

Year 11 into 12 Transition Workbook - Mathematics

Please complete the following questions over the Summer holidays. All are past GCSE questions that you will be expected to be able to answer in order to access the AS Mathematics course. It will be collected at the start of the course in September.

If you have any difficulties with these then revise the necessary topics from your GCSE material.

Index laws and surds

1. (a) Find the value of

(i) 64^0

.....

(ii) $64^{\frac{1}{2}}$

.....

(iii) $64^{-\frac{2}{3}}$

.....

(4)

(b) $3 \times \sqrt{27} = 3^n$

Find the value of n .

$n = \dots\dots\dots$

(2)

(Total 6 marks)

2. (a) Write down the value of $8^{\frac{1}{3}}$

.....

(1)

$8\sqrt{8}$ be written in the form 8^k

(b) Find the value of k .

$k = \dots\dots\dots$

(1)

Summer Homework

$8\sqrt{8}$ can also be expressed in the form $m\sqrt{2}$ where m is a positive integer.

(c) Express $8\sqrt{8}$ in the form $m\sqrt{2}$

.....

(2)

(d) Rationalise the denominator of $\frac{1}{8\sqrt{8}}$

Give your answer in the form $\frac{\sqrt{2}}{p}$ where p is a positive integer.

.....

(2)

(Total 6 marks)

3. Work out

$$\frac{(5 + \sqrt{3})(5 - \sqrt{3})}{\sqrt{22}}$$

Give your answer in its simplest form.

.....

(Total 3 marks)

4. (a) Find the value of $16^{\frac{1}{2}}$

.....

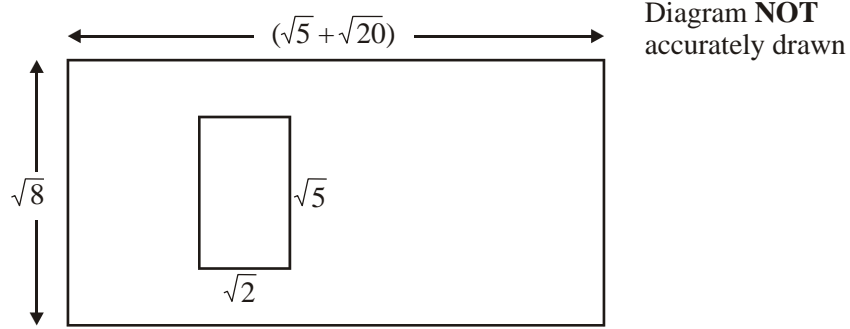
(1)

(b) Given that $\sqrt{40} = k\sqrt{10}$, find the value of k .

.....

(1)

Summer Homework



A large rectangular piece of card is $(\sqrt{5} + \sqrt{20})$ cm long and $\sqrt{8}$ cm wide.

A small rectangle $\sqrt{2}$ cm long and $\sqrt{5}$ cm wide is cut out of the piece of card.

(c) Express the area of the card that is left as a percentage of the area of the large rectangle.

.....%

(4)

(Total 6 marks)

5. Expand and simplify

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

.....

(Total 2 marks)

Summer Homework

Algebra: factorising, expanding and algebraic fractions

6. (a) Simplify fully $(3x^2y^4)^3$

..... (2)

(b) Expand and simplify $(2x + 5)(3x - 2)$

..... (2)

(c) Simplify fully $\frac{x^2 + 5x + 6}{x^2 + 2x}$

..... (2)
(Total 6 marks)

7. Simplify fully

(a) $(3xy^2)^4$

..... (2)

(b) $\frac{x^2 - 3x}{x^2 - 8x + 15}$

..... (3)
(Total 5 marks)

Summer Homework

8. (a) Factorise

$$9x^2 - 6x + 1$$

.....

(2)

(b) Simplify

$$\frac{6x^2 + 7x - 3}{9x^2 - 6x + 1}$$

.....

(3)

(Total 5 marks)

Quadratic equations

9. The diagram below shows a 6-sided shape.

All the corners are right angles.

All measurements are given in centimetres.

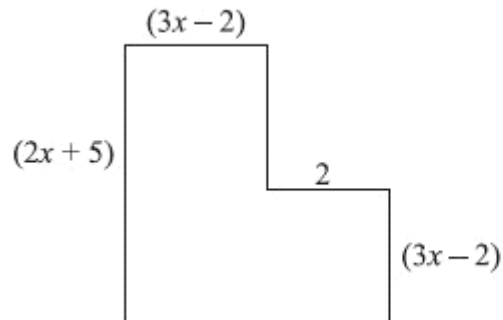


Diagram **NOT** accurately drawn

The area of the shape is 25 cm^2 .

(a) Show that $6x^2 + 17x - 39 = 0$

(3)

(b) (i) Solve the equation

$$6x^2 + 17x - 39 = 0$$

$$x = \dots\dots\dots \text{ or } x = \dots\dots\dots$$

(ii) Hence work out the length of the longest side of the shape.

.....cm

(4)

(Total 7 marks)

10. Solve this quadratic equation.

$$x^2 - 5x - 8 = 0$$

Give your answers correct to 3 significant figures.

$$x = \dots\dots\dots \text{or } x = \dots\dots\dots$$

(Total 3 marks)

Simultaneous equations

11. Solve

$$\begin{aligned} 2x - 3y &= 11 \\ 5x + 2y &= 18 \end{aligned}$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total 4 marks)

Summer Homework

12. Solve the simultaneous equations

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

$$3x - 2y = 28$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total 4 marks)

Summer Homework

13. Solve the simultaneous equations

$$x^2 + y^2 = 29$$

$$y - x = 3$$

.....
(Total 7 marks)

Inequalities

14. Solve the inequality $3x + 2 > -7$

.....
(Total 2 marks)

Summer Homework

15. (i) Solve the inequality $7x - 3 > 17$

.....

x is a whole number such that $7x - 3 > 17$

- (ii) Write down the smallest value of x .

.....

(Total 3 marks)