

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

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# Yr 11 to Alevel Bridging Work Test

## Weeks 1 to 4

Date:

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**Time:** 1 hour 30 minutes

**Total marks available:** 77

**Total marks achieved:** \_\_\_\_\_

Please use what you have learned so far to complete some exam questions. You will need to refer to your notes and maybe use the internet to help you. Feel free to email me if you are stuck with the wording on a question 😊

Good Luck!!

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You may use a calculator, but you **MUST** show all your methods to gain the marks. You **DO NOT** have to write on the paper, if you need more space, feel free to write on a separate piece of paper.

**The King Edmund School**

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## Questions

**Q1.**

Express  $8^{2x+3}$  in the form  $2^y$ , stating  $y$  in terms of  $x$ .

(2)

(Total 2 marks)

**Q2.**

Given that  $32\sqrt{2} = 2^a$ , find the value of  $a$ .

(3)

(Total 3 marks)

**Q3.**

(a) Evaluate  $(32)^{\frac{3}{5}}$ , giving your answer as an integer.

(2)

(b) Simplify fully  $\left(\frac{25x^4}{4}\right)^{\frac{1}{2}}$

(2)

(Total 4 marks)

**Q4.**

(a) Find the value of  $16^{\frac{1}{4}}$

(2)

(b) Simplify  $x(2x^{-\frac{1}{4}})^4$

(2)  
**(Total 4 marks)**

**Q5.**

Given that

$$f(x) = 2x^2 + 8x + 3$$

(a) find the value of the discriminant of  $f(x)$ .

(2)

(b) Express  $f(x)$  in the form  $p(x + q)^2 + r$  where  $p$ ,  $q$  and  $r$  are integers to be found.

(3)

The line  $y = 4x + c$ , where  $c$  is a constant, is a tangent to the curve with equation  $y = f(x)$ .

(c) Calculate the value of  $c$ .

(5)

**(Total 10 marks)**

**Q6.**

Find the set of values of  $x$  for which

(a)  $2(3x + 4) > 1 - x$

(2)

(b)  $3x^2 + 8x - 3 < 0$

(4)

**(Total 6 marks)**

**Q7.**

$$f(x) = x^2 - 8x + 19$$

- (a) Express  $f(x)$  in the form  $(x + a)^2 + b$ , where  $a$  and  $b$  are constants.

(2)

The curve  $C$  with equation  $y = f(x)$  crosses the  $y$ -axis at the point  $P$  and has a minimum point at the point  $Q$ .

- (b) Sketch the graph of  $C$  showing the coordinates of point  $P$  and the coordinates of point  $Q$ .

(3)

- (c) Find the distance  $PQ$ , writing your answer as a simplified surd.

(3)

**(Total for question = 8 marks)**

**Q8.**

A student was asked to give the exact solution to the equation

$$2^{2x+4} - 9(2^x) = 0$$

The student's attempt is shown below:

$$2^{2x+4} - 9(2^x) = 0$$

$$2^{2x} + 2^4 - 9(2^x) = 0$$

Let  $2^x = y$

$$y^2 - 9y + 8 = 0$$

$$(y - 8)(y - 1) = 0$$

$$y = 8 \text{ or } y = 1$$

$$\text{So } x = 3 \text{ or } x = 0$$

(a) Identify the two errors made by the student.

(2)

(b) Find the exact solution to the equation.

(2)

**(Total for question = 4 marks)**

**Q9.**

Find the set of values of  $x$  for which

(a)  $4x - 3 > 7 - x$

(2)

(b)  $2x^2 - 5x - 12 < 0$

(4)

(c) **both**  $4x - 3 > 7 - x$  **and**  $2x^2 - 5x - 12 < 0$

(1)

**(Total 7 marks)**

**Q10.**

$$4x - 5 - x^2 = q - (x + p)^2$$

where  $p$  and  $q$  are integers.

(a) Find the value of  $p$  and the value of  $q$ .

