Extended Mathematics (Revision Paper) Paper 2

Targeted Topics P2 (Oct/Nov 2014)

Chapter 1 (Numbers)

➢ Ratio, Proportion, Percentage
➢ Arranging numbers and conversion of units
➢ Simple & Compound Interest
➢ Boundaries
➢ Sequence
➢ Standard Form

DON'T STOP WHEN YOU ARE TIRED. STOP WHEN YOU ARE DONE!

SUCCESS is a state of mind. If you want success - start thinking of yourself as a success.

Dr. Joyce Brothers
1 Write in order of size, smallest first.

\[
\frac{5}{98}, \quad 0.049, \quad 5\%.
\]

Answer \(0.049 < 5\% < \frac{5}{98}\) [2]

2 The graph below can be used to convert between euros (€) and pounds (£).

(a) Change £5 into euros.

Answer (a) € \(\underline{8}\) [1]

(b) Change €90 into pounds.

\(5 : 8\)

Answer (b) £ \(\underline{56.25}\) [1]

3 The top speed of a car is 54 metres per second. Change this speed into kilometres per hour.

\[
54 \text{ m/s} \times \frac{3600}{1000} \text{ km/h}
\]

Answer \(194.4 \text{ km/h}\) [2]

5 The ratios of teachers : male students : female students in a school are 2 : 17 : 18. The total number of students is 665. Find the number of teachers.

\(2 : 17 : 18\)

\(\times 19\)

Answer 38 [2]
6 A rectangular field is 18 metres long and 12 metres wide. Both measurements are correct to the nearest metre. Work out exactly the smallest possible area of the field.

\[ 17.5 \times 11.5 = \]

Answer: \( \frac{201.25}{m^2} \) [2]

8 Complete this table of squares and cubes. The numbers are not in sequence.

<table>
<thead>
<tr>
<th>Number</th>
<th>Square</th>
<th>Cube</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>( \sqrt{121} )</td>
<td>121</td>
<td>( 1331 )</td>
</tr>
<tr>
<td>( \sqrt{196} )</td>
<td>19.6</td>
<td>2744</td>
</tr>
<tr>
<td>(-7)</td>
<td>(-49)</td>
<td>(-343)</td>
</tr>
</tbody>
</table>

[3]

11 Write each of these four numbers in the correct place in the Venn Diagram below.

\[ 2.6, \quad \frac{4}{17}, \quad \sqrt{12}, \quad \sqrt{\frac{112}{17}} \]

Rational numbers can be written as a fraction of integers.

[4]

15 In 1950, the population of Switzerland was 4,714,900. In 2000, the population was 7,087,000.

(a) Work out the percentage increase in the population from 1950 to 2000.

\[ \frac{4710000}{4714900} \times 100 = 50.3 \% \]

Answer (a): \( \frac{50.3}{\%} \) [2]

(b) (i) Write the 1950 population correct to 3 significant figures.

Answer (b)(i): \( 4.71 \times 10^6 \) [1]

(ii) Write the 2000 population in standard form.

Answer (b)(ii): \( 7.087 \times 10^6 \) [1]
1. A train left Sydney at 23:20 on December 18th and arrived in Brisbane at 02:40 on December 19th. How long, in hours and minutes, was the journey?

\[ \begin{array}{c}
2.40 \\
4.0 \\
\hline
2.80 \approx 3.20
\end{array} \]

*Answer* \(2.0\) h \(20\) min \(1\)

2. Use your calculator to find the value of

\[ \frac{6 \sin 50^\circ}{\sin 25^\circ} \]

*Answer* \(10.876\) \(1\)

3. Write the numbers \(0.5^2, \sqrt{0.5}, 0.5^3\) in order with the smallest first.

\(0.25, 0.7, 0.125\)

*Answer* \(0.5^3 < 0.5^2 < \sqrt{0.5}\) \(2\)

4. The population, \(P\), of a small island was 6380, correct to the nearest 10. Complete the statement about the limits of \(P\).

