

Algebra 4H Assessment

THE ANSWERS

Higher Level



All questions

Clip	Grade	Title of clip	Question(s)	Marked out of	Score	%
178.	6	Product of Three Binomials	1	9	—	—
179.	6	Iteration - Trial and Improvement	2 - 4	13	—	—
180.	6	Iterative Processes	5 - 6	9	—	—
190.	7	Rearranging Difficult Formulae	7	8	—	—
191.	7	Solving Quadratics with the Formula	8 - 9	11	—	—
192.	7	Factorising Hard Quadratics	10 - 11	10	—	—

Out of 60 TOTAL SCORE \_\_\_\_\_

Final Percentage  %

1) Expand and simplify:

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

$$\underline{2x^3 + 7x^2 + 3x} \quad 3$$

b)  $(3x + 2)(x - 1)(2x + 5)$

$$\underline{6x^3 + 13x^2 - 9x - 10} \quad 3$$

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

$$\underline{5x^3 - 2x^2 - 45x + 18} \quad 3$$

2) The equation  $x^3 - x = 45$

has a solution between 3 and 4.

Use a trial and improvement method to find this solution, giving your answer correct to 1 decimal place.

You must show all your working.

$x$	$x^3 - x = 45$	
3	$3^3 - 3 = 24$	Small
4	$4^3 - 4 = 60$	Big
3.6	$3.6^3 - 3.6 = 43.056$	Small
3.7	$3.7^3 - 3.7 = 46.953$	Big
3.65	$3.65^3 - 3.65 = 44.977$	Small

$$x = \underline{3.7} \quad 4$$

3) Use trial and improvement to solve

$$x^2 + \frac{1}{x} = 27$$

Give your answer to 1 decimal place.

You must show all your working.

$x$	$x^2 + \frac{1}{x} = 27$	
5	$5^2 + \frac{1}{5} = 25.2$	Small
6	$6^2 + \frac{1}{6} = 36.17$	Big
5.1	$5.1^2 + \frac{1}{5.1} = 26.206$	Small
5.2	$5.2^2 + \frac{1}{5.2} = 27.232$	Big
5.15	$5.15^2 + \frac{1}{5.15} = 26.717$	Small

$$x = \underline{5.2} \quad 4$$

4) A prism has volume  $V = x^3 + 3x^2$

The volume of the prism is  $120 \text{ cm}^3$

Use trial and improvement to work out the value of  $x$  to 1 decimal place.

You must show all your working.

$x$	$x^3 + 3x^2 = 120$	
3	$3^3 + 3 \times 3^2 = 54$	Small
4	$4^3 + 3 \times 4^2 = 112$	Small
5	$5^3 + 3 \times 5^2 = 200$	Big
4.1	$4.1^3 + 3 \times 4.1^2 = 119.351$	Small
4.2	$4.2^3 + 3 \times 4.2^2 = 127.008$	Big
4.15	$4.15^3 + 3 \times 4.15^2 = 123.14$	Big

$$x = \underline{4.1} \quad 5$$

5) A sequence is defined by the term-to-term rule

$$u_{n+1} = u_n^2 - 2u_n + 11$$

Give that  $u_1 = 3$ , find  $u_2$ ,  $u_3$  and  $u_4$ .

$$u_2 = \underline{14} \quad 2$$

$$u_3 = \underline{179} \quad 2$$

$$u_4 = \underline{31694} \quad 2$$

6) A sequence is defined by the term-to-term rule

$$x_{n+1} = 7 - \frac{1}{x_n}$$

Using a starting value of  $x_1 = 1$ ,

find a solution to  $x = 7 - \frac{1}{x}$

Give your answer to 2 significant figures.

$$x = \underline{6.9} \quad 3$$

7) a) Rearrange  $L = \frac{x}{y} - 2$  to make  $x$  the subject.

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

b) Rearrange  $2x + 1 = 4(2y - x)$  to make  $x$  the subject.

$$x = \frac{8y - 1}{6} \quad 3$$

c) Rearrange  $y = \frac{3x - 4}{7 - x}$  to make  $x$  the subject.

$$x = \frac{7y + 4}{y + 3} \quad 3$$

8) Solve:

a)  $x^2 + 8x + 5 = 0$

Give your answers to 2 decimal places.

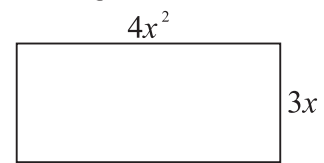
$$x = \underline{-0.68}, \underline{-7.32} \quad 3$$

b)  $2x^2 - 6x - 1 = 0$

Give your answers to 3 significant figures.

$$x = \underline{3.16}, \underline{-0.158} \quad 3$$

9) A rectangle has length  $4x^2$  and width  $3x$ .



The perimeter of the rectangle is 13 cm.

Work out the length of the rectangle.  
Give your answer to 1 decimal place.

$$3.6 \quad 5$$

10) Factorise:

a)  $6x^2 + 11x + 3$

$$\underline{(2x + 3)(3x + 1)} \quad 3$$

b)  $3x^2 + 13x - 10$

$$\underline{(x + 5)(3x - 2)} \quad 3$$

11) Solve:

$$3x^2 - 34x + 63 = 0$$

$$x = \underline{\frac{7}{3}}, \underline{9} \quad 4$$