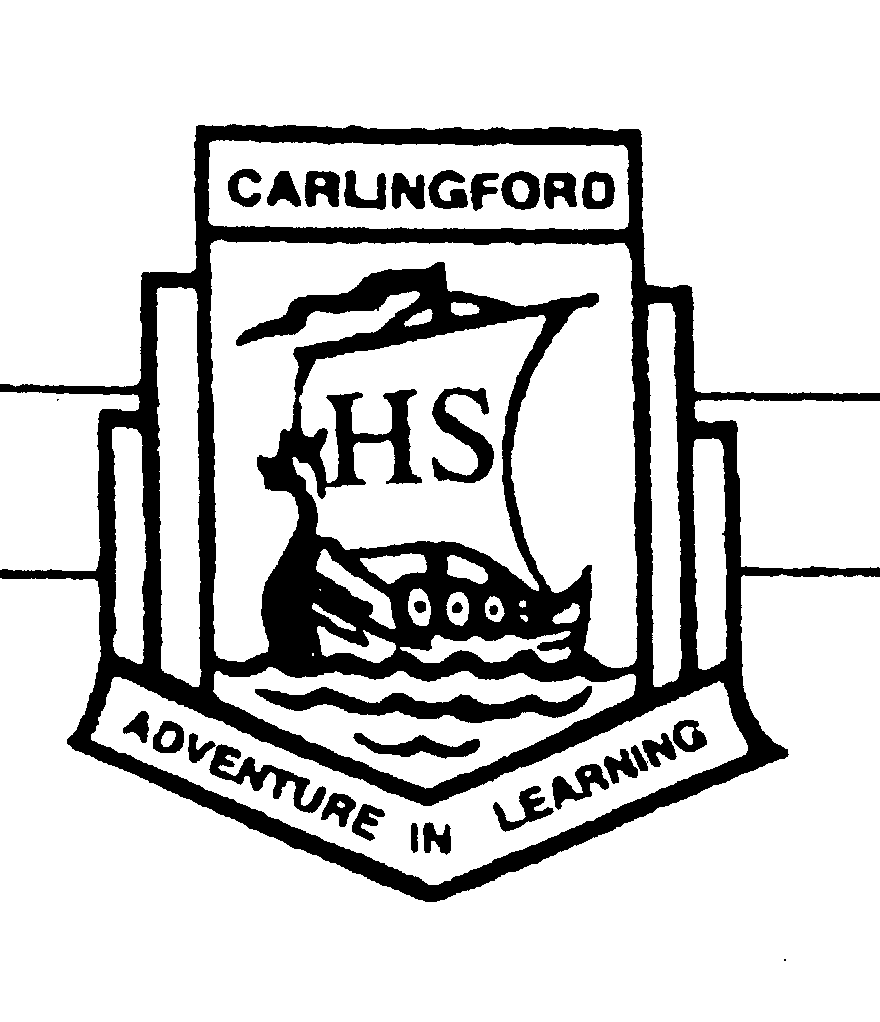
**Carlingford High School**



**Mathematics**

**Year 10 Yearly Examination**

**5.3 Course**

**2017**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: 5.3.\_\_\_

Circle your teacher's name: Mr Cheng Ms Strilakos

*Time allowed: 1 hour 30 minutes*

* Board approved calculators may be used.
* Show all necessary working.
* Marks may be deducted for careless or untidy work.
* Questions marked with an asterisk \* are extension level questions.
* Complete the examination in blue or black pen.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TOPIC** | **Multiple**  **Choice** | **Linear**  **Relation-**  **ships** | **Compound Interest** | **Area and Volume** | **Quadratics**  **& Inequali-**  **ties** | **Data**  **Analysis** | **Graphs** | **Trigon-ometry** | **Probab**  **-ility** | **Vari-**  **ation** | **Geometry** | **Total** |
| **MARK** | **/9** | **/9** | **/11** | **/8** | **/18** | **/10** | **/6** | **/11** | **/10** | **/3** | **/7** | **/102** |

**SINGLE AND BIVARIATE DATA ANALYSIS**

Q.1 Find the median for the following set of data.

(i)

1 2 3 4 5 6 7 8

(ii) Find the interquartile range for the following data. **Show all working**.

Stem Leaf

4 0 2 4 7

5 1 3 4 6 9

6 8 8 8

7 0 2 4 5 5 6 7

8 1 2 2 4 5

[1+2=3 marks]

Q.2 The following boxplot represents the number of hours worked by a student each day for a period of 6 weeks during the holidays.

2 4 6 8 10 12 14

(i) What is the 5-point summary for this data?

(ii) On what percentage of days did this student work more than 9 hours?