*Answer* \(6375 < P < 6385\) \(2\)

5. Work out the value of

\[ \begin{array}{c}
\frac{-1}{2} - \frac{3}{8} \\
\frac{-1}{2} + \frac{3}{8} \\
\hline
\frac{-4}{8} - \frac{3}{8} \\
\frac{-4}{8} + \frac{3}{8} \\
\hline
\frac{-7}{8} \\
\frac{-7}{8} \times \frac{8}{1} \\
\hline
\frac{56}{8} = 7
\end{array} \]

*Answer* \(7\) \(2\)
9 Sara has $3000 to invest for 2 years. She invests the money in a bank which pays simple interest at the rate of 7.5\% per year. Calculate how much interest she will have at the end of the 2 years.

\[
\text{Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100} = \frac{3000 \times 7.5 \times 2}{100} = 450
\]

Answer $450$ \[2\]

10 The area of a small country is 78 133 square kilometres.

(a) Write this area correct to 1 significant figure.

\[\text{Answer (a)} = 80000 \text{ km}^2 \] \[1\]

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

\[\text{Answer (b)} = 7.8133 \times 10^4 \text{ km}^2 \] \[1\]
1 Calculate \[
\frac{25}{32}
\]
(a) giving your answer as a fraction, 
\[\text{Answer (a)} \quad \frac{25}{32} \quad [1]\]
(b) giving your answer as a decimal.
\[\text{Answer (b)} \quad 0.78125 \quad [1]\]

3 A block of cheese, of mass 8 kilograms, is cut by a machine into 500 equal slices.

(a) Calculate the mass of one slice of cheese in kilograms.
\[\frac{8\text{ kg}}{500} = \frac{8000\text{ g}}{500\text{ g}} = 16\text{ g}\]
\[\text{Answer (a)} \quad 16\text{ g} = 0.016\text{ kg} \quad [1]\]

(b) Write your answer to part (a) in standard form.
\[\text{Answer (b)} \quad 1.6 \times 10^{-2}\text{ kg} \quad [1]\]

4 Calculate the value of \((\cos 40^\circ)^2 + (\sin 40^\circ)^2\).
\[\text{Answer} \quad 1 \quad [2]\]
To raise money for charity, Jalaj walks 22 km, correct to the nearest kilometre, every day for 5 days.

(a) Complete the statement in the answer space for the distance, $d$ km, he walks in one day.

\[
\text{Answer (a)} \quad 21.5 \leq d < 22.5 \quad [2]
\]

(b) He raises $1.60 for every kilometre that he walks. Calculate the least amount of money that he raises at the end of the 5 days.

\[
\frac{(1.60 \times 22)}{5} = \text{Answer (b)} \quad 17.2 \quad [1]
\]

A house was built in 1985 and cost $62,000. It was sold in 2003 for $310,000.

(a) Work out the 1985 price as a percentage of the 2003 price.

\[
\frac{62000}{310000} \times 100\% = \text{Answer (a)} \quad 20\% \quad [2]
\]

(b) Calculate the percentage increase in the price from 1985 to 2003.

\[
\frac{400}{\text{Answer (b)}} \% \quad [2]
\]
Date: 14th Oct 2014

2006

1. The planet Neptune is 4.496 x 10^9 kilometres from the Sun. Write this distance in standard form.
   \[ \text{Answer: } 4.496 \times 10^9 \text{ km} \] [1]

2. Write down the next prime number after 89.
   \[ \text{Answer: } 97 \] [1]

3. The table gives the average surface temperature (°C) on the following planets.

   \[
   \begin{array}{|c|c|c|c|c|c|c|}
   
   \hline
   \text{Planet} & \text{Earth} & \text{Mercury} & \text{Neptune} & \text{Pluto} & \text{Saturn} & \text{Uranus} \\
   \hline
   \text{Average temperature} & 15 & 350 & -220 & -240 & -180 & -200 \\
   \hline
   \end{array}
   \]

   (a) Calculate the range of these temperatures.
   \[ \text{Answer(a): } 590 \text{ °C} \] [1]

   (b) Which planet has a temperature 20°C lower than that of Uranus?
   \[ \text{Answer(b): Neptune} \] [1]

