WORK SAMPLE PORTFOLIO

Annotated work sample portfolios are provided to support implementation of the Foundation – Year 10 Australian Curriculum.

Each portfolio is an example of evidence of student learning in relation to the achievement standard. Three portfolios are available for each achievement standard, illustrating satisfactory, above satisfactory and below satisfactory student achievement. The set of portfolios assists teachers to make on-balance judgements about the quality of their students’ achievement.

Each portfolio comprises a collection of students’ work drawn from a range of assessment tasks. There is no predetermined number of student work samples in a portfolio, nor are they sequenced in any particular order. Each work sample in the portfolio may vary in terms of how much student time was involved in undertaking the task or the degree of support provided by the teacher. The portfolios comprise authentic samples of student work and may contain errors such as spelling mistakes and other inaccuracies. Opinions expressed in student work are those of the student.

The portfolios have been selected, annotated and reviewed by classroom teachers and other curriculum experts. The portfolios will be reviewed over time.

ACARA acknowledges the contribution of Australian teachers in the development of these work sample portfolios.

THIS PORTFOLIO: YEAR 8 MATHEMATICS

This portfolio provides the following student work samples:

Sample 1  Number and measurement: Food pyramids
Sample 2  Number: Feed the family
Sample 3  Statistics: Books, cricket and pets
Sample 4  Algebra: Linear relationships in the real world
Sample 5  Geometry: Sorting quadrilaterals
Sample 6  Number: Ratios
Sample 7  Number: Halfway
Sample 8  Algebra: Solving linear equations
Sample 9  Probability: Venn diagrams and two-way tables
Sample 10  Measurement: Circumference and area
Sample 11  Measurement: Rain on the roof
Sample 12  Number and measurement: Investigating circles
Sample 13  Geometry: Congruence
Sample 14  Measurement: Perimeter and area
Sample 15  Number: Integers
Sample 16  Number: Percentages

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This portfolio of student work shows the solving of everyday problems involving rates, ratios and percentages (WS1, WS2, WS6, WS16), including those involving profit and loss (WS16). The student uses efficient mental and written strategies to carry out the four operations with integers (WS15) and describes rational numbers (WS7). The student explains issues related to the collection of data and the effect of outliers on means and medians in that data (WS3). The student solves linear equations (WS8) and graphs linear relationships on the Cartesian plane (WS4). The student deduces the properties of quadrilaterals (WS5), names the features of circles and calculates the areas and perimeters of plane shapes including circles (WS10, WS12, WS14). The student solves problems relating to the volume of prisms (WS11). The student investigates the conditions for congruence and applies these conditions to triangles (WS13). The student models authentic situations with two-way tables and Venn diagrams (WS9).
Number and measurement: Food pyramids

Year 8 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

By the end of Year 8, students solve everyday problems involving rates, ratios and percentages. They recognise index laws and apply them to whole numbers. They describe rational and irrational numbers. Students solve problems involving profit and loss. They make connections between expanding and factorising algebraic expressions. Students solve problems relating to the volume of prisms. They make sense of time duration in real applications. They identify conditions for the congruence of triangles and deduce the properties of quadrilaterals. Students model authentic situations with two-way tables and Venn diagrams. They choose appropriate language to describe events and experiments. They explain issues related to the collection of data and the effect of outliers on means and medians in that data.

Students use efficient mental and written strategies to carry out the four operations with integers. They simplify a variety of algebraic expressions. They solve linear equations and graph linear relationships on the Cartesian plane. Students convert between units of measurement for area and volume. They perform calculations to determine perimeter and area of parallelograms, rhombuses and kites. They name the features of circles and calculate the areas and circumferences of circles. Students determine complementary events and calculate the sum of probabilities.

Summary of task

Students were given this task to consolidate previously studied units on rates, ratios and percentages.
9. Food Pyramids

This “pyramid” is used to offer advice to people about what amounts of different kinds of food they should eat each day.

The larger the area of the region, the more of that kind of food is recommended.

So, for example, people are encouraged to eat lots of grains, but very little fats, oils and sweets.

1. By finding the area of particular sections of the “pyramid”, state the recommended percentages of the total daily diet which should be allocated to:
   - fats, oils, and sweets;
   - vegetables;
   - area of whole pyramid  2. Area of fats, oils and sweets  3. Percentage

\[ A = \frac{1}{2} \times b \times h \]

\[ A = \frac{1}{2} \times 12.4 \times 10 \]

\[ = 62 \text{ cm}^2 \]

\[ \text{Vegetables; } \]

\[ \text{Area of vegetable } = \frac{1}{2} b \times h \] (a+b)

\[ \frac{1}{2} \times 2.3 \times 3.4 + 4.9 \]

\[ = 15.2 \% \]

\[ \text{Calculations: } \]

\[ 100 \times \frac{9.43}{62} \]

\[ = 15.2 \% \]

\[ \text{Interprets the calculated answer in the context of the problem.} \]

Food Pyramids used by kind permission of NSW Department of Education and Communities.

Note: For the purpose of the work sample portfolio, the image has been reduced in size.
Number: Feed the family

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Summary of task

Students were given a task to complete in class time relating to the unit of work they had completed on ratios and scales.
### Annotations

- **Simplifies ratios using given quantities in both a simple and more complex question.**
- **Identifies that the original recipe needs to be scaled by a factor of 5.**
- **Puts correct answers in table and converts to larger units of measure.**

---

**Number: Feed the family**

**FEED THE FAMILY ON FATHERS DAY**

Remember
1kg = 1000g

The whole family are coming to your house for Father’s Day and you have to cook pancakes for everyone!

