SUBSTITUTION

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier

1.

20 The table shows some values of x and y that satisfy the equation $y = a\cos x^\circ + b$

x	0	30	60	90	120	150	180
y	3	$1 + \sqrt{3}$	2	1	0	$1 - \sqrt{3}$	-1

Find the value of y when $x = 45$

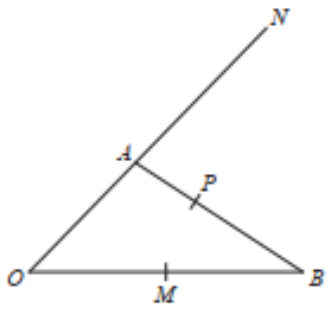
.....

(Total for Question 20 is 4 marks)

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

2.

21



OAN, OMB and APB are straight lines.
$AN = 2OA$.
M is the midpoint of OB.

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

$\overrightarrow{AP} = k\overrightarrow{AB}$ where k is a scalar quantity.

Given that MPN is a straight line, find the value of k.

.....

(Total for Question 21 is 5 marks)

Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

3.

19 $p^2 = \frac{x - y}{xy}$

$x = 8.5 \times 10^9$
$y = 4 \times 10^8$

Find the value of p.
Give your answer in standard form correct to 2 significant figures.

.....

(Total for Question 19 is 3 marks)

Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier

4.

3. (a) $p = 2$
$q = -4$

Work out the value of $3p + 5q$

.....

(2)

(b) Factorise $3m - 6$

.....

(1)

(Total 3 marks)

OCR GSCE – Tuesday 5 November 2019 – Paper 6 (Calculator) Higher Tier

5.

10 The value of a house, £H, is given by the formula

$$H = 165\,000 \times 1.03^t$$

where t is the number of years after 1st January 2010.

(a) Write down the value of the house on 1st January 2010.

(a) £ ..... **[1]**

(b) Write down the annual percentage increase in the value of the house.

(b) ..... % **[1]**

(c) Show that the value of the house is over £200 000 on 1st January 2017. **[2]**

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

6.

22 At the start of 2018, the population of a town was 17 150.
At the start of 2019, the population of the town was 16 807.

It is assumed that the population of the town is given by the formula

$$P = ar^t$$

where P is the population of the town t years after the start of 2018.

(a) Write down the value of a.

(a) ..... **[1]**

(b) Show that $r = 0.98$. **[1]**

(c) Show that the population is predicted to be less than 16 000 at the start of 2022. **[2]**

(d) Use the formula to work out what the population might have been at the start of 2017.

(d) ..... **[2]**

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

7.

12 The value of a car, £V, is given by

$$V = 16\,500 \times 0.82^n$$

where n is the number of years after it is bought from new.

(a) Write down the value of the car when new.

(a) £ ..... **[1]**

(b) Write down the annual percentage decrease in the value of the car.

(b) ..... % **[1]**

(c) Show that the value of the car after 4 years is less than half its value when new. **[2]**

OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

8.

20 In the following equation, n is an integer greater than 1.

$$(\sqrt{2})^n = k\sqrt{2}$$

(a) (i) Find k when $n = 7$.

(a)(i) $k =$ ..... **[2]**

(ii) Find n when $k = 64$.

(ii) $n =$ ..... **[2]**

(b) Show that $\dfrac{14}{3-\sqrt{2}}$ can be written in the form $a + b\sqrt{2}$. **[5]**

OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

9.

11 Amelia buys a new car.
The expected future value of this car, £V, is given by

$$V = 16000 \times 0.75^t$$

where t is the age of the car in complete years.

(a) (i) Write down the value of the car when new.

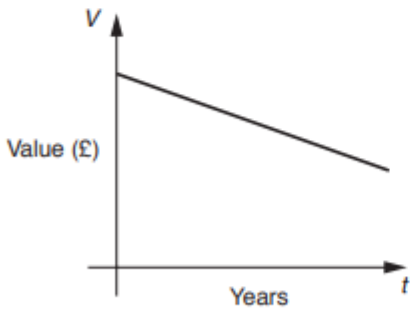
(i) £ ..... **[1]**

(ii) Write down the annual percentage decrease in the expected value of the car.