4. Work out
   \[ \frac{2\tan30°}{1-(\tan30°)^2} \]
   \[ \text{Answer: } 1.732 \] [2]

7. Sima drinks 2.5 litres of water each day.
   A full glass holds 125 millilitres of water.
   How many full glasses of water does Sima drink each day?
   \[ \frac{2500}{125} = 20 \]
   \[ \text{Answer: } 20 \] [2]
8 Write the following in order of size, smallest first.

\[
\begin{align*}
\frac{\pi}{4} & \quad \frac{1}{\sqrt{2}} & \quad \frac{3}{4} & \quad \sin 47^\circ \\
0.785 & \quad 0.707 & \quad 0.75 & \quad 0.73
\end{align*}
\]

Answer \( \frac{1}{\sqrt{2}} < \sin 47^\circ < \frac{3}{4} < \frac{\pi}{4} \) \[2\]

9 The distance between Singapore and Sydney is 6300 km correct to the nearest 100 km. A businessman travelled from Singapore to Sydney and then back to Singapore. He did this six times in a year. Between what limits is the total distance he travelled?

\( (6250 \times 2) \times 6 = 75000 \)

\( (6350 \times 2) \times 6 = \)

Answer \( 75000 \) km ≤ total distance travelled < \( 76200 \) km \[2\]

10 For the sequence \( 5 \frac{1}{2}, \quad 7, \quad 8 \frac{1}{2}, \quad 10, \quad 11 \frac{1}{2}, \quad ... \)

(a) find an expression for the \( n \)th term.

\( \frac{3}{2} n + 4 \)

Answer (a) \( \frac{3}{2} n + 4 \) \[2\]

(b) work out the 100th term.

Answer (b) 154 \[1\]
15 Angharad had an operation costing $500.
   She was in hospital for $x$ days.
   The cost of nursing care was $170$ for each day she was in hospital.

   (a) Write down, in terms of $x$, an expression for the total cost of her operation and nursing care.

   \[ \text{Answer (a)} \quad 500 + 170x \quad \text{[1]} \]

   (b) The total cost of her operation and nursing care was $2370$.
   Work out how many days Angharad was in hospital.

   \[
   \begin{align*}
   500 + 170x &= 2370 \\
   170x &= 1870 \\
   x &= \frac{1870}{170} = 11 \text{ days} \quad \text{Answer (b) [2]}
   \end{align*}
   \]

16 In 2004 Colin had a salary of $7200$.

   (a) This was an increase of 20\% on his salary in 2002.
   Calculate his salary in 2002.

   \[
   7200 \times 0.8 = 5760 \quad \text{Answer (a) [2]}
   \]

   (b) In 2006 his salary increased to $8100$.
   Calculate the percentage increase from 2004 to 2006.

   \[
   \frac{8100 - 7200}{7200} = \frac{900}{7200} = \frac{1}{8} \quad \text{Answer (b) [2]}
   \]

   \[
   12.5 \%
   \]
4. Write the following in order of size, smallest first.

\[\cos 100^\circ \quad \sin 100^\circ \quad \tan 100^\circ\]

Answer: \(\tan 100^\circ < \cos 100^\circ < \sin 100^\circ\) [2]

5. A tin of soup has the following information on the label.

<table>
<thead>
<tr>
<th>200 grams of soup contains</th>
<th>Protein</th>
<th>Carbohydrate</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 g</td>
<td>8.7 g</td>
<td>5.8 g</td>
<td></td>
</tr>
</tbody>
</table>

(a) What fraction of the soup is Protein? Give your answer in its simplest form.

\[\frac{4}{200} \times 100 = \frac{1}{50}\]

Answer(a): \(\frac{1}{50}\) [1]

(b) What percentage of the soup is Carbohydrate?

\[\frac{8.7}{200} \times 100 = 4.35\%\]

Answer(b): 4.35% [1]

6. Carmen spends 5 minutes, correct to the nearest minute, preparing one meal. She spends a total time of 7 minutes preparing 30 meals. Between what limits does \(T\) lie?

\[4 \text{ min } 30 \times \frac{5 \text{ min } 30}{30} \times \frac{30}{30}\]

Answer: \(135 < T < 165\) [2]
Kalid and his brother have $2000 each to invest for 3 years.

