IGCSE EXTENDED MATHEMATICS (0580)

TOPICAL PAST PAPER QUESTIONS - 2016/2017

NUMBERS (Paper 2)

1. (0580-S 2016-Paper 2/1-Q1)

A train leaves Zurich at 2240 and arrives in Vienna at 0732 the next day.

Work out the time taken.

........................ h ........................ min [1]

2. (0580-S 2016-Paper 2/2-Q1)

Write 0.0000574 in standard form.

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

3. (0580-S 2016-Paper 2/3-Q1)

Find the cube root of 4913.

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

4. (0580-S 2016-Paper 2/1-Q2)

From a sample of 80 batteries, 3 are faulty.

Work out the percentage of faulty batteries.

........................................... % [1]

5. (0580-S 2016-Paper 2/2-Q2)

Calculate: \[
\frac{3.07 + 2^4}{5.03 - 1.79}
\]

........................................... [1]
6. (0580-S 2016-Paper 2/3-Q2)
Write 71 496 correct to 2 significant figures.

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

7. (0580-S 2016-Paper 2/1-Q3)
Write $1.27 \times 10^{-3}$ as an ordinary number.

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

8. (0580-S 2016-Paper 2/2-Q3)
Write 3.5897 correct to 4 significant figures.

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

9. (0580-S 2016-Paper 2/1-Q4)
Calculate $(2.1 - 0.078)^7$, giving your answer correct to 4 significant figures.

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

10. (0580-S 2016-Paper 2/1-Q5)
Omar changes 2000 Saudi Arabian riyals (SAR) into euros (€) when the exchange rate is €1 = 5.087 SAR.
Work out how much Omar receives, giving your answer correct to the nearest euro.

€ .................................[2]
11. (0580-S 2016-Paper 2/2-Q5)

From the list of numbers, write down:

(a) the square numbers,

(b) a prime factor of 99.

12. (0580-S 2016-Paper 2/3-Q5)

Without using a calculator, work out $\frac{1}{12} \times \frac{1}{5}$.

Show all your working and give your answer as a fraction in its lowest terms.

13. (0580-S 2016-Paper 2/1-Q6)

Find the lowest common multiple (LCM) of 36 and 48.
14. (0580-S 2016-Paper 2/2-Q7)

A map is drawn to a scale of 1 : 1000 000.
A forest on the map has an area of 4.6 cm².

Calculate the actual area of the forest in square kilometres.

........................................... km² [2]

15. (0580-S 2016-Paper 2/3-Q8)

Write the recurring decimal 0.3\(\bar{2}\) as a fraction.
[0.3\(\bar{2}\) means 0.3222...]

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

16. (0580-S 2016-Paper 2/1-Q10)

The sides of an equilateral triangle are 9.4 cm, correct to the nearest millimetre.

Work out the upper bound of the perimeter of this triangle.

........................................... cm [2]

17. (0580-S 2016-Paper 2/3-Q10)

Find the highest common factor (HCF) of 56 and 70.

........................................... [2]
18. **(0580-S 2016-Paper 2/2-Q12)**

Write the recurring decimal 0.36 as a fraction.
Give your answer in its simplest form.
[0.36 means 0.3666...]

................................................. [3]

19. **(0580-S 2016-Paper 2/2-Q13)**

The base of a triangle is 9 cm correct to the nearest cm.
The area of this triangle is 40 cm² correct to the nearest 5 cm².

Calculate the upper bound for the perpendicular height of this triangle.

................................................. cm [3]

20. **(0580-S 2016-Paper 2/2-Q14)**

*Without using a calculator*, work out \( \frac{5}{8} \times \frac{3}{7} \).
Show all your working and give your answer as a mixed number in its lowest terms.

................................................. [3]
21. (0580-S 2016-Paper 2/1-Q16)

Without using a calculator, work out \( \frac{6}{7} \div 1\frac{2}{3} \).

Show all your working and give your answer as a fraction in its lowest terms.

\[ \text{........................................... [3]} \]

22. (0580-S 2016-Paper 2/3-Q17)

(a) \( V = IR \)

In an experiment \( I \) and \( R \) are both measured correct to 1 decimal place.

When \( I = 4.0 \) and \( R = 2.7 \), find the lower bound for \( V \).

\[ \text{........................................... [2]} \]

(b) \( S = \frac{D}{T} \)

In an experiment \( D \) and \( T \) are both measured correct to 2 significant figures.

When \( D = 7.6 \) and \( T = 0.23 \), find the upper bound for \( S \).

\[ \text{........................................... [2]} \]
23. (0580-S 2016-Paper 2/1-Q18)

A car of length 4.5 m is travelling at 105 km/h. It passes over a bridge of length 36 m.

Calculate the time, in seconds, it takes to pass over the bridge completely.

.............................. s [3]

24. (0580-S 2016-Paper 2/2-Q19)

It is estimated that the world’s population is growing at a rate of 1.14% per year. On January 1st 2014 the population was 7.23 billion.

(a) Find the expected population on January 1st 2020.

.............................. billion [2]

(b) Find the year when the population is expected to reach 10 billion.

