These Questions Can Be Used at Various Times Throughout the Year

This resource comprises five booklets. Each booklet is a compilation of all the questions in a particular strand released between 2012 and 2016. The multiple-choice questions appear first, followed by open-response. The questions are sorted according to the overall expectations in The Ontario Curriculum, Grades 1–8: Mathematics to which each is mapped. Detailed information about the questions, such as the year of release, the overall expectation and the category of knowledge and skills the question is mapped to, is listed after them. This detailed information also includes the answer key for each multiple-choice question. The scoring guides (with the item-specific rubric and student samples at each code) for each open-response question follow.
How to Use This Resource

Overall and specific expectations in the primary- and junior-division mathematics curriculum are organized into the five strands. For the sake of consistency, EQAO has also organized this resource by strand. EQAO reports an overall score for each student but does not provide scores by strand, as there are not a sufficient number of assessment questions mapped to each strand to report accurately at that level. The overall difficulty of all the questions on the assessment remains approximately the same from year to year; however, the overall difficulty of questions by strand may vary from year to year.

The questions

- are linked to expectations in The Ontario Curriculum, which forms the basis of the programs of instruction in Ontario classrooms,
- were developed and scored by Ontario teachers and validated through use in provincial testing and
- address various mathematical processes and categories of knowledge and skills in The Ontario Curriculum.

Suggested uses of these booklets:

- Select specific questions by overall expectation based on student learning.
- Use the scoring guides for the open-response questions to assist students in evaluating the reasonableness and completeness of their solutions.
- Use multiple-choice questions as open-response questions, when appropriate, by not including the answer options. Students can answer the question and then discuss the steps required and other possible answers, including those arrived at through common errors. Discuss whether there are multiple methods that can be used to answer the question. Students can then compare their answer to the multiple-choice options. Encourage the students to identify ways to ensure their solution process is complete and the question is answered fully.
- Use technology in the classroom to have students record multiple-choice answers instantly, which will allow for discussion of correct answers and the common errors demonstrated by the incorrect options (along with other errors not included in these options). This discussion can lead to a deeper understanding of concepts and assist students in correcting their own misunderstandings. Another option is to have students start with the correct answer and work backward to formulate a question.
- Encourage students to use manipulatives, and model how to apply them. For example, number lines can be used with questions mapped to expectations in the Number Sense and Numeration strand as well as those mapped to other strands, such as Patterning and Algebra or Data Management and Probability.

Details of the Assessment

EQAO assessments are comparable from year to year, as they share a common structure. The blueprint, which can be found in the Framework, defines how the questions are spread throughout the curriculum. (For more information, see www.eqao.com.) EQAO releases only half of the assessment each year (and has done so since 2013), so the released questions from a particular year do not cover the full blueprint. The blueprint specifies the number and types of questions (multiple-choice or open-response) that are mapped to a particular group of expectations. Each group of expectations can consist of one or more overall expectations, which themselves include specific expectations. Although EQAO releases only the overall expectation, each question is mapped to a specific expectation. The specific expectations vary from year to year; however, some of them involve knowledge or skills that may be assessed every year, or different parts of the expectation can be assessed on a yearly basis.
EQAO's Definitions of the Categories of Knowledge and Skills

EQAO has adapted the definitions of the categories of knowledge and skills from the achievement chart found in *The Ontario Curriculum*. These definitions assist EQAO in mapping questions.

A question is mapped to the category of **Knowledge and Understanding** if students must demonstrate only subject-specific content (knowledge) or comprehension of its meaning and significance (understanding), or both, in order to answer the question. These questions assess basic knowledge or understanding of concepts.

A question is mapped to the category **Application** if students must select the appropriate tool or get the necessary information and “fit” it to the problem. A question may change from **Knowledge and Understanding** to **Application** if context is added.

Questions that require students either to select and sequence a variety of tools or to demonstrate a critical thinking process (e.g., reasoning) are mapped to the category **Thinking**. Consider whether students need to make a plan to answer the question. **Thinking** questions require students to select more than one tool and sequence them (e.g., add first then subtract) or use reasoning to determine the answer. There may be more than one way to answer these questions.