(a) North Eastern Bank advertises savings with simple interest at 5% per year.
Kalid invests his money in this bank.
How much money will he have at the end of 3 years?

\[ 2000 + \frac{2000 \times 5 \times 3}{100} = 2000 + \frac{3000}{100} \]

Answer: $2300

(b) South Western Bank advertises savings with compound interest at 4.9% per year.
Kalid's brother invests his money in this bank.
At the end of 3 years, how much more money will he have than Kalid?

\[ P \left(1 + \frac{R}{100}\right)^T = 2000 \left(1 + \frac{4.9}{100}\right)^3 = 2308.64 \]

\[ \frac{2300}{8.64} \]
1. Write down the next two prime numbers after 47.

Answer: 53 and 59 [2]

2. Write the following in order of size, smallest first.

\[
\begin{align*}
\sqrt{9} & \quad \frac{5}{7} & \quad 72\% & \quad \left(\frac{4}{3}\right)^{-1} \\
0.73 & \quad 0.71 & \quad 0.72 & \quad 0.75
\end{align*}
\]

Answer: \(\frac{5}{7}\) < 72\% < \(\sqrt{\frac{9}{17}}\) < \(\left(\frac{4}{3}\right)^{-1}\) [2]

3. Lin scored 18 marks in a test and Jon scored 12 marks.
Calculate Lin's mark as a percentage of Jon's mark.

\[
\frac{18}{12} \times 100 = 150\%.
\]

Answer: 150% [2]
4  (a) The formula for the $n$th term of the sequence

\[ 1, 5, 14, 30, 55, 91, \ldots \] is \[ \frac{n(n+1)(2n+1)}{6} \]

Find the 20th term.

\[ \frac{20 \cdot (21) \cdot (42)}{6} \]

Answer (a) \[ 1540 \] \[ [1] \]

(b) The $n$th term of the sequence \( 10, 17, 26, 37, 50, \ldots \) is \((n+2)^2 + 1\).

Write down the formula for the $n$th term of the sequence \( 17, 26, 37, 50, 65, \ldots \)

Answer (b) \[ (n+3)^2 + 1 \] \[ [1] \]

6  Write the following in order of size, smallest first.

\[
\begin{array}{ccc}
\frac{399}{401} & \frac{698}{701} & \frac{598}{601} \\
0.99501 & 0.9957 & 0.99500
\end{array}
\]

Answer \[ \frac{598}{601} \ldots < \frac{399}{401} < \frac{698}{701} \ldots \] \[ [2] \]
7 Write the number 1045.2781 correct to

(a) 2 decimal places.  
Answer(a) \[\underline{1045.28}\] [1]

(b) 2 significant figures.
Answer(b) \[\underline{1000}\] [1]

2009

3 At 0506 Mr Ho bought 850 fish at a fish market for \$2.62 each.  
95 minutes later he sold them all to a supermarket for \$2.86 each.

(a) What was the time when he sold the fish?

\[
\begin{align*}
&0506 \rightarrow 54 \text{ mins} \\
&0600 \rightarrow 1 \text{ hr 12 mins} \\
&0644 \rightarrow 1 \text{ hr 44 mins}
\end{align*}
\]
Answer(a) \[\underline{0644}\] [1]

(b) Calculate his total profit.

\[
(\underline{2.86 \times 850}) - (2.62 \times 850)
\]
Answer(b) \[\underline{204}\] [1]
6. In 2005 there were 9 million bicycles in Beijing, correct to the nearest million.

The average distance travelled by each bicycle in one day was 6.5 km correct to one decimal place.

Work out the upper bound for the total distance travelled by all the bicycles in one day.

\[ \text{UB 9.5 million} \times \text{UB 6.55 km} \]

Answer \[ \underline{62,225,000} \text{ km} \] [2]

11. In January Sunanda changed £25,000 into dollars when the exchange rate was $1.96 = £1.

In June she changed the dollars back into pounds when the exchange rate was $1.75 = £1.

