



Aberdare Community School
Mathematics Department

WJEC GCSE
Higher – Calculator
Algebra

Algebra skills - early questions

Name:

Set:

Date:

Teacher:

4. (a) Solve $8x + 4 = 7 - 4x$.

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[3]

(b) Solve $5(2x - 3) = 50$.

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[3]

4. (a) Solve the following equations.

(i) $\frac{3x}{5} = 6$

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

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[5]

2. (a) Solve $10x + 9 = 6x + 11$.

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[3]

(b) Solve $5(x - 4) = 50$.

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[3]

5.

(b) Solve $8x + 7 = 2x + 10$.

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[3]

(c) Solve $\frac{y}{5} = 10$.

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[1]

4. (a) Solve $8x + 4 = 7 - 4x$.

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[3]

(b) Solve $5(2x - 3) = 50$.

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[3]

4.

(b) Expand and simplify $3(7t + 2) + 5(t - 7)$.

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..... [2]

(c) Solve $\frac{17-x}{6} = 2$.

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..... [2]

(d) Simplify $\frac{a^3 \times a^6}{a^2}$.

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..... [1]

(e) Expand $y(y^3 + 6)$.

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..... [2]

(f) Solve $\frac{x}{2} + 6 = 20$.

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..... [2]

3. (a) Solve $7x + 2 = 3 + 5x$.

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[3]

- (c) Simplify $a^5 \times a^2$.

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[1]

- (d) Expand $b(b + 3)$.

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[2]

4. (a) Solve $6x - 8 = 4x + 20$.

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[3]

2. (a) Solve $\frac{x}{4} = 20$.

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..... [1]

(c) Solve $4(3x + 7) = 64$.

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..... [3]

(d) Find the value of $3a^2$ when $a = -2$.

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..... [1]

4. (a) Complete the table.

$3x$	33
x	11
$2c - 3$	17
c	
$c - a$	3
a	
$a + b$	12
b	
$c + b$	

[4]

3. When $f = 6$ and $g = -3$, find the value of the following.

(a) $\frac{2f - 5g}{3}$

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[2]

(b) $(fg^2)^3$

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[2]

6.

(b) Solve the inequality $5(t - 2) > 3t + 14$.

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[3]

(c) Solve $x(x + 4) = 0$.

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[2]



5. Miriam is working on a spreadsheet. She has been asked to work with a number of formulae, but soon realises that some of the formulae are the same.

Here is the list of formulae given to Miriam:

Formula A $y = 3(a + b) - b$

Formula B $y = a(a + 1) + b$

Formula C $y = 5a - b - 2a + 3b$

Formula D $y = 2b(a + 1) + a(3 - 2b)$

- (a) Simplify each of the above formulae.

Formula A $y = 3(a + b) - b$

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Formula B $y = a(a + 1) + b$

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Formula C $y = 5a - b - 2a + 3b$

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Formula D $y = 2b(a + 1) + a(3 - 2b)$

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[7]

- (b) Which of the formulae are identical?

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[1]

4.

(c) Expand and simplify $9(x + 4) - 4(x - 5)$.

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[2]

(d) Solve $\frac{35-x}{6} = 7$.

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[3]

2.

(d) Solve $4(3x - 11) = 40$.

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[3]

(e) Solve $\frac{45}{x} = 5$.

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[1]

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[3]

3. (a) Solve $5(2x - 7) = 75$.

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[3]

(b) Simplify $7x - 3(4x - 1)$.

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[2]

4370
060005



1. (a) Solve $\frac{3x}{4} = 24$.

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..... [2]

(b) Solve $\frac{8}{x} = 16$.

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..... [1]

(c) Solve $7(5x - 4) = 77$.

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..... [3]

(d) Solve the inequality $6x + 5 < 47$.

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..... [2]

(e) Write down the smallest whole number that satisfies the inequality $3x > 67$.

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..... [2]

4.

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(c) Find the value of y^3 when $y = -4$.

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[1]

(d) Given that $a = 3$, $b = -7$ and $c = 10$, evaluate $\frac{2a^2 - b}{5c}$.

Express your answer as a decimal.

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[3]

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020007



4.

(b) Solve $\frac{2}{3}x + 6 = 10 - \frac{1}{3}x$.

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[2]



3. (a) Abby is having difficulty deciding on a four-digit code for her debit card.



To generate a code, she decides to write down an expression in which she would substitute her age.

When an expression produces a four-digit number, she could then use it as her code.

Abby is 17 years old.

In each of the following expressions, y is Abby's age.

Evaluate the expressions to find which of them Abby could use to produce a four-digit code for her debit card.

You must show all your working and answers.

$$y^2 - 2y$$

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$$3y(2y^2 + 5)$$

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$$\frac{289y + 502}{5}$$

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Abby's four-digit code

[4]

- (b) Charlie is also having difficulty deciding on a four-digit code. He decides to use the smallest four-digit number he gets by squaring a prime number. Find Charlie's four-digit code.