Questions where students need to select one tool and use it repeatedly (without any sequencing of tools) are usually mapped to the category **Application**. However, the selection of a tool, its use more than once and the addition or subtraction of the results requires a plan. Questions requiring such a plan are generally mapped to the category **Thinking**.

The category and specific expectation each question is mapped to is confirmed by many Ontario educators, including the question writer, review committees and an expert reviewer. In the classroom, these questions can be mapped to a category based on the knowledge and skills the students currently have. If students have never been taught a specific skill, the question could be mapped to **Application** or even **Thinking**; however, after they are taught the skill, it could be mapped to **Knowledge and Understanding** or **Application**.

As the EQAO assessment is written near the end of the school year, it assumes that students have been taught the knowledge and skills outlined in the curriculum for the year.

Each question is also mapped to a category of knowledge and skills. EQAO maps multiple-choice questions to the **Knowledge and Understanding**, **Application**, and **Thinking** categories. Open-response questions are mapped to either **Application** or **Thinking**. EQAO does not map any questions to the category **Communication**, but teachers can evaluate this skill through any open-response questions where students need to show their work or justify their answer.
How to Use This Resource (continued)

Here are some examples to help distinguish the different categories of knowledge and skills questions are mapped to.

Example 1:

When two multiple-choice questions are the same, the answer options can determine the category of knowledge and skills the question is mapped to.

**VERSION 1**

Which of these is equivalent to 8%?

a 80  
b 8  
c 0.8  
d 0.08

**VERSION 2**

Which of these is equivalent to 8%?

a \( \frac{2}{25} \)  
b \( \frac{2}{20} \)  
c \( \frac{1}{8} \)  
d \( \frac{8}{10} \)

**VERSION 1**

To answer this question, students need to determine which value is equivalent to 8%. By the end of Grade 6, students should know this answer or be able to calculate it quickly. The category that the question is mapped to is **Knowledge and Understanding**.

(correct answer: d)

**VERSION 2**

For version 2, the answer options have changed the category, as students need to determine which fraction is equivalent to 8%. One approach is to change 8% to a fraction and then compare \( \frac{8}{100} \) to the given fractions to determine which one is equivalent. The students can also change the fractions in the options to percentages and see which one is equivalent to 8%. As students are required to select a tool to answer this question, it is mapped to the category **Application**.

(correct answer: a)
Example 2:
When the answer options are similar, the question can be changed to influence the category of knowledge and skills.

VERSION 1
The first term of a pattern is 28672. The pattern rule is “divide by 4 to get the next term.”
What is the 5th term?

a 28
b 112
c 448
d 7168

VERSION 2
A pattern is shown below. Each term increases by the same amount.
4, 41, 78, 115, 152, …
What is the 9th term in the pattern?

a 226
b 263
c 300
d 337

VERSION 3
The terms of a pattern are made using toothpicks. Term 1 and Term 5 are not shown.

Determine the total number of toothpicks used in Term 1 to Term 5 of this pattern.
Justify your answer.

The total number of toothpicks used in Term 1 to Term 5 of this pattern is _____.

VERSION 1
This question is mapped to the category Knowledge and Understanding. Students start with the first term and apply the given pattern rule to determine the 5th term.
(correct answer: b)

VERSION 2
This question does not provide students with the pattern rule. They must first figure out the constant that the terms are increasing by and then apply it to determine the 9th term. Therefore, this question is mapped to Application, as the tool is not given.
(correct answer: c)

VERSION 3
This is an open-response question. It is mapped to the category Thinking, as students must make a plan. They must first figure out the pattern and then determine both Term 1 and Term 5. After that, students must determine the number of toothpicks in each term and add them together. Refer to question 19 in the Patterning and Algebra strand booklet for samples of student responses with annotations.
Example 3:

Multiple-choice and open-response questions can be mapped to the category Thinking.

**VERSION 1**

These polygons have been ordered from smallest to largest based on a geometric property.

Which property has been used to order the polygons?