Calculate the profit she made, giving your answer in pounds (£).

\[ 25,000 \times \frac{1}{1.96} = 49,000 \rightarrow 28,000 \]

\[ 28,000 - 25,000 = \]

Answer £ \[ \underline{3,000} \] [3]

14. (a) There are \( 10^9 \) nanoseconds in 1 second.

Find the number of nanoseconds in 5 minutes, giving your answer in standard form.

\[ 10^9 \times 60 \times 5 \]

\[ 10^9 \times 3 \times 10^2 \]

\[ = 3 \times 10^{11} \]

Answer(a) \[ \underline{3 \times 10^{11}} \] [2]

(b) Solve the equation \[ 5(x + 3 \times 10^7) = 4 \times 10^7. \]

\[ 5x + 1.5 \times 10^7 = 4 \times 10^7 \]

\[ Answer(b) x = 5 \times 10^6 \]

\[ 5x = 2.5 \times 10^7 \]

\[ x = 0.5 \times 10^7 \]

\[ x = 5 \times 10^6 \]
2 Calculate \(3\sin120^\circ - 4(\sin120^\circ)^3\).

Answer: \(0\) [2]

3 Write the following in order of size, smallest first.

\[
\frac{2}{\sqrt{3}} \quad 2 - \sqrt{3} \quad \sqrt{3} \quad \frac{2 - \sqrt{3}}{2} \quad 1.18 \quad 0.268 \quad 1.73 \quad 1.13
\]

Answer: \(2 - \sqrt{3} \lessdot \frac{2 - \sqrt{3}}{2} \lessdot \frac{2}{\sqrt{3}} \lessdot \sqrt{3}\) [2]

5 Write \(2^8 \times 8^2 \times 4^2\) in the form \(2^n\).

\[
2^8 \times (2^3)^2 \times (2^2)^{-2}
\]

Answer: \(2^{10}\) [2]

6 Change 64 square metres into square millimetres.

Give your answer in standard form.

\[
64 \times 1000^2
\]

\[
64 \times (10^3)^2
\]

\(= 64 \times 10^6\)

\(= 6.4 \times 10^7\)

Answer: \(6.4 \times 10^7\) mm\(^2\) [2]
2 Which of the following numbers are irrational?

\[ \frac{2}{3}, \sqrt{36}, \sqrt[3]{3} + \sqrt{6}, 0.75, 48\%, 8 \frac{1}{2} \]

Answer: circled [2]

3 Show that \( \frac{5}{9} + \frac{7}{9} = \frac{7}{8} \).

Write down all the steps in your working.

Answer:

\[ \frac{5}{q} \div \frac{7}{q} \]

\[ \frac{14}{q} \div \frac{16}{q} \]

\[ \frac{14}{q} \times \frac{9}{16} = \frac{14}{16} = \frac{7}{8} \]

[2]

4 \[ \frac{3}{6} < \frac{2}{3} \]

Which of the following could be a value of \( x? \)

5 A meal on a boat costs 6 euros (EUR) or 11.5 Brunei dollars (S). In which currency does the meal cost less, on a day when the exchange rate is EUR = S1.9037? Write down all the steps in your working.

\[ \text{EUR 6} = \$11.4222 \quad <\$11.5 \]

\[ \times 1.9037 \]

Answer: Euros [2]
6. Use your calculator to find the value of \( 2^{1/3} \).

Give your answer correct to 4 significant figures.

\[
\sqrt[3]{2} = 3.321997085 \approx 3.3322
\]

Answer \( 3.3322 \) [2]

7. Solve the equation \( 4x + 6 \times 10^3 = 8 \times 10^4 \).

Give your answer in standard form.

\[
4x + 6 \times 10^3 = 8 \times 10^4
\]

\[
4x + 0.6 \times 10^4 = 8 \times 10^4
\]

\[
x = 7.4 \times 10^4
\]

Answer \( x = 1.85 \times 10^4 \) [3]

9. Ashraf takes 1500 steps to walk \( d \) metres from his home to the station. Each step is 90 centimetres correct to the nearest 10 cm.