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[2]

1. A scientist has found that under certain conditions the force (F) acting on a moving particle is given by the following formula,

$$F = 100t - t^2$$

where t is the time measured in seconds from the time the particle started to move.

Calculate the value of the force after 1 minute 40 seconds.

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[2]



2. (a) Solve $\frac{2}{x} = 8$.

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..... [1]

(b) Solve $2(7x - 13) = 16$.

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..... [3]

(c) Solve $\frac{x + 4}{12} = 6$.

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..... [2]

(d) Write down the greatest whole number that satisfies the inequality $5x < 34$.

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..... [2]

(e) Solve the inequality $3x - 4 < 26$.

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..... [2]

5. (a) Solve $8x - 11 = 3x + 29$.

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[3]

(d) Expand $2x(x + 6)$.

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[2]



4. (a) Solve $\frac{8x}{5} = 60$.

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..... [2]

(b) Solve $\frac{3}{x} = 12$.

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..... [1]

(c) Solve $9x - 4 = 7(x + 2)$.

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..... [3]

(d) Solve the inequality $10x + 5 > 45$.

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..... [2]

(e) Write down the smallest whole number that satisfies the inequality $9x > 60$.

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..... [2]

3.

(b) Find the value of $2x^3$ when $x = -5$.

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[1]

(c) Given that $a = 25$, $b = -3$ and $c = 7$, evaluate $\frac{a-b}{8c}$.

Express your answer as a decimal.

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[3]

4353
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6. (a) Solve $\frac{x}{3} + 42 = 53$.

[2]

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(b) Solve $\frac{40 - x}{11} = 4$.

[3]

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3. (a) Simplify each of the following.

(i) $-7g - 4h - 6g - (-8h)$

[2]

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(ii) $3p^6 \times 5p^5$

[1]

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(iii) $\frac{46y^6}{23y^2}$

[1]

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(b) Pencils cost x pence each.

Pens cost twice as much as pencils.

Write and simplify an expression, in terms of x , for the total cost of 3 pencils and 4 pens.

[2]

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4. The formula used for converting a temperature measured in degrees Celsius ($^{\circ}\text{C}$) to its value in degrees Fahrenheit ($^{\circ}\text{F}$) is

$$F = \frac{9C}{5} + 32.$$

Metal is heated to a temperature of 140°F .
What is this temperature in degrees Celsius?

[3]

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1.

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(b) Solve $7x + 13 = 3x + 5$.

[3]

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5. One of the services offered by *Maid4U* is cleaning ovens. *Maid4U* calculates the cost for this service using the following method.

- START with a standard charge of £18
- ADD a fee of £12 for every complete hour worked AND an additional fee of 25p for every additional minute worked
- MULTIPLY the total charge so far by 1.2
- This equals the final charge

(a) Calculate the cost of cleaning an oven that takes

(i) $2\frac{1}{2}$ hours [2]

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(ii) 45 minutes [1]

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(b) Write a formula for working out the final charge, £*F* for cleaning an oven taking *h* hours and *m* minutes. [4]

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(c) Doris notices that there is a problem with the method for calculating the cost of cleaning an oven. Her oven took 2 hours to clean, and her neighbour's oven took 1 hour 50 minutes. Doris's bill for cleaning her oven was cheaper, yet took a longer time. Explain why this happens. [1]

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4361
02/00/09

1. (a) Solve $11 = \frac{220}{x}$.

[1]

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(b) Solve $3(4x - 13) = 45$.

[3]

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(c) Solve $\frac{x+4}{12} = 6$.

[2]

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1.

(b) Given that $x = 20$, $y = -3$ and $z = 5$, evaluate $3x + y^2z$. [2]

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(c) Solve the equation $\frac{4x}{5} = 20$. [2]

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(d) Solve the equation $6x - 19 = 2x + 12$. [3]

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5. Lizzie's job is to calculate solutions for a data analysis company which involves working with algebraic equations and expressions.

Process the following for Lizzie.

(a) Factorise $35x + 15$. [1]

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(b) Simplify $3a + 5b - 19a - 16b$. [1]

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(c) Simplify $3(3d - 2e) - (d - e)$. [2]

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2.

(d) Solve the inequality $9x + 5 < 77$.

[2]

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(e) Write down the greatest whole number that satisfies the inequality $5x < 85$.

[2]

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2. (a) Solve $\frac{5x}{8} = 10$.

[2]

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(b) Solve $\frac{28}{x} = 7$.

[1]

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(c) Solve $6(3x - 17) = 42$.

[3]

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1.

[1]

(d) Solve the equation $\frac{3}{a} = 10$.

[1]

(e) Solve the equation $3(x - 2) = x + 2$.

[3]



1.

[2]

(c) Given the formula $H = 3R + 2S$, find H when $R = 1\frac{1}{3}$ and $S = -1.8$.

[2]

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1. Given the formula $v = u + at$, find v when $u = -20$, $a = 9.8$ and $t = 5$.

[2]

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