

# A LEVEL MATHS INTRODUCTORY ASSESSMENT

Name: \_\_\_\_\_

## Purpose

This work gives you the opportunity to practise the skills that will be required to start AS Level Mathematics successfully. We want to ensure you do not feel overwhelmed when you begin your Sixth Form studies. You did well in your GCSE Mathematics course so we have high expectations of your algebra and number skills.

This work will also help you identify whether you need to do any extra work over summer to ensure you are ready for maths at Key Stage 5. You will have a basic skills test in your first maths lesson.

## Support

These two books might be helpful:

1. "Head Start to AS Maths" by Richard Parsons.
2. "Collins Maths - Bridging GCSE and A Level: Student Book" by Mark Rowland.

For online resources, look at the links on [nonsuchmaths.blogspot.co.uk](http://nonsuchmaths.blogspot.co.uk).

Questions - Do not use a calculator. Show all workings (use additional paper if necessary).

## Section 1: Maths Skills (Write on the sheet)

1. Expand and simplify

(a)  $(2x + 3)(2x - 1)$

(b)  $4x(3x - 2) - x(2x + 5)$

2. Factorise

(a)  $y^2 - 64$

(b)  $2x^2 + 5x - 3$

3. Simplify

(a)  $\frac{4x^3y}{8x^2y^3}$

(b)  $\frac{3x+2}{3} + \frac{4x-1}{6}$

4. Solve

(a)  $\frac{h-1}{4} + \frac{3h}{5} = 4$

(b)  $p^2 + 4p = 12$

5. Make  $x$  the subject of the formula

(a)  $v^2 = u^2 + 2ax$

(b)  $y = \frac{x+2}{x+1}$

6. Work out the values of the following, giving your answers as fractions

(a)  $4^{-2}$

(b)  $\left(\frac{8}{27}\right)^{\frac{1}{3}}$



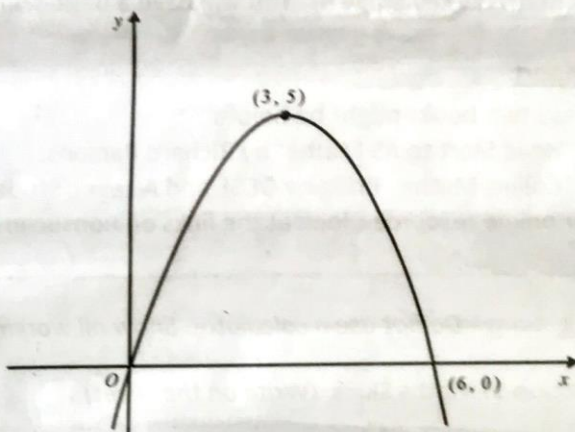
**Section 2: A Level Style Questions** (Attach additional paper)

- Giving your answer in the form  $a + b\sqrt{2}$ , where  $a$  and  $b$  are rational numbers, find  $(3 - \sqrt{8})^2$
- Solve the simultaneous equations

$$y = x - 2$$

$$y^2 + x^2 = 10.$$

- The diagram shows a sketch of the curve with equation  $y = f(x)$ . The curve passes through the origin  $O$  and through the point  $(6, 0)$ . The maximum point on the curve is  $(3, 5)$ .



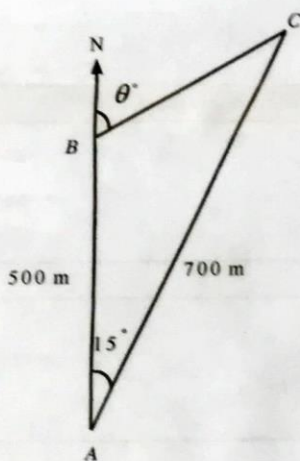
On separate diagrams, sketch the curve with equation

(a)  $y = 3f(x)$

(b)  $y = f(x + 2)$

Show clearly the coordinates of the maximum point and of each point at which the curve crosses the  $x$ -axis.

- The diagram above shows 3 yachts  $A$ ,  $B$  and  $C$  which are assumed to be in the same horizontal plane. Yacht  $B$  is 500m due north of yacht  $A$  and yacht  $C$  is 700m from  $A$ . The bearing of  $C$  from  $A$  is  $015^\circ$ .



- Calculate the distance between yacht  $B$  and yacht  $C$ , in metres to 3 significant figures.

The bearing of yacht  $C$  from yacht  $B$  is  $\vartheta^\circ$ , as shown in the diagram.

- Calculate the value of  $\vartheta$ .

**Answers**

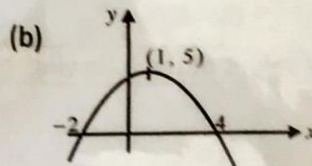
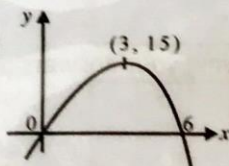
Check your own answers so you can identify whether you need to do any additional work over summer to prepare for Year 12. Your maths teacher will ask to see your workings. If you get totally stuck on something, leave it and ask your teacher for help in September.

**Section A:** 1) a)  $4x^2 + 4x - 3$  b)  $10x^2 - 13x$  2) a)  $(y + 8)(y - 8)$  b)  $(2x - 1)(x + 3)$  3) a)  $\frac{x}{2y^2}$  b)  $\frac{10x+3}{6}$

4) a)  $h = 5$  b)  $p = -6$  or  $p = 2$  5) a)  $x = \frac{v^2 - u^2}{2a}$  b)  $x = \frac{2-y}{y-1}$  6) a)  $\frac{1}{16}$  b)  $\frac{2}{3}$

**Section B**

1)  $17 - 12\sqrt{2}$  (2)  $x = 3$   $x = -1$ ,  $y = 1$   $y = -3$  (3a)



(4) a)  $BC = 253\text{m}$  (cosine rule) (b)  $046^\circ$  (Sine Rule/ambiguous case)