- a number of sides
- b number of acute angles
- c number of lines of symmetry
- d number of pairs of parallel sides

(correct answer: c)

**VERSION 2**

Complete the chart.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of acute angles</th>
<th>Number of obtuse angles</th>
<th>Number of lines of symmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectangle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right trapezoid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isosceles trapezoid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the grid, draw and name a quadrilateral that has 2 obtuse angles and no lines of symmetry.

**VERSION 2**

This open-response question is also mapped to the category Thinking. Students need to use reasoning or make a plan to answer the second part. Students must consider which quadrilateral has the given properties and then draw it. They may consider each type of quadrilateral and determine its properties, or they may try to draw one with the given properties.

Refer to question 14 in the Geometry and Spatial Sense strand booklet for samples of student responses with annotations.
Examples of questions

Number Sense and Numeration

Junior Division

Grade 6

Multiple-Choice and Open-Response Questions

INSTRUCTIONS

Answering Multiple-Choice Questions

Like this:  ●  Not like this:  ×  ✓  ☐  ☐

• Use a pencil only.
• Fill only one circle for each question.
• Fill the circle completely.
• Cleanly erase any answer you wish to change.

Answering Open-Response Questions

• Write on the space provided in this booklet.
1. Which of the following numbers has the greatest value?
   - 0.4
   - 0.25
   - 0.089
   - 0.304

2. Which represents the number 93,050 in words?
   - ninety-three thousand fifty
   - nine thousand three hundred fifty
   - nine thousand three hundred fifty
   - ninety-three thousand five hundred

3. Which of the following fractions has the smallest value?
   - \(\frac{4}{5}\)
   - \(\frac{4}{4}\)
   - \(\frac{4}{3}\)
   - \(\frac{4}{2}\)

4. Look at the numbers below.
   \[
   \frac{3}{2}, \frac{5}{8}, \frac{9}{4}, \frac{17}{8} \]
   Which list shows these numbers ordered from smallest to largest?
   - \(\frac{3}{2}, \frac{5}{8}, \frac{9}{4}, \frac{17}{8}\)
   - \(\frac{5}{8}, \frac{3}{2}, \frac{9}{4}, \frac{17}{8}\)
   - \(\frac{3}{2}, \frac{5}{8}, \frac{17}{8}, \frac{9}{4}\)
   - \(\frac{3}{2}, \frac{9}{4}, \frac{5}{8}, \frac{17}{8}\)

5. Mrs. Garrett sends surveys to 120 students, and 78 students return the survey. Which statement best describes the percent of students who return the survey?
   - exactly 50%
   - exactly 75%
   - between 50% and 75%
   - between 75% and 100%

6. How many minutes are in 365 days?
   - 8760 minutes
   - 21,900 minutes
   - 262,800 minutes
   - 525,600 minutes
7  Mr. Adams buys juice boxes for 384 students. The juice boxes are sold in cases of 24.
   If each student receives one juice box, how many cases has Mr. Adams bought?
   ○ 12
   ○ 16
   ○ 360
   ○ 408

8  What is the value of 0.730 − 0.156?
   ○ 0.083
   ○ 0.426
   ○ 0.574
   ○ 0.626

9  The masses of 4 meteorites are 1.32 kg, 0.9 kg, 2.046 kg and 3.8 kg.
   Which is the best estimate of the total mass of the 4 meteorites?
   ○ 4 kg
   ○ 6 kg
   ○ 8 kg
   ○ 10 kg

10 Wasim’s hair grows 0.4 cm each week.
    At this rate, which is closest to the increase in length of Wasim’s hair over 3 months if it is not cut?
    ○ 1 cm
    ○ 5 cm
    ○ 8 cm
    ○ 12 cm

11 Betsy has a bakery. She uses 128.4 g of flour to make 6 muffins.
    How much flour does it take to make 72 muffins?
    ○ 21.4 g
    ○ 770.4 g
    ○ 1540.8 g
    ○ 9244.8 g

12 Which of these expressions has a value of 0.555?
    ○ 55.5 ÷ 100
    ○ 55.5 ÷ 1000
    ○ 5.55 × 100
    ○ 5.55 × 1000
13. What is the ones digit of the answer to $3468 \div 100$?

