

#### 5<sup>th</sup> Year Revision List - Maths Ordinary Level

#### Teachers: SCO/RS/DOF/SCN

#### Fifth year covered from September 2016/2017

Algebra 1 and 2

#### Chapter 1 and Chapter 2 page 1 – 46

- Evaluating expressions
- Simplifying algebraic expressions
- Linear equations
- Simultaneous equations
- Factors required to solve quadratic equations
- Quadratic equations
- Simplifying surds
- Quadratic formula
- Constructing a quadratic equation when given its roots
- Simultaneous equations, one linear and one quadratic
- Single variable linear inequalities
- Double inequalities
- Changing the subject of a formula
- Indices and rules of indices
- Exponential equations

#### • Arithmetic

#### chapter 5 page 98-133

- Proportion
- Dividing quantities in a given ratio
- Percentages
- Relative error and percentage error
- Tolerance
- Foreign exchange
- Interest
- Compound interest
- Repayments/further investments
- Depreciation
- Annual equivalent rate (AER) and annual percentage rate (APR)
- Distance, speed and time
- Two part problems
- Universal social charge (USC)
- Income tax
- USC and income tax
- Index notation
- Using a calculator addition, subtraction, multiplication and division



## • Coordinate geometry of the line

### Chapter 3 page 49-73

- Midpoint of a line segment
- Distance
- Slope of a line
- Parallel and perpendicular lines
- Equation of a line
- Verify a point belongs to a line
- Equation of a line 2
- Equation of a line 3 where you work out the slope or point
- Equation of a line 4 y = mx + c
- Slope of a line when given its equation
- Equation of a line, parallel or perpendicular to a given line
- Point of intersection of two lines
- Graphing lines
- Lines that contain the origin
- Lines parallel to the axes
- Area of a triangle
- Transformations of the plane

## • Coordinate geometry of the circle

### Chapter 12 page 336-349

- Equation of a circle, centre (0, 0) and radius r
- Points inside, on or outside a circle 1
- Intersection of a line and a circle : Two points of intersection or one point of contact
- General equation of a circle, centre (h, k) and radius r
- Points inside, on or outside a circle two
- Transformations



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#### Chapter 7 Page 186-205

- Complex numbersImaginary numbers the symbol i
- Complex numbers
- Addition, subtraction and multiplication by a real number
- Multiplication of complex numbers
- Complex conjugate
- Division by a complex number
- Equality of complex numbers
- Quadratic equations with complex roots
- Proving that a line and a curve do not meet
- Argand diagram
- Modulus
- Higher powers of i
- Further geometrical properties of complex numbers

### Geometry 1 and 2 Chapters 11 page 302 – 332 and chapter 15 page 430-448

- Types and names of angles
- Angles and parallel lines
- Quadrilaterals
- Angle-side relationship in a triangle and triangle inequality
- Pythagoras theorem
- Area of a triangle and parallelogram
- Diagonals and area
- Transversal intersecting three parallel lines
- Congruent triangles
- Circle
- Similar triangles
- Using similar triangles to solve real life problems
- Enlargements
- Constructions
  - Bisector of an angle
  - > Perpendicular bisector of a given line segment
  - > Line perpendicular to a given line L, passing through a given point not on L
  - > Line perpendicular to a given line L, passing through a point on L
  - > Line parallel to a given line L, passing through a point A not on L
  - Dividing a line into equal segments
  - > Construct an angle 60° without using a protractor or set square
  - > Tangent to a circle at a given point on the circle
  - Constructing triangles and quadrilaterals

Three centres of a triangle:



Circumcentre and circumcircle

- Incentre and incircle
- Centroid

ProbabilityChapter 6page 137 - 181Only topics covered by all classes in probability will be on the exam.Events and OutcomesTwo EventsSample SpacesExpected ValueFundamental principle of countingArrangements

Text and tests is a brilliant resource and each end of chapter 'Test yourself section' is challenging but very worthwhile.

When studying for your maths exam use your hard back notes, the text book, the internet and the student CD on <a href="http://www.projectmaths.ie">www.projectmaths.ie</a>

The best way to study for any maths exam is to practice lots of exercises from the book and exam papers which are available online.

Exam papers are available on <u>www.examinations.ie</u>

Other examples of useful websites:

www.mathsisfun.com

www.studentxpress.ie

www.mathopenref.com/tocs/constructionstoc.html

www.khanacademy.org

Equipment for Maths Summer Exam.

- Pens a number of pens: red and blue/black
- Pencils sharpened
- Ruler
- Calculator
- Eraser
- Sharpener
- Maths geometry set
- Formula Book



# Sample Questions:

Q1.