This is the recipe to make enough pancakes for 4 people:

**Ingredients**
- Plain Flour – 200g
- Self Raising Flour – 300g
- Milk – 200g (200mL)
- Egg – 1

1. Write down the simplified ratio of:

<table>
<thead>
<tr>
<th>Plain Flour : Self Raising Flour</th>
<th>Milk : Dry Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>\frac{200}{300} : \frac{1}{3}</td>
<td>\frac{200}{2} : 5</td>
</tr>
</tbody>
</table>

2. If this feeds a family of 4, show how you would calculate what quantities you would need for 20 people. Put your answers in the table below (WORKING SPACE):

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Flour</th>
<th>SR Flour</th>
<th>Milk</th>
<th>Eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>\frac{1000}{1400}</td>
<td>\frac{1500}{1500}</td>
<td>\frac{1000}{1500}</td>
<td>\frac{5}{Eggs}</td>
</tr>
</tbody>
</table>
Number: Feed the family

3. Pricing
   Items can only be bought in the following quantities

<table>
<thead>
<tr>
<th>Flour $3.50 per kg</th>
<th>SR Flour $3.50 per kg</th>
<th>Milk $1 per 1kg (1 litre)</th>
<th>Eggs: packs of 6 for $4</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) How many packets of each item will you have to buy? (WORKING SPACE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flour</td>
<td>SR Flour</td>
<td>Milk</td>
<td>Eggs</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

   b) What is the total cost?
   - 15 x $3.50 = $52.50
   - 2.5 x $1.00 = $2.50
   - 1 x $4.00 = $4.00
   - Total cost = $69.00

   c) What quantity of each item will be left over?
   - Flour: 15 x 3 = 45
   - SR Flour: 2 x 3 = 6
   - Milk: 1 x 3 = 3
   - Eggs: 1 x 3 = 3
   - Total left over = 45 + 6 + 3 + 3 = 57

4. How many people could you feed for $50?
   (WORKING SPACE)
   - You could feed 60 people

5. How would you change the recipe to feed
   a) 60 people
   b) 2 people

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Flour</th>
<th>SR Flour</th>
<th>Milk</th>
<th>Eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0.5</td>
<td>0.00</td>
<td>0.5</td>
</tr>
</tbody>
</table>

   Calculates number of packets of each ingredient and cost based on answer to question 2 showing some working.

   Uses calculated cost to feed 20 people to reasonably estimate number of people who could be fed with $50.

   Simplifies and applies ratios to scale quantities up and down.
Statistics: Books, cricket and pets

Year 8 Mathematics achievement standard

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Summary of task

Students were given a task to complete in class time relating to the unit of work they had completed on statistical analysis of data and the effects of outliers on the interpretation of data.
Calculates mean, median and mode from a list of discrete data.

Recognises that the outlier would increase the mean but have little effect on the median and mode.
Statistics: Books, cricket and pets

2. In a cricket match, Australia scored a total of 347 runs. There were 11 batters.
   a) What was the mean number of runs per player?
      \[ \frac{347}{11} = 31.5 \text{ per batter} \]
   
   b) Do you know how many runs each batter scored? Why/Why not?
      Because it doesn't show which batter got how much.
   
   c) If you are told that the median score was 36, write down a possible score for each player in the table below.

<table>
<thead>
<tr>
<th>Batter 1</th>
<th>Batter 2</th>
<th>Batter 3</th>
<th>Batter 4</th>
<th>Batter 5</th>
<th>Batter 6</th>
<th>Batter 7</th>
<th>Batter 8</th>
<th>Batter 9</th>
<th>Batter 10</th>
<th>Batter 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>12</td>
<td>24</td>
<td>18</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
<td>88</td>
<td>39</td>
</tr>
</tbody>
</table>

3. A survey was taken in a year 8 class asking each student how many pets they had at home.
   A frequency distribution histogram was drawn of the results.
   a) Fill out the frequency distribution table

<table>
<thead>
<tr>
<th>x</th>
<th>f</th>
<th>fx</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>59</td>
</tr>
</tbody>
</table>

How many students were surveyed?

\[ 25 \]

How many pets were there all together?

\[ 59 \]

What is the mean number of pets?

\[ 2.36 \]

What is the effect of the outlier?

- Pets: 45
- People: 24
- Mean: 1.875

Who might be this information be useful for?

Annotations

Calculates the mean showing working.

Demonstrates understanding that the sum of the data values does not provide information about individual data values.

Creates an appropriate data set with the correct median, number of values and sum.

Interprets data presented in a graph to find the number of students surveyed and the total number of pets and calculates the mean using these numbers.

Recognises 14 as the outlier and calculates the decrease in the number of pets and the mean without the outlier included.
Algebra: Linear relationships in the real world

Year 8 Mathematics achievement standard

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Summary of task

Students were asked to research the peak rates for taxi hire in the ACT and NSW. The rates at the time are shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>ACT</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flag fall</td>
<td>$4.70</td>
<td>$3.50</td>
</tr>
<tr>
<td>Price/km</td>
<td>$1.90</td>
<td>$2.14</td>
</tr>
</tbody>
</table>

Students were asked to use their knowledge of graphing and equations to make comparisons between the two sets of information and to use mathematical reasoning to draw conclusions from the investigation.
Algebra: Linear relationships in the real world

Comparing rates

1. Fill in the following tables to compare the Peak rates of NSW and ACT

<table>
<thead>
<tr>
<th></th>
<th>ACT</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flag</td>
<td>Flag</td>
<td>Flag</td>
</tr>
<tr>
<td>rate</td>
<td>+ 1km</td>
<td>+ 2km</td>
</tr>
<tr>
<td>$4.70</td>
<td>$3.50</td>
<td>$5.60</td>
</tr>
<tr>
<td>$6.60</td>
<td>$5.64</td>
<td>$8.50</td>
</tr>
<tr>
<td>$9.50</td>
<td>$9.78</td>
<td>$11.20</td>
</tr>
<tr>
<td>$12.30</td>
<td>$14.70</td>
<td></td>
</tr>
</tbody>
</table>

2. Plot the two tables on the graph provided, using a different colour for each.

Annotations

Graphs linear relationships, labelling the axes and giving units, a key and a title.
Algebra: Linear relationships in the real world

3. Write an Algebraic equation to suit the ACT Taxi rates.
   (Hint: flag rate + price per km = Cost of ride)
   \[ 4.20 + 1.90x = C \]
   \[ x = \text{km} \]

4. Write an Algebraic equation to suit the NSW Taxi rates
   \[ 3.50 + 2.19x = C \]

5. Explain how your equations work, in words:
   The equation works by adding the
   flag rate to the price per kilometre.
   since the price per km by the amount of
   km.

6. At which distance does NSW become more expensive than ACT taxis and why?
   At the same mark because the NSW
   price per km is larger but flag rate
   is smaller. Eventually the NSW taxi price
   will be higher than the ACT.