- 3
- 4
- 6
- 8

14. Which of the following is equal in value to 8%?

- $\frac{16}{200}$
- $\frac{16}{50}$
- $\frac{4}{25}$
- $\frac{4}{5}$

15. Which fraction is equivalent to 8%?

- $\frac{2}{25}$
- $\frac{2}{20}$
- $\frac{1}{8}$
- $\frac{8}{10}$

16. A store sells 12 oranges for $3.96. How much does one orange cost?

- $3.84$
- $3.03$
- $0.39$
- $0.33$

17. There are 12 books in a case. There are 6 cases in a box and 24 boxes in a container. If each container of books costs $2592, what is the cost of one book?

- $1.50$
- $9.00$
- $18.00$
- $36.00$

18. Jamie buys 3 ice cream cones for $4.65. At this rate, how much will it cost to buy 2 ice cream cones?

- $1.29$
- $1.55$
- $2.33$
- $3.10$
This number line is divided into 4 equal parts using points.

The value of Point A is __________.

Complete the chart to compare the numbers below to Point A’s value.

<table>
<thead>
<tr>
<th>Number</th>
<th>Greater or less than Point A’s value</th>
<th>Justify your answer with fractions, decimals or percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>Circle one: greater than less than</td>
<td></td>
</tr>
<tr>
<td>0.88</td>
<td>Circle one: greater than less than</td>
<td></td>
</tr>
<tr>
<td>0.09</td>
<td>Circle one: greater than less than</td>
<td></td>
</tr>
</tbody>
</table>
A Canadian television station shows 16 minutes of commercials every hour between 8:00 a.m. and 11:00 p.m. every day.

How many minutes of commercials are there on the station between 8:00 a.m. and 11:00 p.m. in 365 days?

Show your work.

There are __________ minutes of commercials on the station between 8:00 a.m. and 11:00 p.m. in 365 days.
Andrew blinks his eyes about 3 times per minute when he is awake. He is awake approximately 14 hours per day. Does he blink his eyes more than 1,000,000 times in one year?

Circle one: Yes  No

Justify your answer.
Mr. Scott plans a class trip for the 30 students in his class. He must pay the following costs per student:

- admission: $3.80
- bus: $10.40
- snack: $5.55
- supplies: $7.31

Round the costs to the nearest dollar and use them to estimate the total cost for the 30 students. Show your work.

The estimated total cost for the 30 students is $ __________ .
A club has money for a trip. The expenses for the trip are shown below:

- lunches: $\frac{1}{4}$ of the money
- tickets: $\frac{2}{5}$ of the money
- snacks: 0.12 of the money
- transportation: 20% of the money

What fraction of the money is left over?
Show your work.

The fraction of the money left over is _______________.

A Grade 6 class is having a fundraiser.

The class buys 3 bags of apples. Each bag has 24 apples. The total cost of the 3 bags of apples is $12.24.

The class sells the apples for $0.75 each.

How much money will the class gain per apple?

Show your work.

