



St Stephen's School Carramar

SEMESTER 2 2005

Year 10 Mathematics Foundations

Name: _____ **Teacher:** _____

TIME ALLOWED FOR THIS PAPER

Working time for paper:	2 hours
Marks available	90 marks

MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER

TO BE PROVIDED BY THE SUPERVISOR

One Question Paper: – Questions 1 to 14 – 90 marks

TO BE PROVIDED BY THE CANDIDATE

Standard Items: pens, pencils, eraser, ruler

Special Items: Drawing instruments, templates and a maximum of 2 graphics calculators satisfying the conditions set by the Curriculum Council.
Two A4 size page of notes.

INSTRUCTIONS TO CANDIDATES

All questions must be attempted to gain full marks.

All working should be completed with a blue pen and diagrams in pencil.

Marks are allocated for working so show ALL your working.

Enjoy, may you achieve mathematical XTC.

IMPORTANT NOTE TO CANDIDATES

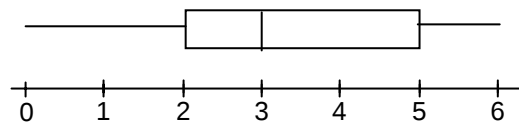
No other items may be taken into the examination room.

It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor BEFORE reading any further.

1. Consider the following set of numbers {4, 2, 3, 4, 2, 3, 2, 1, 0, 5, 1} and calculate: [5 marks]

- a. Mean = _____
- b. Mode = _____
- c. Median = _____
- d. Range = _____
- e. Standard Deviation = _____

2. The diagram below is the median box plot associated with a set of six scores. All the scores are whole numbers. [6 marks]



- (a) Given that the mean is $3\frac{1}{6}$, find the six numbers within this set.

3. A weatherman decided to record daily maximum temperatures and atmospheric pressures for a two-week period. His results are listed below:
[10 marks]

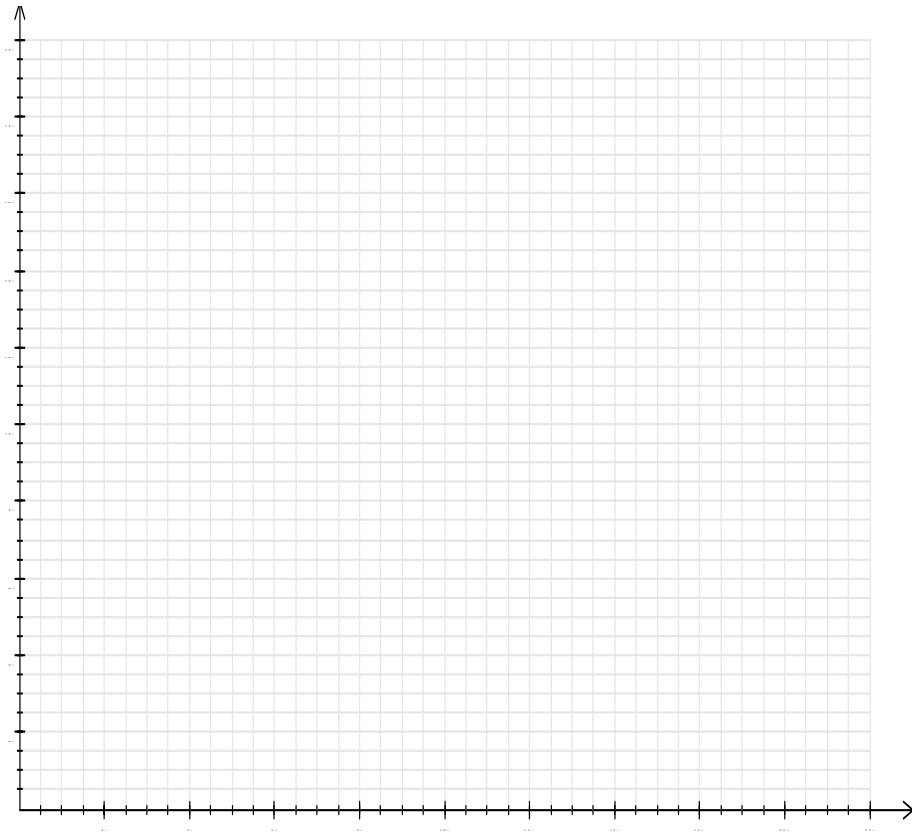
Day	1	2	3	4	5	6	7
Temp °C	24	26	23	19	19	20	27
Pressure	1012	1024	1002	991	992	995	1026