7. If you had $20, how far could you travel in a taxi in the ACT?
   \[ 20 = 4.2 + 1.9x \]
   \[ 15.3 = 9.1x \]
   \[ 1.03x = \]
8. Explain why this graph could not represent the rate of a taxi?

Annotations

This couldn’t represent the cost of the taxi because the price decreases so you wouldn’t have to pay money.

Explain why the graph is a not valid representation and relates it to the context.
Geometry: Sorting quadrilaterals

Year 8 Mathematics achievement standard

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Summary of task

Students were given a task to complete in class time relating to the unit of work they had completed on quadrilaterals. They were required to show their reasoning when drawing conclusions.
## Geometry: Sorting quadrilaterals

### 19. Sorting Quadrilaterals

In the table below, sketch a quadrilateral with the properties indicated by each box in the table. Label all right angles and sides that are parallel. If it is impossible to fill a particular box in the table, write “impossible” and a brief justification for this. (Two cells in the table have already been completed for you.) If a particular case is possible, write in the most specific name you can for the quadrilateral you have drawn underneath your drawing (e.g., rectangle, trapezium, etc.)

<table>
<thead>
<tr>
<th>Number of pairs of parallel sides (exactly)</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Annotations

- **D**emonstrates an understanding of the features of quadrilaterals.
- **D**emonstrates geometric reasoning when combining the constraints of the number of right angles and parallel sides in the construction of quadrilaterals.
Number: Ratios

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Summary of task

Students were given a task to complete in class time relating to the unit of work they had completed on reasoning using problem-solving strategies.
Number: Ratios

The ratio of the number of adults to the number of children in a group is 2:5. The ratio of males to females is 10:11.

Explain how this group could be made up, presuming that the group includes at least 1 adult, 1 child, 1 male and 1 female. Use diagrams where appropriate.

Example 1:

\[
\begin{align*}
10 \times 5 &= 50 \text{ males} \\
50 : 55 &= 50 \text{ males} \\
10 \times 5 &= 50 \text{ adults} \\
5 \times 11 &= 55 \text{ children}
\end{align*}
\]

Example 2:

\[
\begin{align*}
2 \times 5 &= 2 \text{ adults} \\
5 \times 2 &= 5 \text{ children} \\
10 \times 1 &= 10 \text{ males} \\
11 \times 1 &= 11 \text{ females}
\end{align*}
\]

Explores both ratios to find an example that satisfies both of them.

Multiplies one ratio by a factor of three to generate a solution.

Synthesises the requirements of both ratios to analyse the composition of the group.
Number: Halfway

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Summary of task

Students were given a task to complete in class time relating to the unit of work they had completed on rational numbers. The task required students to demonstrate their reasoning and problem-solving skills to answer the questions.
Number: Halfway

A teacher asks “what number is halfway between 4 and 6 on the number line?”

Kurt answers “5.”

“Yes” says the teacher. “So what number is halfway between \( \frac{1}{2} \) and \( \frac{5}{2} \)?”

“\( \frac{1}{2} \)” answers Chantelle.

“Think again” says the teacher!

Why was Kurt correct and Chantelle wrong? Explain your answer fully, using your understanding of fractions. What should Chantelle’s answer have been? Show this on a number line.

You can change \( \frac{4}{24} \) to \( \frac{6}{24} \) and \( \frac{1}{6} \) to \( \frac{4}{24} \).

The answer would be \( \frac{5}{24} \), because that is halfway between \( \frac{4}{24} \) and \( \frac{6}{24} \).

You have to change the denominator.

At first I tried the denominator as 12, but it just ended up as \( \frac{2}{12} \) and \( \frac{3}{12} \). So then I tried 24, and it worked.

Chantelle is wrong because they are not the same.

Annotations

Represents rational numbers on a number line on which the line segments are equally spaced.

Compared the two rational numbers using equivalent fractions with the same denominator.

Uses fraction bars of approximately equal length and area to show the relative sizes of the rational numbers being compared.
Algebra: Solving linear equations

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Summary of task

Students were given a task to complete in class time after a unit of work on algebraic expansions and solving equations.
## Algebra: Solving linear equations

### Annotations

Expands each expression and then solves the equation.

Expands the expression ensuring correct usage of negatives in the expansion and the solution of the equation.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Expanded Expression</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>9(d + 6) = 63</td>
<td>9d + 54 = 63</td>
<td>d = 1</td>
</tr>
<tr>
<td>(y + 5) = 80</td>
<td>8y + 40 = 80</td>
<td>y = 5</td>
</tr>
<tr>
<td>6(f - 10) = 18</td>
<td>6f - 60 = 18</td>
<td>f = -7</td>
</tr>
<tr>
<td>5(m - 1) = 10</td>
<td>5m - 5 = 10</td>
<td>m = 3</td>
</tr>
<tr>
<td>4(x + 9) = 56</td>
<td>4x + 36 = 56</td>
<td>x = 5</td>
</tr>
<tr>
<td>8(4y - 3) = 72</td>
<td>32y - 24 = 72</td>
<td>y = 3</td>
</tr>
<tr>
<td>2(3t + 5) = 10</td>
<td>6t + 10 = 10</td>
<td>t = 0</td>
</tr>
<tr>
<td>7(x - 4) = 56</td>
<td>7x - 28 = 56</td>
<td>x = 12</td>
</tr>
<tr>
<td>3(4x + 3) = 93</td>
<td>12x + 9 = 93</td>
<td>x = 7</td>
</tr>
<tr>
<td>10(2a - 3) = 50</td>
<td>20a - 30 = 50</td>
<td>a = 4</td>
</tr>
<tr>
<td>4(x + 2) = 40</td>
<td>4x + 8 = 40</td>
<td>x = 8</td>
</tr>
<tr>
<td>7(2x + 1) = 21</td>
<td>14x + 7 = 21</td>
<td>x = 1</td>
</tr>
<tr>
<td>3(2z - 9) = 15</td>
<td>6z - 27 = 15</td>
<td>z = 5</td>
</tr>
<tr>
<td>3(3a - 1) = 42</td>
<td>9a - 3 = 42</td>
<td>a = 5</td>
</tr>
<tr>
<td>5(2x + 3) = 55</td>
<td>10x + 15 = 55</td>
<td>x = 4</td>
</tr>
<tr>
<td>4(p + 7) = 32</td>
<td>4p + 28 = 32</td>
<td>p = 1</td>
</tr>
</tbody>
</table>
Probability: Venn diagrams and two-way tables

Year 8 Mathematics achievement standard

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Summary of task

Students had been using Venn diagrams and two-way tables to model information and hence draw conclusions.