The class gains _________ per apple.
## Detailed Information About the Questions

### Number Sense and Numeration

#### Multiple-Choice Questions

<table>
<thead>
<tr>
<th>QUESTION NUMBER</th>
<th>YEAR QUESTION RELEASED</th>
<th>OVERALL EXPECTATION</th>
<th>COGNITIVE SKILL</th>
<th>KEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2015</td>
<td>1</td>
<td>KU</td>
<td>a</td>
</tr>
<tr>
<td>2</td>
<td>2012</td>
<td>1</td>
<td>KU</td>
<td>a</td>
</tr>
<tr>
<td>3</td>
<td>2013</td>
<td>1</td>
<td>KU</td>
<td>a</td>
</tr>
<tr>
<td>4</td>
<td>2012</td>
<td>1</td>
<td>TH</td>
<td>a</td>
</tr>
<tr>
<td>5</td>
<td>2014</td>
<td>1</td>
<td>TH</td>
<td>c</td>
</tr>
<tr>
<td>6</td>
<td>2016</td>
<td>1</td>
<td>TH</td>
<td>d</td>
</tr>
<tr>
<td>7</td>
<td>2015</td>
<td>2</td>
<td>AP</td>
<td>b</td>
</tr>
<tr>
<td>8</td>
<td>2014</td>
<td>2</td>
<td>KU</td>
<td>c</td>
</tr>
<tr>
<td>9</td>
<td>2012</td>
<td>2</td>
<td>AP</td>
<td>c</td>
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<td>2013</td>
<td>2</td>
<td>AP</td>
<td>b</td>
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<tr>
<td>11</td>
<td>2015</td>
<td>2</td>
<td>TH</td>
<td>c</td>
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<tr>
<td>12</td>
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<td>KU</td>
<td>a</td>
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<td>AP</td>
<td>b</td>
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<td>14</td>
<td>2012</td>
<td>3</td>
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<td>a</td>
</tr>
<tr>
<td>15</td>
<td>2016</td>
<td>3</td>
<td>AP</td>
<td>a</td>
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<td>16</td>
<td>2014</td>
<td>3</td>
<td>AP</td>
<td>d</td>
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<td>17</td>
<td>2013</td>
<td>3</td>
<td>TH</td>
<td>a</td>
</tr>
<tr>
<td>18</td>
<td>2012</td>
<td>3</td>
<td>TH</td>
<td>d</td>
</tr>
</tbody>
</table>

#### Open-Response Questions

<table>
<thead>
<tr>
<th>QUESTION NUMBER</th>
<th>YEAR QUESTION RELEASED</th>
<th>OVERALL EXPECTATION</th>
<th>COGNITIVE SKILL</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>2016</td>
<td>1</td>
<td>AP</td>
</tr>
<tr>
<td>20</td>
<td>2014</td>
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<td>AP</td>
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<tr>
<td>21</td>
<td>2012</td>
<td>1</td>
<td>TH</td>
</tr>
<tr>
<td>22</td>
<td>2015</td>
<td>2</td>
<td>TH</td>
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<tr>
<td>23</td>
<td>2012</td>
<td>3</td>
<td>TH</td>
</tr>
<tr>
<td>24</td>
<td>2013</td>
<td>3</td>
<td>TH</td>
</tr>
</tbody>
</table>

### Legend

- **KU**: Knowledge and Understanding
- **AP**: Application
- **TH**: Thinking

*This is the number of the overall expectation in the Number Sense and Numeration strand that the question is mapped to. The overall expectations are numbered according to the order in which they appear in The Ontario Curriculum.*
Junior Division

Grade 6

Open-Response Questions

Item-specific rubrics and sample student responses with annotations

QUESTIONS 19 TO 24
### Question 19

<table>
<thead>
<tr>
<th>Code</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>• Blank: nothing written or drawn in response to the question</td>
</tr>
</tbody>
</table>
| I    | • Illegible: cannot be read; completely crossed out/erased; not written in English  
• Irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, “?”, “!”, “I don’t know”)  
• Off topic: no relationship of written work to the question |

**10**
Application of knowledge and skills to determine the value of a point on a number line and compare that number to other values shows limited effectiveness due to  
• misunderstanding of concepts  
• incorrect selection or misuse of procedures

**20**
Application of knowledge and skills to determine the value of a point on a number line and compare that number to other values shows some effectiveness due to  
• partial understanding of the concepts  
• errors and/or omissions in the application of the procedures

**30**
Application of knowledge and skills to determine the value of a point on a number line and compare that number to other values shows considerable effectiveness due to  
• an understanding of most of the concepts  
• minor errors and/or omissions in the application of the procedures

**40**
Application of knowledge and skills to determine the value of a point on a number line and compare that number to other values shows a high degree of effectiveness due to  
• a thorough understanding of the concepts  
• an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding)
Question 19

**Code 10**

This number line is divided into 4 equal parts using points.

The value of Point A is **0.5**.

Complete the chart to compare the numbers below to Point A’s value.