Day	8	9	10	11	12	13	14
Temp °C	30	34	30	29	26	26	28
Pressure	1037	1056	1036	1030	1024	1025	1028

- Calculate the mean daily maximum temperature over the two-week period.
- Calculate the mean daily atmospheric pressure over the two-week period.
- Describe the relationship between daily maximum temperatures and atmospheric pressure over the two-week period.
- Derive a linear equation that expresses the relationship between daily atmospheric pressure and maximum temperature. Coefficients should be stated accurate to 3 significant figures.
- Use this equation to predict the atmospheric pressure on a day when the temperature reaches a maximum of 25 °C.
- Use this equation to predict the maximum daily temperature (accurate to 1 decimal place) when the atmospheric pressure is measured at 1050.

4. Draw a scatter diagram to present the following data in the space below.
[6 marks]

Year	No. of Police	No. of Prisoners
1901	519	360
1911	481	323
1921	493	211
1931	573	319
1941	638	211
1951	877	362
1961	1169	526
1971	1616	1261
1981	2656	1350
1991	3168	1612



- a. Determine the correlation co-efficient for the above data. [1]
- b. Determine the equation for the linear regression line. [2]

5. Three cards labelled 1, 2, and 3 are placed in a hat. A card is drawn, its number recorded, then replaced. This is then repeated, and the two numbers added.

[7 marks]

- a. Draw a tree diagram to show all the possible outcomes.

determine the probability that:

- b. The total is exactly five? [1]

- c. The total is less than three? [1]

- d. The total is at least four? [1]

- e. The total is more than six? [1]

6. 100 students were surveyed about their favourite subject and the results recorded. Unfortunately the student conducting the survey spilled a drink on her records and some of the results are unreadable. The remaining results are shown:

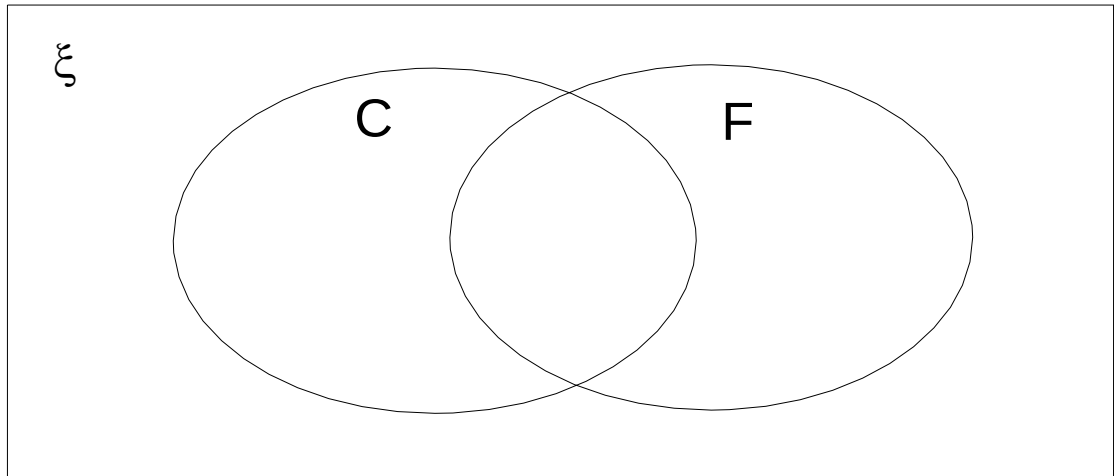
[7 marks]

	Year 8	Year 9	Year 10	Total
Maths	28			
Other			12	41
Total	40	18		100

- a. Complete the missing values in the table above. [3]
- b. What is the probability that the student was in year 8? [1]
- c. What is the probability that the student's favourite subject was maths? [1]
- d. What is the probability that a randomly selected student is NOT a year 9 whose favourite subject is maths? [2]

A sample 98 members of the school population was asked questions about whether they had eaten chocolate or fruit that day. 85 said they had eaten chocolate. 52 said they had eaten fruit. 43 had eaten both chocolate and fruit.