Students were required to complete the activity involving Venn diagrams and a two-way table.
Probability: Venn diagrams and two-way tables

1. Stephen asked 100 coffee drinkers whether they like milk or sugar in their coffee.
2. According to the diagram below, how many of the 20 people who like both milk and sugar also like milk?

Annotations

- Synthesises information in Venn diagram to reason a solution to each question.

3. From the Venn diagram below how many people study

   - French and Spanish
   - French, Spanish and Japanese
   - French and Japanese

Annotations

- Demonstrates understanding of the structure of the two-way table and how the totals of the vertical columns and horizontal rows align.

4. Copy and complete the two-way table for Year 9 transport survey

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>81</td>
<td>35</td>
<td>116</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>52</td>
<td>71</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>87</td>
<td>187</td>
</tr>
</tbody>
</table>

Annotations

- Demonstrates understanding of the structure of the two-way table and how the totals of the vertical columns and horizontal rows align.
Measurement: Circumference and area

Year 8 Mathematics achievement standard

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Summary of task

Students were given a task to complete in class time after a unit of work on circles.
Measurement: Circumference and area

Circumference and area of circles

a) on one of the circles label:
   I. an arc
   II. a sector
   III. a segment

b) Calculate the circumference and area of each of the given circles

1. \[ r = 2 \text{ cm} \]
   \[ C = 2 \times \pi \times 2 = 4 \pi \approx 12.56 \text{ cm} \]
   \[ A = \pi \times 4 \times 2 = 4 \pi \approx 12.56 \text{ cm}^2 \]

2. \[ r = 1.5 \text{ cm} \]
   \[ C = 2 \times \pi \times 1.5 \approx 9.42 \text{ cm} \]
   \[ A = \pi \times 1.5^2 \approx 7.07 \text{ cm}^2 \]

3. \[ r = 1.4 \text{ m} \]
   \[ C = 2 \times \pi \times 1.4 \approx 8.79 \text{ m} \]
   \[ A = \pi \times 1.4^2 \approx 6.15 \text{ m}^2 \]

4. \[ r = 3.6 \text{ mm} \]
   \[ C = 2 \times \pi \times 3.6 \approx 22.68 \text{ mm} \]
   \[ A = \pi \times 3.6^2 \approx 40.71 \text{ mm}^2 \]

5. \[ r = 3 \text{ m} \]
   \[ C = 2 \times \pi \times 3 \approx 18.84 \text{ m} \]
   \[ A = \pi \times 3^2 \approx 28.27 \text{ m}^2 \]

Annotations

Calculates the circumference and area of the circle with correct usage of units.
Uses the wrong radius for area but performs a correct calculation.

Identifies and labels the required parts of the circle.

Rounds answers and states the number of decimal places to which they were rounded.
Measurement: Rain on the roof

Year 8 Mathematics achievement standard

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Summary of task

Students were given a task to complete in class time after a unit of work on volume.
Measurement: Rain on the roof

Rain on My Roof

Typical roof areas:

<table>
<thead>
<tr>
<th>Home Type</th>
<th>Roof area(m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bedroom home</td>
<td>100</td>
</tr>
<tr>
<td>3 bedroom home</td>
<td>150</td>
</tr>
<tr>
<td>4 bedroom home</td>
<td>200</td>
</tr>
<tr>
<td>5 bedroom home</td>
<td>250</td>
</tr>
</tbody>
</table>

Assume the roof is flat. (This makes little difference to the amount of rain collected).

From the table, choose a home.

Using your choice of home, calculate the amount of rainwater in litres (L) collected by the roof of your chosen home when one millimetre (1mm) of rain falls.

My choice of home: 250 m² - 5 bedroom

Calculations:

Rain is a rectangular prism
Volume of rain = \(250 \times 0.001\) m³
Volume in litres = \(250 \times 0.001 \times 1000\) L
= 250 L

Amount of rainwater collected by the roof when 1mm of rain falls is the same as the area of the roof because multiplying by 1000 cancels out the 0.001

Calculates to volume of water on the roof in litres.

Draws a correct conclusion as to why the numerical answer in litres is the same as the numerical answer to the area of the roof.
Number and measurement: Investigating circles

Year 8 Mathematics achievement standard

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Summary of task

Students had been learning about the concept of irrational numbers, including π, and the relationship between the circumference of a circle and the radius.

The students were asked to investigate the relationship between the circumference and the diameter of a circle by measuring a variety of circular objects. They were given one week to complete the task.
Number and measurement: Investigating circles

**Year 8 Task One: Investigating Circles**

1. Label the diagram of the circle to the right including all the important features you know.

![Diagram of a circle with labeled parts]

2. (a) Use an appropriate method to measure the circumference and the diameter of the circular objects below.
   (b) Represent the ratio circumference : diameter in the form of $a:1$
   (c) Summarize your findings.

<table>
<thead>
<tr>
<th>Object</th>
<th>Circumference</th>
<th>Diameter</th>
<th>Circumference : Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180 cm</td>
<td>53 cm</td>
<td>180.55 : 53 : 3.506 : 1</td>
</tr>
<tr>
<td></td>
<td>94 cm</td>
<td>60 cm</td>
<td>94.20 : 60 : 1.570 : 1</td>
</tr>
<tr>
<td></td>
<td>260 cm</td>
<td>175 cm</td>
<td>260.00 : 175 : 1.486 : 1</td>
</tr>
</tbody>
</table>

**Annotations**

Names and indicates some parts of a circle.

Measures the circumference and diameter of a variety of circular objects with reasonable accuracy.

Determines the ratio of the circumference to the diameter and writes it in the form $a:1$.

Obtains several reasonable approximations for the irrational number $\pi$. 
Number and measurement: Investigating circles

Annotations

Describes in detail how the circumference and diameter of each object was measured and identifies possible sources of error in the measurement processes used.
Number and measurement: Investigating circles

Annotations

Obtains reasonable measurements for the diameter and circumference.