(ii) ..... % **[1]**

(iii) Show that the expected value of the car when 2 years old is £9000. **[2]**

(b) Amelia sketches a graph to show the expected value of her car as it gets older.



Explain how you know that Amelia's graph is incorrect.

.....

..... **[1]**

(c) Amelia assumes that her car will have no value at all after 20 years.

Explain why her assumption is mathematically incorrect.

.....

..... **[1]**

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

10.

1 Use the formula $s = ut + \frac{1}{2}at^2$.

(a) Calculate s when $u = 5$, $t = 10$ and $a = 3$.

(a) $s =$ ..... **[2]**

(b) Make a the subject of the formula.

(b) $a =$ ..... **[2]**

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

11.

14 The diagram shows a cross placed on a number grid.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

L is the product of the left and right numbers of the cross.
T is the product of the top and bottom numbers of the cross.
M is the middle number of the cross.

(a) Show that when $M = 35$, $L - T = 99$. **[2]**

(b) Prove that, for any position of the cross on the number grid above, $L - T = 99$. **[5]**

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

12.

4 Find the value of s when $u = 12$, $a = 10$ and $t = 4$.

$$s = ut + \frac{1}{2}at^2$$

..... **[2]**

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

13.

10 On 1st November 2015 there were 4200 trees planted in a wood.
On 1st November 2016, only 3948 of these trees were still alive.

It is assumed that the number of trees still alive is given by

$$N = ar^t$$

where N is the number of trees still alive t years after 1st November 2015.

(a) Write down the value of a.

(a) ..... **[1]**

(b) Show that r is 0.94. **[2]**

(c) Show that on 1st November 2030 the number of trees still alive is predicted to have decreased by over 60% compared with 1st November 2015. **[3]**

OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

14.

3 The value of a car £V is given by

$$V = 20\,000 \times 0.9^t$$

where t is the age of the car in complete years.

(a) Write down the value of V when $t = 0$.

(a) £ ..... **[1]**

(b) What is the value of V when $t = 3$?

(b) £ ..... **[2]**

(c) After how many complete years will the car's value drop below £10 000?

(c) ..... **[2]**

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

15.

17 $y = 6x^4 + 7x^2$ and $x = \sqrt{w+1}$.

Find the value of w when $y = 10$.
Show your working.

$w =$ ..... **[6]**

AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

16.

24 $f(x) = \sin(x - 90°)$

Circle the value of $f(0°)$

[1 mark]

1 0 $-\frac{1}{2}$ –1

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

17.

1 Circle the point that lies on the curve $y = x^2 - 4x + 1$

[1 mark]

(–1, 4) (–1, –4) (–1, –2) (–1, 6)

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

18.

27 $f(x) = \frac{2x}{5} - 1$

Work out the value of $f^{-1}(3) + f(-0.5)$

[5 marks]

Answer _____

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

19.

26 $g(x) = 16 - x$ $h(x) = x^3$

Solve $gh(x) = 24$

[3 marks]

$x =$ _____

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

20.

26 $f(x) = \frac{x}{x+2}$ $g(x) = x^2 - 2$

Work out $fg(x)$

Give your answer in the form $a + bx^n$ where a, b and n are integers.

[3 marks]

Answer _____

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

21.

27 The point $\left(3, \frac{1}{64}\right)$ lies on the curve $y = k^x$ where k is a constant.

Show that the point $\left(\frac{1}{2}, \frac{1}{2}\right)$ lies on the curve.

[3 marks]

AQA GSCE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

22.

3 Circle the point that does **not** lie on the curve $y = x^3$

[1 mark]

$\left(-\frac{1}{2}, -\frac{1}{8}\right)$ (5, 125) $\left(\frac{1}{3}, \frac{1}{9}\right)$ (–1, –1)

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

23.

16 $f(x) = x^2 - x^3$

Circle the value of f(–3)

[1 mark]

18 –18 36 –36

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

24.

30 $f(x) = \frac{x}{3} + 4$ for all values of x.

$g(x) = 6x^2 + 3$ for all values of x.

Work out $fg(x)$.

Give your answer in the form $ax^2 + b$ where a and b are integers.

[2 marks]

Answer _____