[5 marks]



c. Show all relevant amounts on the Venn diagram above. [2]

d. What is the probability that a student chosen at random has eaten chocolate but has not eaten fruit? [1]

e. What is the probability that a student chosen at random has eaten fruit but has not eaten chocolate? [1]

f. What is the probability that a student chosen at random has eaten neither chocolate nor fruit? [1]

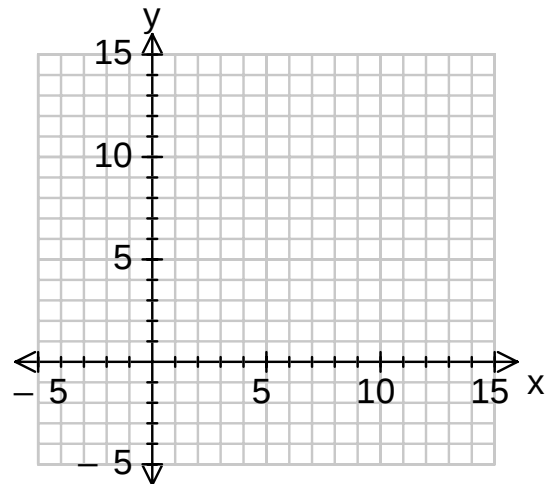
7. On the grid provided, plot and label the following lines: [8 marks]

a. $y = x - 2$

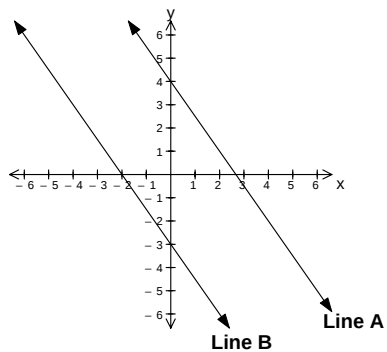
b. $y = 10 - x$

c. $x = 2$

d. $y = 14$



8. a. In the diagram given below, Line A has the equation $y = -1.5x + 4$ [4 marks]



If Line B is parallel to the given line, what is its equation? [2]

b. Give the equation of a line that would be perpendicular to Line B. [2]

9. Find the equation of the line which passes through these points: (Show all your Working. *[6 marks]*

a) (1,4) and (2,3)

[3]

b) (-1,8) and (1,-2)

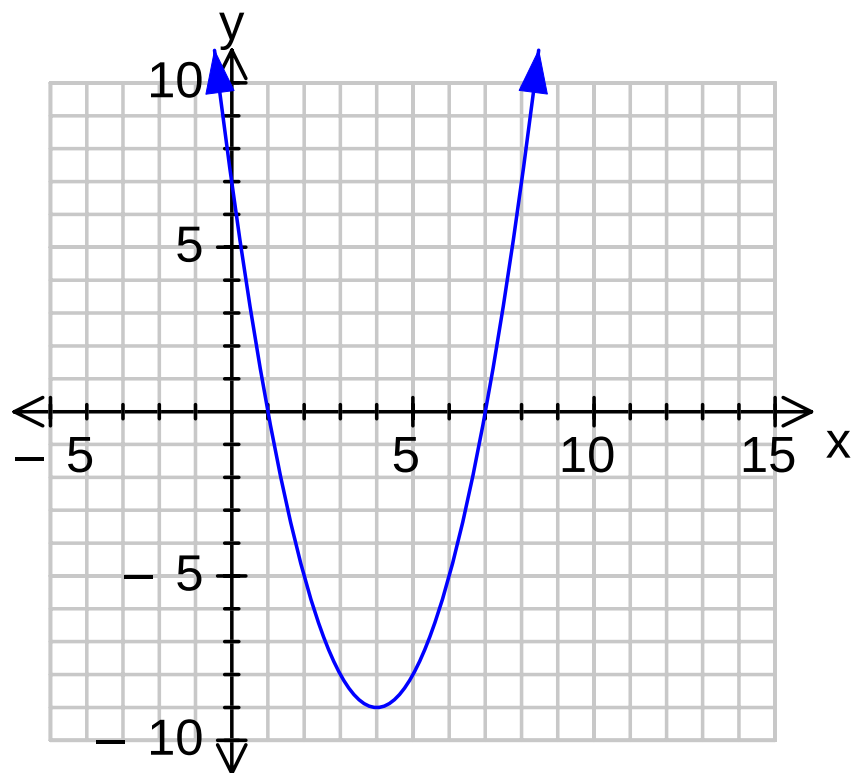
[3]