Determines the ratio of the circumference to the diameter.

Concludes that the drive is circular by observing that the ratio of the circumference to the diameter has a value close to those found for other circular objects.
Geometry: Congruence

Year 8 Mathematics achievement standard

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Summary of task

Students had completed a unit of work on congruence in which they used transformations to create congruent figures and investigated the conditions for the congruence of triangles.

Students were asked to demonstrate and apply their knowledge of transformations and the conditions for the congruence of triangles. They completed the task in class under exam conditions.
Geometry: Congruence

1. Identify the matching side and angles in these congruent triangles.

   \[ \triangle ABC \cong \triangle DEF \]

   \[ \triangle ACD \cong \triangle DEP \]

2. Construct the reflection of the shape ABCDEF in the line MP.

   \[ \text{Reflects a figure in a vertical axis.} \]

3. Construct the reflection of the triangle ABC in the dotted line. Label your new vertices A', B' and C'.

   \[ \text{Identifies and names corresponding sides and angles of congruent triangles in matching order.} \]
Geometry: Congruence

4. a. Which of the following triangles are congruent? (Circle two triangles; diagrams are not to scale.)

   ![Triangle Diagram]

   b. Which test shows they are congruent?
   
   AAS, SAS

5. Consider the following diagram.

   ![Diagram of Triangle ABC with point D]

   a. Which of the following congruence statements has the correct vertex order?
   
   \[ \triangle ABD \cong \triangle DCB \quad \triangle ABD \cong \triangle DBC \quad \triangle ABD \cong \triangle CDB \quad \triangle ABD \cong \triangle CD \]

   b. Which congruence test shows that the two smaller triangles are congruent?

   R.M.S

   c. Explain your answer to (b).
   
   Because we are shown that the 90° angles are congruent.

   d. What kind of triangle is \( \triangle ABC \)? Explain your answer.

   Isosceles, because the base edge is not equal to the right and left edges.

Annotations

- Selects a pair of congruent triangles.
- States all appropriate tests that can be used to show that the triangles are congruent.
- Attempts to identify the correct test for congruency.
Geometry: Congruence

6. The rectangle in the diagram is to be rotated 90° clockwise about the marked point.

Draw the resulting rectangle inside the diagram.

7. a. State the congruence test that applies to the following two triangles. (The diagram is not to scale.)

b. Explain how the two triangles above could instead be proved congruent by the SSS test.

Because if we use the lengths (7 and 3) we can find the missing length with Pythagoras' Theorem.

8. Circle the two congruent triangles below, and state the applicable congruence test.

SAS

Annotations

Rotates a figure by the desired angle but does not use the correct centre of rotation.

Recognises the connection to Pythagoras' Theorem and explains how this could be used to prove the triangles are congruent by a different test.

Identifies the two congruent triangles and states a test that can be used to show that the triangles are congruent.
Measurement: Perimeter and area

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Summary of task

Students completed a unit of work on finding the perimeter and area of a range of two-dimensional shapes.

The task required students to answer a number of questions related to the perimeter and area of a range of two-dimensional shapes, including circles. Students were asked to apply their skills to some real-world problems. They completed the task under exam conditions in class time.
Measurement: Perimeter and area

1. Calculate the perimeter and area of these shapes. Be sure to include units. Make your answers clear. Unless otherwise specified, all measurements given are in centimetres.

   a. Parallelogram
      \[ P = 11 + 7 + 11 + 7 = 36 \text{ cm} \]
      \[ A = 11 \times 3 = 33 \text{ cm}^2 \]

   b. Kite
      \[ P = 6.7 + 6.7 + 5 + 5 + 20 \text{ cm} = 23.9 \text{ cm} \]
      \[ A = \frac{1}{2} \times 10 \times 6 = 30 \text{ cm}^2 \]
      \[ c^2 = 4^2 + 3^2 = 16 + 9 = 25 \text{ cm}^2 \]
      \[ \text{Perimeter} = 10 + 5 \times 2 = 20 \text{ cm} \]

   c. Trapezium
      \[ P = 11.4 + 14.5 + 31 + 19.7 = 86.7 \text{ cm} \]
      \[ A = \frac{1}{2} (11.4 + 31) \times 18.3 = 281.01 \text{ cm}^2 \]

   d. Circle
      \[ P = 2\pi r = 2 \times 3.14 \times 14 = 87.96 \text{ cm} \]
      \[ A = \pi r^2 = 3.14 \times 14^2 = 615.75 \text{ cm}^2 \]

Annotations

Determines the perimeter of various plane shapes.

Uses appropriate formulas to determine the areas of typical plane shapes.

Uses Pythagoras’ Theorem to calculate the lengths of unknown sides in order to determine the perimeter.
Measurement: Perimeter and area

2. Using the three circles below, draw and label all the parts of a circle that you know.

3. Explain why it is not possible to find the area of this shape.

4. A reasonable estimate for the shaded area is (in cm$^2$ – circle one)

<table>
<thead>
<tr>
<th>12</th>
<th>16</th>
<th>20</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.9</td>
<td>15.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.9</td>
<td>15.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Explain your answer.
Work sample 14

Mathematics Year 8
Above satisfactory

Measurement: Perimeter and area

5. The following diagram is drawn to scale.

Estimate the shaded area (nearest cm²), explaining your answer (with words and/or diagrams).

\[ 6 \times 6 = 36 \text{ cm}^2 \]

To find the area you measure the 16 and 6 together to get 96 then the small semi-circled like bump doesn’t show a big area so I estimated that it was 3 cm².

6. a. The Earth is approximately a sphere. Its diameter is 12 755 km. Find the distance around the equator.

\[ 2 \times \pi \times 12755 \]
\[ = 2 \times 3.14 \times 6371.5 \]
\[ = 40071.0193 \text{ km} \]

b. The Earth spins on its axis once every 24 hours. If you stand on the equator, you are moving through space very fast because of the Earth’s rotation. Calculate this speed.