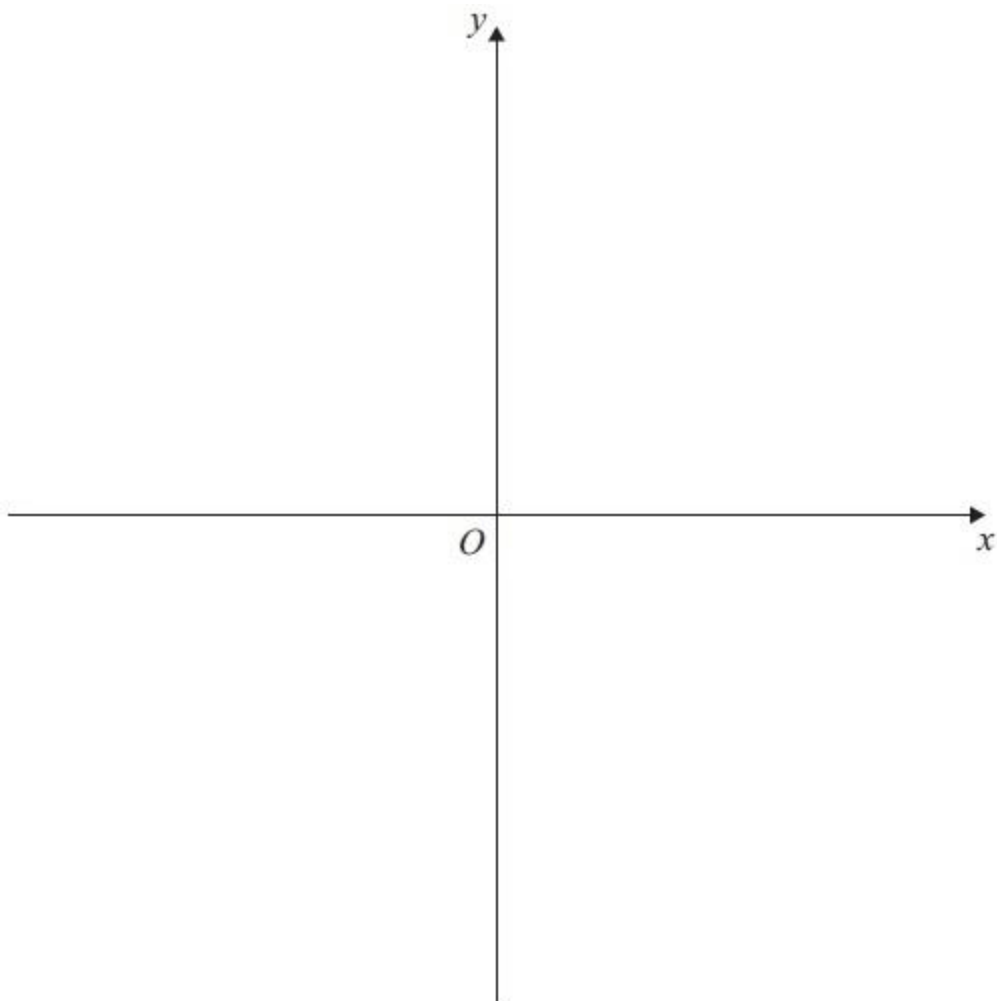
(3)

(b) Calculate the discriminant of  $4x - 5 - x^2$

(2)

(c) On the axes on page 17, sketch the curve with equation  $y = 4x - 5 - x^2$  showing clearly the coordinates of any points where the curve crosses the coordinate axes.

(3)



**(Total 8 marks)**

Q11.

Solve the simultaneous equations

$$y - 3x + 2 = 0$$

$$y^2 - x - 6x^2 = 0$$

**(7)**

**(Total 7 marks)**



**Q12.**

Find the set of values of  $x$  for which

(a)  $3x - 7 > 3 - x$

(2)

(b)  $x^2 - 9x \leq 36$

(4)

(c) **both**  $3x - 7 > 3 - x$  **and**  $x^2 - 9x \leq 36$

(1)

**(Total 7 marks)**

Q13.

The equation  $kx^2 + 4x + (5 - k) = 0$ , where  $k$  is a constant, has 2 different real solutions for  $x$ .

(a) Show that  $k$  satisfies

$$k^2 - 5k + 4 > 0.$$

(b) Hence find the set of possible values of  $k$ .

**(3)**

**(4)**

**(Total 7 marks)**