10. Study the following graph and express the quadratic equation in the form stated. [6 marks]

a. Turning point form: _____

b. Factor form: _____

c. General form: _____

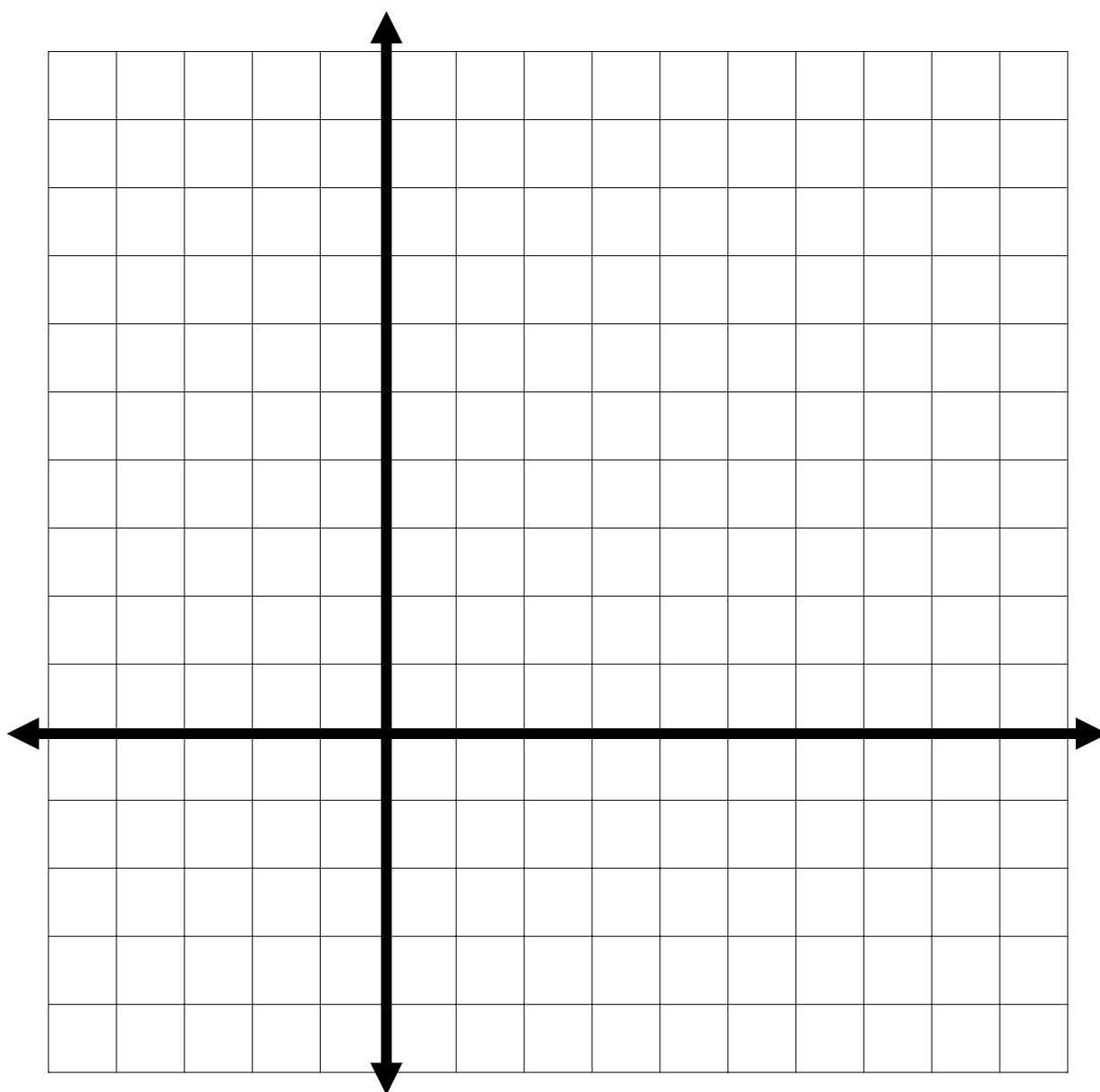


12. Draw the following quadratic equations on to the grid below, labelling each curve and the axes appropriately: [6 marks]

a. $y = -x^2 + 3x + 1$

b. $y = (x + 2)^2 + 2$

c. $y = (x - 5)(x - 7)$



13. Solve the following quadratic equations using the quadratic formula.

(Show all your working.)

[6 marks]

a. $5x(3x + 15) = 0$

b. $3x(x - 3) = x + 8$

14. For the following equation determine: (show all working)

[8 marks]

- i. the line of symmetry
- ii. the turning point
- iii. the x-intercepts (if any)
- iv. the y-intercept

a) $y = (x - 3)(x + 5)$