Find the lower bound and the upper bound for \( d \).

\[
0.85 \times 1500
\]

Answer \( 2750 \leq d \leq 14250 \) [3]
The table shows the opening and closing times of a café.

<table>
<thead>
<tr>
<th></th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening</td>
<td>0600</td>
<td>0600</td>
<td>0600</td>
<td>0600</td>
<td>0600</td>
<td>(a)</td>
<td>0800</td>
</tr>
<tr>
<td>Closing</td>
<td>2200</td>
<td>2200</td>
<td>2200</td>
<td>2200</td>
<td>2200</td>
<td>2200</td>
<td>1300</td>
</tr>
</tbody>
</table>

(a) The café is open for a total of 100 hours each week.

Work out the opening time on Saturday:

\[
\frac{100(16+16+16+16+16+5)}{16+16+16+16+16+5}
\]

Answer(a) \[0700\] [2]

(b) The owner decides to close the café at a later time on Sunday. This increases the total number of hours the café is open by 4%.

Work out the new closing time on Sunday.

\[100 + 4\% = 104 \text{ hrs}\]

\[+4 \text{ hrs}\]

Answer(b) \[1700\] [1]
16th Oct 2014

2012

1 The ferry from Helsinki to Travemunde leaves Helsinki at 17:30 on a Tuesday. The journey takes 28 hours 45 minutes.

Work out the day and time that the ferry arrives in Travemunde.

Answer Day Wednesday Time 22:15 [2]

3 For this question, $1 < x < 2$.

Write the following in order of size, smallest first.

$$\frac{5}{x}, 5x, \frac{x}{5}, x - 5$$

$x = 1.5$ 5 5 0.2 -4

$x = 2$ 2.5 10 0.4 -3

Answer $x - 5 < \frac{x}{5} < \frac{5x}{x} < \frac{5}{x}$ [2]

4

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{p}{12}$$

Work out the value of $p$.

Show all your working.

$$\frac{3}{2} + \frac{1}{3} + \frac{1}{4}$$

$$\frac{18}{12} + \frac{4}{12} + \frac{3}{12} = \frac{25}{12}$$

Answer $p = \frac{25}{12}$ [2]
5 A lake has an area of 63,800,000,000 square metres.

Write this area in square kilometres, correct to 2 significant figures.

\[
\frac{6.38 \times 10^{10} \text{ m}^2}{(1000)^2} = 6.38 \times 10^4 \text{ km}^2
\]

Answer \( \frac{64000}{\text{km}^2} \) [2]

\[
\frac{6.38 \times 10^{10}}{10^6} = 6.38 \times 10^4
\]

\[
= 63800 \text{ km}^2
\]

\[
= 64000 \text{ km}^2
\]

13 The taxi fare in a city is $3 and then $0.40 for every kilometre travelled.

(a) A taxi fare is $9.

How far has the taxi travelled?

\[
3 + 0.4 \times x = 9
\]

\[
0.4 \times x = 6
\]

\[
x = 15
\]

Answer (a) \( 15 \text{ km} \) [2]

(b) Taxi fares cost 30% more at night.

How much does a $9 daytime journey cost at night?

\[
$9 \times 1.3 =
\]

Answer (b) $11.70 [2]
3 The first five terms of a sequence are shown below.

\[ 13 \quad 9 \quad 5 \quad 1 \quad -3 \]

Find the \( n \)th term of this sequence.

\[-4n + 17\]

\[ \text{Answer} \quad -4n + 17 \quad [2] \]

4 Calculate \((4.3 \times 10^8) + (2.5 \times 10^7)\).

Give your answer in standard form.

\[
\begin{array}{c}
430000000 \\
+ \\
250000000 \\
\hline
4550000000
\end{array}
\]

\[\frac{4.3 \times 10^8}{0.25 \times 10^8} = \frac{4.3}{0.25} \times 10^8 = 4.55 \times 10^8 \]

\[\text{Answer} \quad 4.55 \times 10^8 \quad [2] \]

6 George and his friend Jane buy copies of the same book on the internet.
George pays $16.99 and Jane pays £11.99 on a day when the exchange rate is $1 = £0.626.