<table>
<thead>
<tr>
<th>Number</th>
<th>Greater or less than Point A’s value</th>
<th>Justify your answer with fractions, decimals or percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>Circle one: greater than less than</td>
<td>$\frac{3}{10} \ 30%$</td>
</tr>
<tr>
<td>0.88</td>
<td>Circle one: greater than less than</td>
<td>$\frac{88}{100} \ 88%$</td>
</tr>
<tr>
<td>0.09</td>
<td>Circle one: greater than less than</td>
<td>$\frac{9}{10} \ 90%$</td>
</tr>
</tbody>
</table>

**Annotation:**
Response demonstrates misunderstanding of concepts; determines **incorrect** value of Point A (0.5) and **no** correct conclusions (**no** circling or answer indicated) with only two correct conversions (conversions for 0.09 are incorrect).
Annotation:
Response demonstrates omissions in the application of the procedures; determines correct value of Point A ($\frac{1}{4}$), but 0-1 correct conclusions (0 correct as justification missing). Note: Justification must include conversion to same form; e.g., Point A to decimal or each number to fraction.
Annotation:
Response demonstrates an understanding of most of the concepts; determines correct value of Point A (decimal) and two correct conclusions (circling for 0.88 and 0.09 are correct). No justification required as Point A and the numbers are already in the same form (decimal) for comparison.
Question 19

Code 40

This number line is divided into ________ using points.

0  A 1

The value of Point A is ________.

Complete the chart to compare the numbers below to Point A's value.

<table>
<thead>
<tr>
<th>Number</th>
<th>Greater or less than Point A's value</th>
<th>Justify your answer with fractions, decimals or percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>Circle one: greater than less than</td>
<td>$\frac{1}{4} = 0.25$</td>
</tr>
<tr>
<td>0.88</td>
<td>Circle one: greater than less than</td>
<td>$\frac{1}{4} = 0.25$</td>
</tr>
<tr>
<td>0.09</td>
<td>Circle one: greater than less than</td>
<td>$\frac{1}{4} = 0.25$</td>
</tr>
</tbody>
</table>

Annotation:
Response demonstrates an accurate application of the procedures; determines correct value of Point A (fraction) and three correct conclusions (circling with justification) as Point A correctly converted to the same form as the numbers (decimal) for comparison.
### Question 20

<table>
<thead>
<tr>
<th>Code</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>• Blank: nothing written or drawn in response to the question</td>
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</table>
| I    | • Illegible: cannot be read; completely crossed out/erased; not written in English  
• Irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, “?”, “!”, “I don’t know”)  
• Off topic: no relationship of written work to the question |
| 10   | Application of knowledge and skills to determine the number of minutes of commercials on television between 8:00 a.m. and 11:00 p.m. in 365 days shows limited effectiveness due to  
• misunderstanding of concepts  
• incorrect selection or misuse of procedures |
| 20   | Application of knowledge and skills to determine the number of minutes of commercials on television between 8:00 a.m. and 11:00 p.m. in 365 days shows some effectiveness due to  
• partial understanding of the concepts  
• errors and/or omissions in the application of the procedures |
| 30   | Application of knowledge and skills to determine the number of minutes of commercials on television between 8:00 a.m. and 11:00 p.m. in 365 days shows considerable effectiveness due to  
• an understanding of most of the concepts  
• minor errors and/or omissions in the application of the procedures |
| 40   | Application of knowledge and skills to determine the number of minutes of commercials on television between 8:00 a.m. and 11:00 p.m. in 365 days shows a high degree of effectiveness due to  
• a thorough understanding of the concepts  
• an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding) |
A Canadian television station shows 16 minutes of commercials every hour between 8:00 a.m. and 11:00 p.m. every day.

How many minutes of commercials are there on the station between 8:00 a.m. and 11:00 p.m. in 365 days?

Show your work.