Let  $z_1 = 3 + 4i$  and  $z_2 = 1 + 2i$ .

(a) Show z<sub>1</sub> and z<sub>2</sub> on an Argand diagram.



**(b)** Show that  $|z_1| > |z_2|$ .

(c) Express  $\frac{Z_1}{Z_2}$  in the form a + bi.

**Q**2.

Solve for x:

5(x+4) - 6(2x+7) = 9(x+3) - 17



# **Q**3.

# Fully factorise each of the following:

# (i) 6a<sup>2</sup>b - 3ab

# (ii) $x^2 - 3x - 28$



(iii)  $16x^2 - 25y^2$ 

# Q4.

(a) Simplify fully:

$$\frac{1}{5x-7} - \frac{4}{10x+1}$$

(b) Hence, or otherwise solve for x where 
$$x \in \mathbb{Z}$$
.  

$$\frac{1}{5x-7} - \frac{4}{10x+1} = \frac{1}{7}$$



# **Q**5.

In a playschool of 30 children 15 like Diluted Orange, 10 like Diluted Orange and Milk while 8 like neither type of drink.

(a) Display the given information on a Venn diagram.



### (b) If a child is picked at random, find the probability that:

### (i) The child likes Milk only.

(ii) The child likes only one type of drink.

#### (iii) The child does not like Diluted Orange.



# **Q**6.

-

### (a) Match each line with its correct equation.



| Line | Equation         |
|------|------------------|
|      | <i>y</i> = 5     |
|      | 3x + 4y - 12 = 0 |
|      | y = 3x + 3       |



(b) Find the slope of the line a.

(c) Find the equation of the line perpendicular to the line *a*, that passes through the point (-3, 2) in the form ax + by + c = 0 where  $a, b, c \in \mathbb{Z}$ .



#### Section 2 – Revision

#### Q1. Number:

- (i) How much will Shane owe at the end of the 5 years, correct to the nearest euro?

(ii) Calculate as a percentage of the principal, the total interest Shane pays on the loan, correct to one decimal place.

(b) (i) Mary purchases a new television priced at €255 inclusive of VAT at 20%. Calculate the price of the television exclusive of VAT.

(ii) A Playstation 4 is sold for  $\in$  350 at a profit of  $\in$  60. Calculate the mark-up on the Playstation correct to the nearest whole number.

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## Q2. Complex Numbers

- (a) (i) Plot the complex numbers  $z_1 = 3 + 4i$ and  $z_2 = -5 + 7i$  on the Argand diagram.
  - (ii) Plot  $z_3$ , the image of  $z_1$ , under symmetry in the origin.





(c) Verify that (2+3i) is a root of the complex quadratic  $z^2 - 4z + 13 = 0$ .





(a) Simplify 3(2x-4)-6(-x-3).

(b) Factorise each of the following:

(i) 
$$4ab - 20ab^2$$

(ii) 
$$x^2 - 10x + 21$$

(iii) 
$$4p^2 - 9q^2$$
.



(c) Simplify fully 
$$\frac{3x^2 + 6x - 72}{3x - 12}$$
.





- (a) Six greyhounds run in a race in Shelbourne Park.
  - (i) In how many ways can they finish the race?

#### (ii) In how many ways can the first three places be filled?

(iii) If the favourite wins the race, in how many ways can second and third place be filled?

#### Q5. Probability

John plays a game by spinning both spinners below. He writes down the result from each (example B3).



(a) How many outcomes are possible?



(b) Write out the sample space for the spinners.





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#### If a result is chosen at random find the probability that the result: (c)

#### Is the letter A with a prime number. (i)

| (**) | ~ |  | 1 | 1 | C |  |  |  |  |  |  |  |  |  |  |  |
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#### Q6. The Line

- The line *l* contains the points A(2, 4) and B(0, -2). **(a)** 
  - (i) Find the slope of the line l.

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**(ii)** Find the equation of the line *l*.

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#### **(b)** Find the equation of the line n which passes through the point (6, 6) and is perpendicular to *l*.

#### (c) Find the intersection point of the lines l and n using simultaneous equations.

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(a) The circle Cl has equation  $(x-3)^2 + (y-2)^2 = 34$ . Write down the centre and radius of the circle Cl.

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(b) Peter claims that the point (2, 7) lies on Cl. Is he correct? Verify your answer.

(c) The point (-2, 5) lies on the circle. Write the co-ordinates of any point that lies on the circle Cl.

(d) Write down the equation of the circle *C2*, the image of *C1* under central symmetry in the origin.

### Question 8 – Geometry

(a) In the diagram K||L. Find the value of x.