Calculate, in dollars, how much more Jane pays.

\[
\begin{array}{c}
11.99 \\
\times \quad \frac{1}{0.626} \\
\hline
16.95 \\
\hline
2.20
\end{array}
\]

\[\text{Answer} \quad 2.20 \quad [2] \]
7 (a) Use your calculator to work out \( \sqrt{65} - 1.7^2 \).

Write down all the numbers displayed on your calculator.

\[ \text{Answer(a)} \quad 5.172257748 \]

(b) Write your answer to part (a) correct to 2 significant figures.

\[ \text{Answer(b)} \quad 5.2 \]

8 Joe measures the side of a square correct to 1 decimal place. He calculates the upper bound for the area of the square as 37.8225 cm².

Work out Joe’s measurement for the side of the square.

\[ \sqrt{37.8225 \text{ cm}^2} = 6.15 \text{ cm} \]

UB = 6.15 cm

\[ \text{Answer} \quad 6.1 \text{ cm} \]

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

Write down all the steps in your working.

\[ \frac{6}{7} + \frac{5}{3} = \frac{6}{7} \times 1 \frac{3}{5} = \frac{18}{35} \]

\[ \text{Answer} \quad \frac{18}{35} \]
13 Carol invests $6250 at a rate of 2% per year compound interest.

Calculate the total amount Carol has after 3 years.

\[ 6250 \left(1 + \frac{2}{100}\right)^3 \]

Answer $6632.55 [3]

2014

1 Calculate \( \frac{\sqrt[3]{16}}{1.3^2} \).

Answer \( 1.49 \) [1]

2 (a) Write 569 000 correct to 2 significant figures.

Answer (a) \( 570 000 \) [1]

(b) Write 569 000 in standard form.

Answer (b) \( 5.69 \times 10^5 \) [1]
6  The mass of 1 cm$^3$ of copper is 8.5 grams, correct to 1 decimal place.

Complete the statement about the total mass, $T$ grams, of 12 cm$^3$ of copper.

\[ 0.45 \times 12 \quad \Rightarrow \quad 8.5 \times 12 \quad \Rightarrow \quad \]

Answer $101.4 \, \text{g} = T < 102.6$ \[\text{[2]}\]

7  Write the following in order, smallest first.

\[ \sqrt{0.1} \quad \frac{43}{201} \quad 2 \frac{1}{2} \% \quad 0.2 \]

\[ 0.32 \quad 0.21 \quad 0.025 \quad 0.2 \]

\[ \text{Answer} \quad \frac{2}{3} \% \quad 0.2 \quad 0.7 \quad \frac{43}{201} < \sqrt{0.1} \quad \text{[2]} \]

8  Without using your calculator, work out $\frac{5}{6} - \left( \frac{1}{2} \times \frac{1}{2} \right)$.

Write down all the steps of your working.

\[ \frac{5}{6} - \left( \frac{1}{2} \times \frac{1}{2} \right) \]

\[ \frac{5}{6} - \left( \frac{1}{2} \times \frac{3}{2} \right) \quad \text{Answer} \quad \frac{1}{12} \quad \text{[3]} \]

\[ \frac{5}{6} - \frac{3}{4} = \frac{10}{12} - \frac{9}{12} = \frac{1}{12} \]
9 At the beginning of July, Kim had a mass of 63 kg. At the end of July, his mass was 61 kg.

Calculate the percentage loss in Kim’s mass.

\[
\text{Change} \times \frac{100}{\text{original}} = \frac{-2}{63} \times 100 = \]

\[\text{Answer} \ 3.17\% \ [3]\]

11 Anita buys a computer for $391 in a sale. The sale price is 15% less than the original price.

Calculate the original price of the computer.

\[
\frac{391}{85} = 85\%.
\]

\[
\frac{391}{85} = 1\%.
\]

\[
\frac{391 \times 100}{85} = 100\%
\]

\[\text{Answer} \ 460\] \ [3]
These are the first 5 terms of a sequence.

Find

(a) the 6th term,

(b) the $n$th term,

(e) which term is equal to $-332$.

\[-7n + 39 = -332\]
\[-7n = -371\]
\[n = 53\]