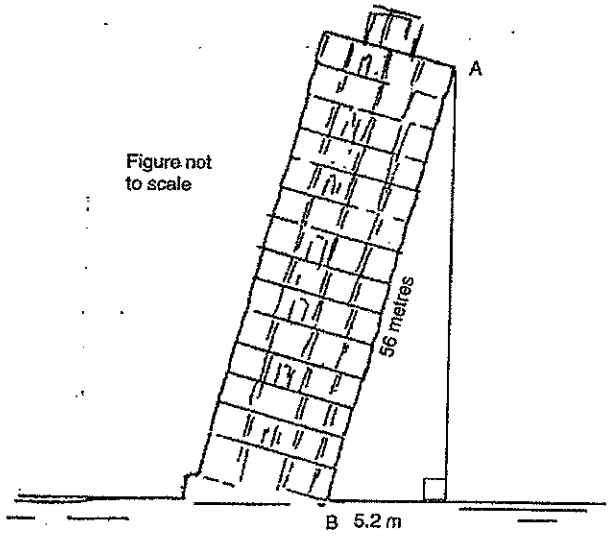


i) Draw a diagram and mark on it both pieces of information. **2**

ii) What is the shortest distance from the top of the tree to the slope? **2**

Marks

e) The diagram below shows the Leaning Tower of Pisa. The length AB is 56 metres. The tower leans 5.2 metres from the vertical as in the diagram. What angle does the tower make with the ground? 2



End of question 26

Question 27 (13 Marks) Use a Separate writing booklet. **Marks**

a) Simplify these ratios:

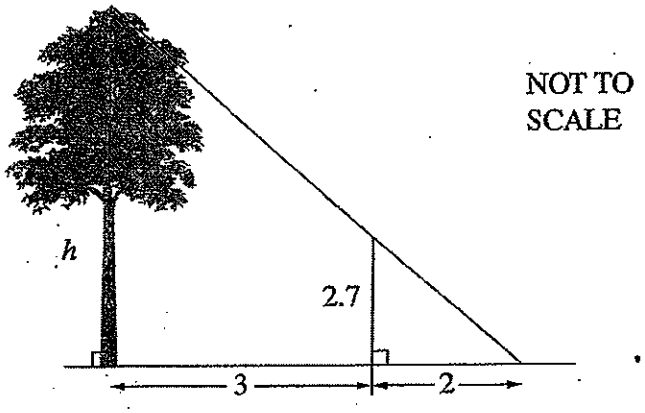
i) 3:12 **1**

ii) 2kg : 900g **1**

b) The ratio of boys to girls at a primary school is 4:7. How many girls are in the school if there are 165 students in total? **2**

c) The scale on a map is given as 1cm = 3km. If the distance between the two points on the map is 2.7cm, find the actual distance between these two points. **1**

d) Calculate the height (h metres) of the tree in the diagram. All measurements are in metres. **2**



e) Convert these rates:

i) 1 500 millilitres/minute to Litres/minute. **1**

ii) 60 kilometres/hour to metres/second. **2**

f) The drop in temperature of a cooling body varies directly with time. If the temperature dropped 8°C in 5 minutes, how long would it take to drop 10°C? **3**

End of question 27

Question 28 (13 Marks) Use a Separate writing booklet. **Marks**

a) John is paid \$5.50 for every bucket of strawberries he picks. If he has picked 25 buckets, how much should he be paid? **1**

b) During a financial year, Andrew's taxable income was \$49 540.

i) Calculate the tax on his income using the table below. **2**

Taxable income range	*Tax payable*
\$20 701–\$38 000	\$3 060 plus 34c for each \$1 over \$20 700
\$38 001–\$50 000	\$8 942 plus 43c for each \$1 over \$38 000
\$50 000 and over	\$14 102 plus 47c for each \$1 over \$50 000

ii) The total amount of tax that Andrew had to pay is the amount calculated in part (i) plus the Medicare levy. The Medicare levy was 1.5% of the taxable income. Calculate the total amount of tax that Andrew paid. **2**

iii) During the financial year, tax instalments of \$573.30 per fortnight were deducted from Andrew's salary. Calculate the refund Andrew received for the financial year. **2**

Question 28 continued. **Marks**

c) Calculate the compound interest on $3 500 if it is invested for 7 years at 12%pa, compounded monthly. 3

d) Sonia bought 500 ANZ Bank shares at $14.40 each, with a dividend yield of 5%. Brokerage costs were 1% of the purchase price, while stamp duty (state tax) was 15 cents per $100 or part thereof.

Calculate the total cost of purchasing the shares. 3

End of examination.