.............................. [2]
25. (0580-S 2016-Paper 2/3-Q19)

At the start of an experiment there are 20000 bacteria.
The number of bacteria increases at a rate of 30% per hour.

(a) Work out the number of bacteria after 4 hours.

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

(b) After how many whole hours, from the start of the experiment, will the number of bacteria be greater than one million?

.................................................. hours [2]

26. (0580-W 2016-Paper 2/1-Q1)

Write down the temperature which is 5°C below −2°C.

.................................................. °C [1]

27. (0580-W 2016-Paper 2/2-Q1)

(a) Write 14835 correct to the nearest thousand.

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

(b) Write your answer to part (a) in standard form.

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

28. (0580-W 2016-Paper 2/3-Q1)

\[ V = 4p^2 \]

Find \( V \) when \( p = 3 \).

\[ V = \text{..................................................} [1] \]
29. (0580-W 2016-Paper 2/1-Q2)

Write 0.0401907 correct to

(a) 3 significant figures, .................................................................[1]

(b) 3 decimal places. .................................................................[1]

30. (0580-W 2016-Paper 2/1-Q3)

The price of a toy is 12 euros (€) in Germany and 14 Swiss francs in Switzerland.
1 Swiss franc = €0.905

Calculate the difference between these two prices.
Give your answer in euros.

€ .................................................................[2]

31. (0580-W 2016-Paper 2/1-Q4)

Work out $\frac{2}{3} - \frac{1}{4}$, giving your answer as a fraction in its lowest terms.

Do not use a calculator and show all the steps of your working.

.................................................................[2]
32. (0580-W 2016-Paper 2/3-Q4)
Write in standard form.
(a) \(2470000\)
.......................................................................................... [1]
(b) \(0.0079\)
.......................................................................................... [1]

33. (0580-W 2016-Paper 2/1-Q5)
(a) Write \(5^{-3}\) as a fraction.
.......................................................................................... [1]
(b) Write \(0.00456\) in standard form.
.......................................................................................... [1]

34. (0580-W 2016-Paper 2/3-Q5)
Without using a calculator, work out \(\frac{3}{5} + \frac{1}{6}\).
Write down all the steps of your working and give your answer as a fraction in its simplest form.
.......................................................................................... [2]

35. (0580-W 2016-Paper 2/2-Q6)
The sides of a square are 8 cm, correct to the nearest centimetre.
Calculate the upper bound for the area of the square.
......................................................................................... cm\(^2\) [2]
36. *(0580-W 2016-Paper 2/3-Q6)*

James is an animal doctor.
The table shows some information about the cats he saw in one week.

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cats seen</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Mean mass of a cat (kg)</td>
<td>1.9</td>
<td>0.9</td>
<td>2.1</td>
<td>1.8</td>
<td>2</td>
</tr>
</tbody>
</table>

One of the cats James saw had a mass of 4 kg.

On which day did he see this cat?

37. *(0580-W 2016-Paper 2/3-Q7)*

Write these in order of size, smallest first.

\[ 0.6^3 \quad 0.22 \quad \sqrt{0.09} \quad 0.4^2 \]

\[ \text{smallest} \]

38. *(0580-W 2016-Paper 2/3-Q8)*

The length of a car is 4.2 m, correct to 1 decimal place.

Write down the upper bound and the lower bound of the length of this car.

\[ \text{Upper bound} = \text{........................................... m} \]

\[ \text{Lower bound} = \text{........................................... m} \]
39. (0580-W 2016-Paper 2/3-Q10)

Calculate.

(a) \( 2^3 - \sqrt{10 + 4^2} \) ........................................... [1]

(b) \( \frac{2\sqrt{3} \times \tan 70^\circ}{3} \) ........................................... [1]

40. (0580-W 2016-Paper 2/3-Q11)

Ahmed paid $34,000 for a car.
His car decreased in value by 40% at the end of the first year.
The value at the end of the second year was 10% less than the value at the end of the first year.

Calculate the value of Ahmed’s car after 2 years.

$ ........................................... [2]

41. (0580-W 2016-Paper 2/1-Q12)

(a) Write $0.70 as a fraction of $5.60, giving your answer in its lowest terms.

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

(b) Write the recurring decimal 0.\( \overline{18} \) as a fraction in its lowest terms.
[ 0.18 means 0.181818... ]

........................................... [2]
42. (0580-W 2016-Paper 2/2-Q12)

Ralf and Susie share $57 in the ratio 2 : 1.

(a) Calculate the amount Ralf receives.

$$ \text{.........} \quad \text{[2]}$$

(b) Ralf gives $2 to Susie.

Calculate the new ratio: Ralf’s money : Susie’s money.
Give your answer in its simplest form.

$$ \text{.........} : \text{.........} \quad \text{[2]}$$

43. (0580-W 2016-Paper 2/3-Q13)

Write the recurring decimal 0.\(\overline{2}\) as a fraction.

[0.\(\overline{2}\) means 0.222...]

$$ \text{.........} \quad \text{[2]}$$

44. (0580-W 2016-Paper 2/2-Q14)

Without using your calculator, work out \(\frac{3}{4} + \frac{2}{3} - \frac{1}{8}\).