7. Draw a diagram of a figure (neat, shaded, but not to scale) that has:
   a. an area of \((6 \text{ cm} \times 4 \text{ cm}) - \pi (2 \text{ cm})^2\)

\[ \text{area} = 6 \times 4 - \pi (2)^2 \]
\[ = 24 - 4\pi \]

b. a perimeter of \(\frac{1}{50} \times 2\pi(13 \text{ cm}) + 13 \text{ cm} + 13 \text{ cm}\)

Annotations

- Determines the area of the rectangle correctly and then estimates the area of the segment to be bigger than one square centimetre.

- Connects the concept of the circumference of a circle to solve a real-world problem in three dimensions.
Measurement: Perimeter and area

8 Several triangles are drawn inside two parallel lines in the diagram below.

a Explain why all the triangles shown have the same area.

They are all the same area because they have same base and perpendicular height.

b Using appropriate measurements with your ruler, calculate their area.

\[
\frac{1}{2}bh = \frac{1}{2} \times 2.5 \times 5.5 = 6.875
\]

c Of all the possible triangles you could draw that are like those above, one triangle has the smallest perimeter. Draw this triangle in the diagram above, and briefly explain your answer.

The triangle with a vertex that is opposite the centre of the base will result in the triangle of smallest perimeter.

9 The trapezium and the parallelogram shown have the same area. How long is the base of the parallelogram?

a

b

h

h

Annotations

Explains why the triangles have the same area using appropriate mathematical terminology.

Indicates that a triangle with a vertex that is opposite the centre of the base will result in the triangle of smallest perimeter.
Number: Integers

Year 8 Mathematics achievement standard

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Summary of task

Students had completed a unit of work on integers.

Students were asked a series of questions that involved calculation and reasoning with integers. The use of calculators was not permitted and students were given 20 minutes of class time to complete the task.
## Number: Integers

### Annotations

**Adds and subtracts integers but makes an error.**

**Multiplies integers.**

**Divides integers.**

**Applies the order of operations to correctly evaluate expressions involving integers.**

<table>
<thead>
<tr>
<th>Integers</th>
<th>Calculators are NOT permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Evaluate:</td>
<td></td>
</tr>
<tr>
<td>a) $5 - 10 = -$5</td>
<td>e) $-8 - 12 = -$4</td>
</tr>
<tr>
<td>b) $20 + -5 = 15$</td>
<td>f) $5 - 11 - 7 = 13$</td>
</tr>
<tr>
<td>c) $-14 + -5 = -19$</td>
<td>g) $9 + 3 - 12 = 0$</td>
</tr>
<tr>
<td>d) $-4 - -7 = 3$</td>
<td>h) $-10 + 4 + 16 = 2$</td>
</tr>
<tr>
<td>2) Evaluate:</td>
<td></td>
</tr>
<tr>
<td>a) $3 \times -5 = 15$</td>
<td>e) $8 \times 1 \times 10 = -80$</td>
</tr>
<tr>
<td>b) $-4 \times -10 = 40$</td>
<td>f) $-2 \times -5 \times -7 = -70$</td>
</tr>
<tr>
<td>c) $7 \times (-3) = -21$</td>
<td>g) $(-2)^3 = -8$</td>
</tr>
<tr>
<td>d) $-5 \times -2 \times -4 = 40$</td>
<td>h) $(-5)^2 = 25$</td>
</tr>
<tr>
<td>3) Evaluate:</td>
<td></td>
</tr>
<tr>
<td>a) $60 + -6 = -(60)$</td>
<td>e) $\frac{20}{-6} = -3.33$</td>
</tr>
<tr>
<td>b) $-45 + -5 = -50$</td>
<td>f) $-\frac{100}{25} = 4$</td>
</tr>
<tr>
<td>c) $-24 + 4 = -6$</td>
<td>g) $\frac{40}{2} = 20$</td>
</tr>
<tr>
<td>d) $\frac{-10}{2} = -10$</td>
<td>h) $-100 \div -20 \div 5 = 1$</td>
</tr>
<tr>
<td>4) Calculate:</td>
<td></td>
</tr>
<tr>
<td>a) $3 \times 12 + -6 = 6$</td>
<td>f) $(5 + 7) - (12 - 9) = 8$</td>
</tr>
<tr>
<td>b) $(7 - 12) \times 4 = -24$</td>
<td>g) $5 + \frac{5}{3} - 12 = -4$</td>
</tr>
<tr>
<td>c) $-5 + (20 \times (14 - 6)) = 105$</td>
<td>$\frac{3}{2} - 12 = -11$</td>
</tr>
<tr>
<td>d) $-12 + 30 + -6 = 14$</td>
<td>h) $\frac{-6}{3} = -2$</td>
</tr>
<tr>
<td>e) $\frac{-4 \times 11 + 5 \times -7}{-9} = 9$</td>
<td>i) $3 - \frac{100 - 10 \times 8}{12 - 2} = 4$</td>
</tr>
</tbody>
</table>
5) At 12 am on Monday, the temperature in Vladivostok was recorded as -8°C. By 6 am the temperature had risen by 3°C. By noon the temperature had risen by a further 7°C. At 6 pm the temperature was -5°C.

What was the change in temperature between noon and 6 pm?

<table>
<thead>
<tr>
<th>Time</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 am</td>
<td>-8°C</td>
</tr>
<tr>
<td>6 am</td>
<td>-5°C</td>
</tr>
<tr>
<td>12 pm</td>
<td>4°C</td>
</tr>
<tr>
<td>6 pm</td>
<td>-5°C</td>
</tr>
</tbody>
</table>

6) Is the value of $(-6)^{100}$ positive or negative? Give a reason for your answer.
   [Note: You do not need to find the value of $(-6)^{100}$].

   It's positive, even though expressions on a negative base number are always negative.

7) Place a number in each box to make the statements true:
   a) $20 + [\_\_\_] = -60$
   b) $35 - 5 \times [\_\_] = 75$

8) Tom wrote:

   "If a question with integers involves exactly two minus signs, one plus sign, and no other operations, then the answer is positive."

Is Tom's statement always correct or sometimes correct or never correct? Provide at least one example to support your decision.

Tom's statement is sometimes correct due to the fact that due to the nature that the operations are arranged, the outcome can be positive or negative:

- $9 - 3 - 1 = -2$
- $2 + 3 - 3 = 6$

Annotations

Determines the correct answer and explains their reasoning using appropriate mathematical terminology.

Determines correct solutions to number sentences involving integers and including the order of operations.

