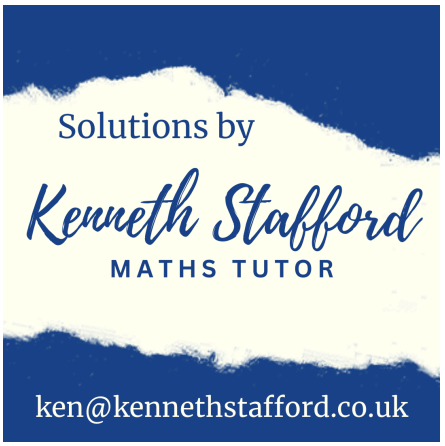
Name: _____

GCSE (1 - 9)

Substitution





These questions are compiled from *released* Pearson Edexcel GCSE maths exam papers
They contain exam questions from up until the ***Summer 2023*** exam series
More recent exam papers do exist but are withheld for mock exams
As new exam papers are released these worksheets will gradually be updated
The ***most current*** version of these worksheets will always be available at: kennethstafford.co.uk

Question	Where the question appeared
1	Edexcel, GCSE, Autumn 2017, Paper 2F, Q14
2	Edexcel, GCSE, Autumn 2018, Paper 1F, Q09
3	Edexcel, GCSE, Autumn 2018, Paper 1F, Q21
4	Edexcel, GCSE, Autumn 2019, Paper 1F, Q17
5	Edexcel, GCSE, Autumn 2019, Paper 2F, Q20
6	Edexcel, GCSE, Autumn 2019, Paper 2F, Q28
7	Edexcel, GCSE, Autumn 2019, Paper 3F, Q07
8	Edexcel, GCSE, Autumn 2020, Paper 2F, Q15
9	Edexcel, GCSE, Summer 2017, Paper 1F, Q16
10	Edexcel, GCSE, Summer 2017, Paper 3F, Q11
11	Edexcel, GCSE, Summer 2018, Paper 1F, Q16
12	Edexcel, GCSE, Summer 2019, Paper 2F, Q11
13	Edexcel, GCSE, Summer 2019, Paper 3F, Q15
14	Edexcel, GCSE, Summer 2022, Paper 1F, Q14
15	Edexcel, GCSE, Summer 2022, Paper 3F, Q23

Substitution (Questions from Edexcel GCSE Past Papers)

1

a and b are odd numbers.

(a) Give an example to show that the value of $2(a + b)$ is a multiple of 4

$a = 1$

$b = 3$

$2(a+b)$

$2(1+3) = 2(4) = 8$

8 is a multiple of 4

(2)

(b) Show that, when a and b are both odd numbers, the value of $2(a + b)$ will always be a multiple of 4

odd + odd = even

2 x even = a mutiple of 4

(2)

(Total for Question 14 is 4 marks)

[Edexcel, GCSE, Autumn 2017, Paper 2F, Q14]

Substitution (Questions from Edexcel GCSE Past Papers)

2

$g = 9$

$h = 4$

Work out the value of $2g + 3h$

$2g + 3h = 2(9) + 3(4)$

$= 18 + 12$

$= 30$

(Total for Question 9 is 2 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1F, Q09]

3

$v^2 = u^2 + 2as$

$u = 12$ $a = -3$ $s = 18$

(a) Work out a value of v.

$v^2 = u^2 + 2as$

$v^2 = (12)^2 + 2(-3) \times (18)$

$v^2 = 144 - 108$

$v^2 = 36$

$v = \sqrt{36} = \pm 6$

(2)

(b) Make s the subject of $v^2 = u^2 + 2as$

$u^2 + 2as = v^2$

$2as = v^2 - u^2$

$s = \frac{v^2 - u^2}{2a}$

$s = \frac{v^2 - u^2}{2a}$

(2)

(Total for Question 21 is 4 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1F, Q21]

4

$x - 1 = 2$

Work out the value of $2x^2$

$x - 1 = 2$

$x = 3$

$2(x)^2$

$= 2(3)^2$

$= 2 \times 9$

$= 18$

(Total for Question 17 is 3 marks)

[Edexcel, GCSE, Autumn 2019, Paper 1F, Q17]

5

An estimate of the height, H metres, of a tall building can be found using the formula

$$H = 4f + 12$$

where the building is f floors high.

A tall building is 110 floors high.
The real height of the building is 442 m.

Seb uses the formula to find an estimate of the height of this building.
He then finds the difference between his estimate and the real height.

Show that this difference is less than 5% of the real height.

$H = 4f + 12$

$H = 4(110) + 12$

$H = 440 + 12 = 452\text{ m}$

Difference $= 452 - 442 = 10\text{m}$

5% of real height $= 5\%$ of $442 = 22.1\text{m}$

$10\text{m} < 22.1\text{m}$

(Total for Question 20 is 4 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2F, Q20]

6

The number of days, d, that it will take to build a house is given by

$$d = \frac{720}{n}$$

where n is the number of workers used each day.