[2+1=3 marks]

**SURFACE AREA AND VOLUME**

Q.1 Two similar rectangular prisms have their surface areas in the ratio

If the volume of the larger prism is what is the volume of the smaller prism? **Show all working.**

[1+1=2 marks]

**INEQUATIONS**

Q.1 Solve each inequality

(i)

(ii)

(iii)

[1+2+2=5 marks]

**TRIGONOMETRY**

Q.1 Find the value of each of the following, giving answers in **exact form**:

(i)

(ii)

(iii)

[3 marks]

Q.2 Given and

find the exact value of

[1+1=2 marks]

Q.3 Solve the equation correct to the nearest

minute, if is between 0° and 180°.

[3 marks]

Q.4 From the top of a building 30 meters high a woman observes a dog on a road due East of the building at an angle of depression of 64°. At the same time a car is observed due South of the building at an angle of depression of 32°. The car is travelling at 40km/hr and is driving on a straight road directly towards the dog.

T

Dog

Road

Car

(i) Put the information into the diagram and find how far apart the dog and the car are at this point in time? (to 1 d.p.)

(ii) How much time does the dog have to move off the road before it gets hit by the car? (answer in seconds to 1 d.p)

[3+2=5 marks]

Q.5 A ship sails 100km due North and then 150km

(i) How far from its start point is it? (2 d.p.)

(ii) What is its bearing from its start point now? (to nearest degree)

[2+2=4 marks]

**NON LINEAR RELATIONSHIPS**

Q.1 Given the parabola with equation

find:

(i) the -axis intercepts

(ii) the -axis intercept

(iii) equation of the axis of symmetry

(iv) coordinates of the vertex

(v) If this parabola is translated 9

units upwards what will its equation now

be?

[5X1=5 marks]

Q.2 (i) Sketch the graph of

clearly labelling any axes intercepts.

**(Draw sketches of the following transformations on your axes above to help you answer the next two parts)**

(ii) If this curve is reflected in the

-axis, what will its equation be?

(iii) If the curve in (i) is reflected in the

-axis, what will its equation be?

[2+1+1=4 marks]

Q.3 Sketch the curve

clearly labelling asymptotes and any axes intercepts.

[3 marks]

Q.4 Find the centre and radius of the circle

given by the equation

[3 marks]

Q.5 Find the coordinates of the points of intersection of the curves with equations:

and

[3 marks]

Q.6(i) Find the points of intersection of the graphs of and .

(ii) Sketch the two curves on the same

set of axes and hence find the shortest

distance between the two branches of the

curve.

[2+2=4 marks]

**SIMULTANEOUS EQUATIONS**

Q.1 Solve the following pair of simultaneous equations:

and

[3 marks]

**LOGARITHMS**

Q.1 Solve the following equations:

(i)

(ii)

[1+2=3 marks]

Q. 2 Solve each of the following exponential equations:

(i)

(ii)

(iii)

[1+2+3=6 marks]

Q.2 Evaluate:

[3 marks]

Q.3 Solve:

[3 marks]

**PROBABILITY**

Q.1 A standard die is tossed and the uppermost number is noted.

Find the probability that the number is:

1. less than or equal to four and a six
2. less than or equal to three or a six
3. even and less than or equal to four

[3X1=3 marks]

Q.2 A dice is tossed. What is the probability that an outcome greater than 4 is obtained **given:**

(i) an even number is obtained

(ii) a number greater than 2 is obtained.

[2 marks]

Q.3 A bag contains 10 blue balls and 3 green balls. A ball is taken out and its colour noted**. It is not replaced**. A second ball is taken out and its colour noted.

(i) Complete the tree diagram and indicate the outcomes and probabilities for each stage of the branches on the tree.

(ii) Find the probability of obtaining

1. a green ball followed by a blue ball
2. a green ball and a blue ball
3. two green balls.

[2+1+1+1=5 marks]

**COORDINATE METHODS IN GEOMETRY**

Q.1 A line with a gradient of passes through the midpoint of and .

Find its equation and give it in General

Form. **Show all working.**

[3 marks]

Q.2

are the vertices of a quadrilateral.

(i) Find the lengths of the diagonals

(ii) Find the gradients of the diagonals.

(iii) Hence state what type of quadrilateral this is.

D

[3 marks]

**PROPERTIES OF GEOMETRICAL FIGURES**

Q.1 A spherical icecream of radius 1.5cm will just fit in a cone so that the centre of the icecream is 3cm from the vertex. Find the radius of the largest spherical icecream which will fit in the cone underneath the first icecream.

1.5cm

1.5cm

3 cm

x

x

[4 marks]

Q.2

Q

O

P

C

B

A

is a square with diagonals intersecting

at and are the midpoints of and

respectively.

1. Prove that
2. Hence show that .

[3+1=4 marks]

**CIRCLE GEOMETRY**

Q.1 What is the value of y?

74°

y°

[1 mark]

Q.2 Prove that is similar to

E

D

A

C

B

[3 marks]

Q.3 Prove that

C

B

O

D

E

A

[2 marks]

END OF EXAM