You must show all your working and give your answer as a mixed number in its simplest form.

$$ \text{.........} \quad \text{[4]}$$
45. (0580-W 2016-Paper 2/1-Q20)

A train travels for $m$ minutes at a speed of $x$ metres per second.

(a) Find the distance travelled, in kilometres, in terms of $m$ and $x$. Give your answer in its simplest form.

........................................ km [2]

(b) When $m = 5$, the train travels 10.5 km.

Find the value of $x$.

$x = ........................................... [2]

46. (0580-S 2017-Paper 2/2-Q1)

Write 0.07164 correct to 2 significant figures.

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

47. (0580-S 2017-Paper 2/3-Q1)

Calculate $\sqrt{\frac{1}{2}(1 - \cos 48^\circ)}$.

........................................... [1]
48. (0580-S 2017-Paper 2/1-Q2)

The thickness of one sheet of paper is \(8 \times 10^{-3}\) cm.

Work out the thickness of 250 sheets of paper.

\[................................. \text{cm} \quad [1] \]

49. (0580-S 2017-Paper 2/1-Q3)

Write 23.4571 correct to

(a) 4 significant figures,

\[................................. \quad [1] \]

(b) the nearest 10.

\[................................. \quad [1] \]

50. (0580-S 2017-Paper 2/2-Q3)

Change 6200 cm\(^2\) into m\(^2\).

\[................................. \text{m}^2 \quad [1] \]

51. (0580-S 2017-Paper 2/3-Q3)

Find the lowest common multiple (LCM) of 20 and 24.

\[................................. \quad [2] \]
52. (0580-S 2017-Paper 2/1-Q4)

The table shows the temperatures in five places at 10 am one day in January.

<table>
<thead>
<tr>
<th>Place</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helsinki</td>
<td>−7</td>
</tr>
<tr>
<td>Chicago</td>
<td>−10</td>
</tr>
<tr>
<td>London</td>
<td>3</td>
</tr>
<tr>
<td>Moscow</td>
<td>−4</td>
</tr>
<tr>
<td>Bangkok</td>
<td>26</td>
</tr>
</tbody>
</table>

(a) Which place was the coldest?

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

(b) At 2 pm the temperature in Helsinki had increased by 4 °C.

Write down the temperature in Helsinki at 2 pm.

................................................. °C [1]

53. (0580-S 2017-Paper 2/2-Q4)

Calculate \( \sqrt{20} + 3.8^2 - 25 \).

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

54. (0580-S 2017-Paper 2/2-Q5)

Work out 85 cents as a percentage of $2.03.

................................................. % [1]
55. (0580-S 2017-Paper 2/1-Q7)

Without using a calculator, work out $1\frac{2}{3} + \frac{5}{7}$.

Write down all the steps of your working and give your answer as a mixed number in its simplest form.

................................. [3]

56. (0580-S 2017-Paper 2/2-Q9)

Without using a calculator, work out $\frac{5}{6} - \frac{1}{2}$.

Show all the steps of your working and give your answer as a fraction in its simplest form.

................................. [2]
57. \((0580\text{-S 2017-Paper 2/2-Q11})\)

(a) Write 0.0605 in standard form.

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

(b) Calculate \(0.1 \times 5.1 \times 10^4\), giving your answer in standard form.

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

58. \((0580\text{-S 2017-Paper 2/3-Q14})\)

Write the recurring decimal 0.6\(\overline{3}\) as a fraction in its lowest terms.
You must show all your working.

.............................................................. [3]

59. \((0580\text{-S 2017-Paper 2/2-Q18})\)

A rectangle has length 62\,mm and width 47\,mm, both correct to the nearest millimetre.
The area of this rectangle is \(A\) \,mm\(^2\).

Complete the statement about the value of \(A\).

.............................................................. \(\leq A < \) .............................................................. [3]
60. (0580-S 2017-Paper 2/3-Q19)

Without using your calculator, work out \( \frac{11}{12} \div \left( \frac{3}{4} - \frac{2}{3} \right) \).

You must show all your working and give your answer as a fraction in its simplest form.

\[ \text{.......................................................... [4]} \]

61. (0580-S 2017-Paper 2/2-Q20)

Write as a single fraction in its simplest form.

\[ \frac{2x-1}{3} - \frac{2}{x+1} \]

\[ \text{.......................................................... [3]} \]
62. (0580-S 2017-Paper 2/3-Q20)

Simplify.

(a) \( 6w^0 \)

(b) \( 5x^3 - 3x^3 \)

(c) \( 3y^6 \times 5y^{-2} \)

63. (0580-S 2017-Paper 2/3-Q24)

Marcel invests $2500 for 3 years at a rate of \( 1.6\% \) per year simple interest.
Jacques invests $2000 for 3 years at a rate of \( x\% \) per year compound interest.
At the end of the 3 years Marcel and Jacques receive the same amount of interest.

Calculate the value of \( x \) correct to 3 significant figures.

\[ x = \]