Annotation:
Response demonstrates a misuse of procedures; no evidence of determining the number of hours between 8 a.m. and 11 p.m. or the number of minutes per day (unclear if 32 represents the number of minutes for 2 hours or 16 hours plus 16 minutes) and incorrectly added 365 instead of multiplied to determine the total number of minutes in 365 days (397).
Question 20

**Code 20**

A Canadian television station shows 16 minutes of commercials every hour between 8:00 a.m. and 11:00 p.m. every day.

How many minutes of commercials are there on the station between 8:00 a.m. and 11:00 p.m. in 365 days?

Show your work.

\[
16 \text{ minutes of commercials} \times 365 \text{ days} = 5,840
\]

There is 5,840 minutes of commercials a year

There are 5,840 minutes of commercials on the station between 8:00 a.m. and 11:00 p.m. in 365 days.

**Annotation:**

Response demonstrates partial understanding of the concepts; no evidence of determining the number of hours between 8 a.m. and 11 p.m. but determines the number of minutes of commercials for one hour only over 365 days (5840).
Question 20

**Code 30**

A Canadian television station shows 16 minutes of commercials every hour between 8:00 a.m. and 11:00 p.m. every day.

How many minutes of commercials are there on the station between 8:00 a.m. and 11:00 p.m. in 365 days?

Show your work.

There are ________ minutes of commercials on the station between 8:00 a.m. and 11:00 p.m. in 365 days.

**Annotation:**
Response demonstrates an understanding of most of the concepts; incorrectly determines the number of hours between 8 a.m. and 11 p.m. (3) but correctly determines the number of minutes of commercials per day (48) and the number of minutes of commercials in 365 days (17 520) based on error.
Question 20

Code 40

A Canadian television station shows 16 minutes of commercials every hour between 8:00 a.m. and 11:00 p.m. every day.

How many minutes of commercials are there on the station between 8:00 a.m. and 11:00 p.m. in 365 days?

Show your work.

\[
\begin{align*}
16 \times 15 &= 240 \\
240 \times 365 &= 87600
\end{align*}
\]

There are 87600 minutes of commercials in 365 days.

Annotation:
Response demonstrates an accurate application of the procedures; correctly determines the number of hours between 8 a.m. and 11 p.m. (15), the number of minutes of commercials per day (240) and the number of minutes of commercials in 365 days (87 600).
### Question 21

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      • Off topic: no relationship of written work to the question |
| 10   | Problem-solving process to determine if Andrew’s eyes blink more than 1,000,000 times in one year shows limited effectiveness due to  
      • minimal evidence of a solution process  
      • limited identification of important elements of the problem  
      • too much emphasis on unimportant elements of the problem  
      • no conclusions presented  
      • conclusion presented without supporting evidence |
| 20   | Problem-solving process to determine if Andrew’s eyes blink more than 1,000,000 times in one year shows some effectiveness due to  
      • an incomplete solution process  
      • identification of some of the important elements of the problem  
      • some understanding of the relationships between important elements of the problem  
      • simple conclusions with little supporting evidence |
| 30   | Problem-solving process to determine if Andrew’s eyes blink more than 1,000,000 times in one year shows considerable effectiveness due to  
      • a solution process that is nearly complete  
      • identification of most of the important elements of the problem  
      • a considerable understanding of the relationships between important elements of the problem  
      • appropriate conclusions with supporting evidence |
| 40   | Problem-solving process to determine if Andrew’s eyes blink more than 1,000,000 times in one year shows a high degree of effectiveness due to  
      • a complete solution process  
      • identification of all important elements of the problem  
      • a thorough understanding of the relationships between all of the important elements of the problem  
      • appropriate conclusions with thorough and insightful supporting evidence |
Andrew blinks his eyes about 3 times per minute when he is awake. He is awake approximately 14 hours per day. Does he blink his eyes more than 1 000 000 times in one year?

Circle one: Yes ☐ No ☐

Justify your answer.

3 \times 14 = 42 \text{ so that's a no because } 3 \times 14 \text{ does not go up to } 1000\,000.