Ali's company will take 40 days to build the house.
Hayley's company will take 30 days to build the house.

Hayley's company will have to use more workers each day than Ali's company.

How many more?

$d = \frac{720}{n}$

$n = \frac{720}{d}$

Ali $n = \frac{720}{40} = 18$ workers

Hayley $n = \frac{720}{30} = 24$ workers

$24 - 18 = 6$

(Total for Question 28 is 3 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2F, Q28]

7

$w = 4u + 3$

Find the value of w when $u = 8$

$w = 4(8) + 3$

$= 32 + 3 = 35$

35

(Total for Question 7 is 2 marks)

[Edexcel, GCSE, Autumn 2019, Paper 3F, Q07]

Substitution (Questions from Edexcel GCSE Past Papers)

8

$T = 3x + 4y$

(a) Work out the value of T when $x = 5$ and $y = -7$

$T = 3(5) + 4(-7)$

$T = 15 + -28 = -13$

-13

(2)

(b) Work out the value of y when $T = 38$ and $x = 6$

$T = 3x + 4y$

$(38) = 3(6) + 4y$

$38 = 18 + 4y$

$20 = 4y$

$y = \frac{20}{4} = 5$

(2)

(Total for Question 15 is 4 marks)

[Edexcel, GCSE, Autumn 2020, Paper 2F, Q15]

9

$v = u + at$

$u = 1$ $a = -3$ $t = \frac{1}{2}$

Work out the value of v.

$v = u + at$

$v = (1) + (-3) \times (\frac{1}{2})$

$v = 1 - 1.5 = -0.5$

$v = -0.5$

(Total for Question 16 is 2 marks)

[Edexcel, GCSE, Summer 2017, Paper 1F, Q16]

10

$T = 4v + 3$

(a) Work out the value of T when $v = 2$

$T = 4v + 3$

$T = 4(2) + 3 = 8 + 3$

$T =$ 11

(2)

(b) Make v the subject of the formula $T = 4v + 3$

$4v + 3 = T$

$4v = T - 3$

$v = \frac{T-3}{4}$

$v = \frac{T-3}{4}$

(2)

(Total for Question 11 is 4 marks)

[Edexcel, GCSE, Summer 2017, Paper 3F, Q11]

Substitution (Questions from Edexcel GCSE Past Papers)

11

$P = 4x + 3y$

$x = 5$

$y = -2$

(a) Work out the value of P.

$P = 4x + 3y$

$P = 4(5) + 3(-2)$

$P = 20 - 6$

$P = 14$

14

(2)

(b) Expand $4e(e + 2)$

$4e(e + 2) = 4e^2 + 8e$

$4e^2 + 8e$

(2)

(c) Solve $3(m - 4) = 21$

$3(m - 4) = 21$

$3m - 12 = 21$

$3m = 33$

$m = \frac{33}{3}$

$m =$ 11

(2)

(Total for Question 16 is 6 marks)

[Edexcel, GCSE, Summer 2018, Paper 1F, Q16]

12

$P = 7r + 3q$

Work out the value of P when $r = 5$ and $q = -4$

$P = 7r + 3q$

$P = 7(5) + 3(-4)$

$P = 35 - 12$

$P = 23$

23

(Total for Question 11 is 2 marks)

[Edexcel, GCSE, Summer 2019, Paper 2F, Q11]

13

You can use this rule to work out the total hire charge, in pounds (£), for hiring a 3D printer for a number of weeks.

Total hire charge (£) = number of weeks × 70 + 50

Mia wants to hire a 3D printer for 4 weeks.

(a) Work out the total hire charge.

Charge = weeks × 70 + 50

Charge = 4 × 70 + 50

= 280 + 50

= 330

£ 330

(2)

Zahir hires a 3D printer.
The total hire charge is £680

(b) For how many weeks does Zahir hire the 3D printer?

Charge = 70x + 50

680 = 70x + 50

630 = 70x

$x = \frac{630}{70} = 9$

9 weeks

(2)

(Total for Question 15 is 4 marks)

[Edexcel, GCSE, Summer 2019, Paper 3F, Q15]

14

$y = 6x - 5$

Work out the value of y when $x = 4$

$y = 6(4) - 5$

$y = 24 - 5 = 19$

$y =$ 19

(Total for Question 14 is 2 marks)

[Edexcel, GCSE, Summer 2022, Paper 1F, Q14]

15

$T = 4m^2 - 11$

(a) Work out the value of T when $m = -3$

$T = 4(-3)^2 - 11$

$T = 4 \times 9 - 11$

$= 36 - 11$

$= 25$

$T =$ 25

(2)

[Edexcel, GCSE, Summer 2022, Paper 3F, Q23]