Determines the validity of a given statement, justifying their decision with an appropriate explanation and examples.
Number: Percentages

Year 8 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

- By the end of Year 8, students solve everyday problems involving rates, ratios and percentages. They recognise index laws and apply them to whole numbers. They describe rational and irrational numbers.
- Students solve problems involving profit and loss. They make connections between expanding and factorising algebraic expressions. Students solve problems relating to the volume of prisms. They make sense of time duration in real applications. They identify conditions for the congruence of triangles and deduce the properties of quadrilaterals. Students model authentic situations with two-way tables and Venn diagrams.
- They choose appropriate language to describe events and experiments. They explain issues related to the collection of data and the effect of outliers on means and medians in that data.

Students use efficient mental and written strategies to carry out the four operations with integers. They simplify a variety of algebraic expressions. They solve linear equations and graph linear relationships on the Cartesian plane. Students convert between units of measurement for area and volume. They perform calculations to determine perimeter and area of parallelograms, rhombuses and kites. They name the features of circles and calculate the areas and circumferences of circles. Students determine complementary events and calculate the sum of probabilities.

Summary of task

Students were given a task to complete in class time after a unit of work on profit and loss.
**Number: Percentages**

Suppose you have a grandmother who gives you one cent on your first birthday. The next year she gives you 3 cents, the following year 9 cents. Each year she triples the amount she gave the year before. Leave all answers correct to two decimal places.

a) How much money would you have on your 14th Birthday?

<table>
<thead>
<tr>
<th>BIRTHDAY</th>
<th>MONEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1c</td>
</tr>
<tr>
<td>2</td>
<td>3c</td>
</tr>
<tr>
<td>3</td>
<td>9c</td>
</tr>
<tr>
<td>4</td>
<td>27c</td>
</tr>
<tr>
<td>5</td>
<td>81c</td>
</tr>
<tr>
<td>6</td>
<td>243c</td>
</tr>
<tr>
<td>7</td>
<td>729c</td>
</tr>
<tr>
<td>8</td>
<td>2187c</td>
</tr>
<tr>
<td>9</td>
<td>6561c</td>
</tr>
<tr>
<td>10</td>
<td>19683c</td>
</tr>
<tr>
<td>11</td>
<td>59049c</td>
</tr>
<tr>
<td>12</td>
<td>177147c</td>
</tr>
<tr>
<td>13</td>
<td>531441c</td>
</tr>
<tr>
<td>14</td>
<td>15944323c</td>
</tr>
<tr>
<td>TOTAL</td>
<td>43986948.4c</td>
</tr>
</tbody>
</table>

b) What percentage is the amount of money on your 14th birthday to the total money given by your grandmother?

\[
\frac{\$15,943.23}{\$4,398,694.84} = 0.036687 \approx \frac{1}{28} 
\]

You are going to use the money your grandmother gave you to refurbish the study at home. Let us do our homework 

**FLUENCY:**

1) Find the selling price of each of the following products from the product catalogue

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost price</th>
<th>%</th>
<th>Profit/loss</th>
<th>Selling Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV storage combo</td>
<td>$13796</td>
<td>30%</td>
<td>profit</td>
<td>$17,354.60</td>
</tr>
<tr>
<td>Set of 4 draws</td>
<td>$45.00</td>
<td>75%</td>
<td>loss</td>
<td>$31.25</td>
</tr>
<tr>
<td>Two seat sofa</td>
<td>$2698.00</td>
<td>33%</td>
<td>profit</td>
<td>$36,01.85</td>
</tr>
</tbody>
</table>

Annotations

Calculates required percentage.

Solves simple profit and loss problems but with an error.
Number: Percentages

2) For each of the following items, find the percentage profit or loss

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost price</th>
<th>Selling Price</th>
<th>%</th>
<th>Profit/Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV storage combo</td>
<td>$1796</td>
<td>$1600</td>
<td>12.9%</td>
<td>-9%</td>
</tr>
<tr>
<td>Set of 4 draws</td>
<td>$45.00</td>
<td>$60</td>
<td>33.3%</td>
<td>-15%</td>
</tr>
<tr>
<td>Two seat sofa</td>
<td>$2698.00</td>
<td>$1698</td>
<td>37.0%</td>
<td>10%</td>
</tr>
</tbody>
</table>

3) How can you tell if an item is being sold for profit or a loss

You can tell by observing the difference between the cost price and the selling price. If the cost is bigger, it is loss and vice versa.

UNDERSTANDING

4) The second hand shop buys second hand desks for $48.00 and sells them for $60.00

a) What is the ratio of the profit to the cost price?
   \[ \frac{48}{60} \rightarrow \frac{4}{5} \rightarrow 1:1.25 \rightarrow 80\% \]

b) What is the percentage profit on the cost price?
   \[ \frac{12}{60} = \frac{1}{5} = 20\% \]

c) What is the ratio of the profit to the selling price?
   \[ \frac{48}{60} \rightarrow \frac{4}{5} \rightarrow 1:1.25 \]

d) What is the percentage profit on the selling price?
   \[ \frac{12}{60} \times 100 = 20\% \]

BUT WHAT YOU WANT AT THE HALF YEARLY SALE

Annotations

Calculates percentage profit and loss.

Draws conclusions based on reason.

Calculates and simplifies ratios and percentages, but with one error in interpretation.
Number: Percentages

<table>
<thead>
<tr>
<th>Cushion SALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
</tr>
<tr>
<td>Alvine spetsig</td>
</tr>
<tr>
<td>Stockholm</td>
</tr>
<tr>
<td>Ever knot</td>
</tr>
</tbody>
</table>

(a) Before the sale, how much would it cost to buy an Alvine flora cushion and a Stockholm cushion?

<table>
<thead>
<tr>
<th>Cushion</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
<td>$20.00</td>
</tr>
<tr>
<td>Stockholm</td>
<td>$31.00</td>
</tr>
</tbody>
</table>

(b) What items could you buy before the sale if you had $50 to spend?

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
<td>$20.00</td>
</tr>
<tr>
<td>Alvine spetsig</td>
<td>$31.00</td>
</tr>
<tr>
<td>Ever knot</td>
<td>$31.00</td>
</tr>
</tbody>
</table>

(c) Calculate the sale price of the 3 cushions advertised

<table>
<thead>
<tr>
<th>Cushion</th>
<th>Original Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
<td>$20.00</td>
<td>$15.00</td>
</tr>
<tr>
<td>Alvine spetsig</td>
<td>$31.00</td>
<td>$18.99</td>
</tr>
<tr>
<td>Stockholm</td>
<td>$31.00</td>
<td>$23.25</td>
</tr>
</tbody>
</table>

(d) How much would it cost to buy an Alvine Flora cushion and a Stockholm cushion at the sale?

<table>
<thead>
<tr>
<th>Cushion</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
<td>$15.00</td>
</tr>
<tr>
<td>Stockholm</td>
<td>$23.25</td>
</tr>
</tbody>
</table>

(e) How much have you saved by buying these 2 items on the sale rather than before the sale?

<table>
<thead>
<tr>
<th>Cushion</th>
<th>Before Sale</th>
<th>On Sale</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvine Flora</td>
<td>$20.00</td>
<td>$15.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Stockholm</td>
<td>$31.00</td>
<td>$23.25</td>
<td>$7.75</td>
</tr>
</tbody>
</table>

Annotations

Performs the required calculations.
Number: Percentages

6) You find that you need a side table. You can choose from the following tables:

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$300</td>
<td>$450</td>
</tr>
<tr>
<td>25% discount</td>
<td>20% discount</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Table 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$280</td>
<td>$600</td>
</tr>
<tr>
<td>33% discount</td>
<td>15% discount</td>
</tr>
</tbody>
</table>

a) Which has the largest discount?
   Table 3

b) Which have the same amount of discount?
   Table 2 and Table 4 both have $70

c) What is the difference between the largest and smallest discount?
   $70 is the difference.

d) If the $600 table with a drawer had a discount of 20%, would $470 be enough to buy it?
   No, $470 would be $10 too small.

Reasoning:

You are in the coffee table shop and you hear "for today only: take 50% off the original price and then a further forty per cent off that. You hear a customer say: This is fantastic!! You get 90% off the original price. This statement is incorrect. Explain.

No, you don't get 90% off the original price because you get 50% off the first price and then from there you get off 40% of that price.

Annotations

Reasons with explanations.

Understands the difference between calculating correctly the solution in two stages and the method implied in the customer's comment.
Number: Percentages

Problem Solving

Are You a Smart Shopper?

In your local town there are 3 stores that sell paint: Fred’s Bargain Centre, Local Hardware and John’s Paints.

This week they have a special deal on some products.

- At Fred’s Bargain Centre, they are selling paint at discount prices

<table>
<thead>
<tr>
<th>Paint</th>
<th>Regular Price</th>
<th>Discounted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>$12.00</td>
<td>35% off</td>
</tr>
<tr>
<td>Green</td>
<td>$15.00</td>
<td>25% off</td>
</tr>
<tr>
<td>Purple</td>
<td>$18.00</td>
<td>40% off</td>
</tr>
</tbody>
</table>

- At the local hardware, you can try items which have a certain amount free

<table>
<thead>
<tr>
<th>Paint</th>
<th>Price per Litre</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>$9.90</td>
<td>20% free</td>
</tr>
<tr>
<td>Green</td>
<td>$14.00</td>
<td>50% free</td>
</tr>
<tr>
<td>Purple</td>
<td>$10.40</td>
<td>60% free</td>
</tr>
</tbody>
</table>

- John’s Paints: there are some buy one get one free deals

<table>
<thead>
<tr>
<th>Paint</th>
<th>Price per Litre</th>
<th>Deal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>$16.00</td>
<td>Buy one get one free</td>
</tr>
<tr>
<td>Green</td>
<td>$28.00</td>
<td>Buy one get one free</td>
</tr>
<tr>
<td>Purple</td>
<td>$20.40</td>
<td>Buy one get one free</td>
</tr>
</tbody>
</table>

7) a) If you shopped at Fred’s Bargain Centre, how much would you actually pay for each item?

<table>
<thead>
<tr>
<th>Paint</th>
<th>Regular Price</th>
<th>Discounted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>$12.00</td>
<td>$7.50</td>
</tr>
<tr>
<td>Green</td>
<td>$15.00</td>
<td>$11.25</td>
</tr>
<tr>
<td>Purple</td>
<td>$18.00</td>
<td>$10.80</td>
</tr>
</tbody>
</table>

b) How much money have you saved on each?

<table>
<thead>
<tr>
<th>Paint</th>
<th>Regular Price</th>
<th>Discounted Price</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>$12.00</td>
<td>$7.50</td>
<td>$4.50</td>
</tr>
<tr>
<td>Green</td>
<td>$15.00</td>
<td>$11.25</td>
<td>$3.75</td>
</tr>
<tr>
<td>Purple</td>
<td>$18.00</td>
<td>$10.80</td>
<td>$7.20</td>
</tr>
</tbody>
</table>

c) Here is shopping list:

- 2 litres of green paint
- 5 litres of yellow paint
- 10 litres of purple paint

(iv) If you bought all the items in one shop, whose would be the cheapest?

The local hardware.

(v) If you could buy the items from different shops, how would you do it to spend the least amount

I would buy:

- Yellow, $39 (Fred’s)
- Green, $49.00 (Local Hardware)
- Purple, $49.00 (Local Hardware)

Answers required questions to enable calculations.
Number: Percentages

Annotations

Demonstrates logical reasoning.

Selects items and calculates totals.

Apart from the cost, can you think of any other advantages or disadvantages with buying these items at just one shop?

If you buy them all from one shop you save money on post because you don’t have to write to three shops.

8) Using the products listed in this task, what could you buy using the money grandmother gave you on your 14th Birthday.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set of 4 draws</td>
<td>$11.95</td>
</tr>
<tr>
<td>Two pair slippers</td>
<td>$86.98</td>
</tr>
<tr>
<td>8x Alumine Flour</td>
<td>$30.00</td>
</tr>
<tr>
<td>1x E invo twist</td>
<td>$18.00</td>
</tr>
<tr>
<td>Table #3</td>
<td>$172.90</td>
</tr>
<tr>
<td>6x green point</td>
<td>$42.00</td>
</tr>
</tbody>
</table>

Total $387.98.