**Annotation:**
Response demonstrates minimal evidence of a solution process; two numbers from the question (3 & 14) are multiplied in the solution process, but the number of minutes per hour and number of days per year are omitted and this result is compared to 1 000 000.
Question 21

Code 20

Andrew blinks his eyes about 3 times per minute when he is awake. He is awake approximately 14 hours per day. Does he blink his eyes more than 1 000 000 times in one year?

Circle one: Yes  🆓 No

Justify your answer.

\[ 3 \times 14 = 42 \times 356 = 14952 \text{ but it's close} \]

Annotation:
Response demonstrates an incomplete solution process; a calculation is shown for the number of times he blinks in a day, but the number of minutes per hour (60) is omitted, and this is used in the calculation of the number of times he blinks per year, but 356 is used as the number of days per year. A correct conclusion based on the calculated result is shown.
Andrew blinks his eyes about 3 times per minute when he is awake. He is awake approximately 14 hours per day. Does he blink his eyes more than 1,000,000 times in one year?

Circle one: Yes  No

Justify your answer.

3 × 60 = 180 blinks per hour
180 × 14 = 2520 per day

30 × 12 = 360

2520 × 360 = 907,200

Andrew does not blink one million times per year.
He only blinks 180 per hour,
2520 per day which is 14 hrs
for him and 2520 × 360 =
907,200.

Annotation:
Response demonstrates a considerable understanding of the relationships between important elements of the problem; accurate calculations are shown for the number of blinks per hour, per day and per year that he makes, but 360 is used, instead of 365 or 366 for the number of days in a year. A correct conclusion, based on the calculated result is shown.
Question 21

Code 40

Andrew blinks his eyes about 3 times per minute when he is awake. He is awake approximately 14 hours per day. Does he blink his eyes more than 1,000,000 times in one year?

Circle one: Yes  No

Justify your answer.

\[
\begin{align*}
60 & \times 3 \quad 180 \\
\times 14 & \quad 2520 \\
\hline
180 & \quad 720 \\
\hline
1800 & \quad 12600 \\
\hline
2520 & \quad 151200 \\
\hline
\quad & \quad 756000 \quad 919800
\end{align*}
\]

Annotation:
Response demonstrates a complete solution process; accurate calculations are shown for the number of blinks per hour, per day and per year that he makes, with a correct conclusion (No) shown.
**Question 22**

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      | Off topic: no relationship of written work to the question |
| 10   | Thinking process to round the class trip costs to the nearest dollar and use them to estimate the total cost for 30 students shows limited effectiveness due to  
      | minimal evidence of a solution process  
      | limited identification of important elements of the problem  
      | too much emphasis on unimportant elements of the problem  
      | no conclusions presented  
      | conclusion presented without supporting evidence |
| 20   | Thinking process to round the class trip costs to the nearest dollar and use them to estimate the total cost for 30 students shows some effectiveness due to  
      | an incomplete solution process  
      | identification of some of the important elements of the problem  
      | some understanding of the relationships between important elements of the problem  
      | simple conclusions with little supporting evidence |
| 30   | Thinking process to round the class trip costs to the nearest dollar and use them to estimate the total cost for 30 students shows considerable effectiveness due to  
      | a solution process that is nearly complete  
      | identification of most of the important elements of the problem  
      | a considerable understanding of the relationships between important elements of the problem  
      | appropriate conclusions with supporting evidence |
| 40   | Thinking process to round the class trip costs to the nearest dollar and use them to estimate the total cost for 30 students shows a high degree of effectiveness due to  
      | a complete solution process  
      | identification of all important elements of the problem  
      | a thorough understanding of the relationships between all of the important elements of the problem  
      | appropriate conclusions with thorough and insightful supporting evidence |
Question 22

**Code 10**

Mr. Scott plans a class trip for the 30 students in his class. He must pay the following costs per student:

- admission: $3.80
- bus: $10.40
- snack: $5.55
- supplies: $7.31

Round the costs to the nearest dollar and use them to estimate the total cost for the 30 students.

Show your work.

\[
\begin{align*}
\text{Admission} &= 3.80 \\
\text{Bus} &= 10.40 \\
\text{Snack} &= 5.55 \\
\text{Supplies} &= 7.31
\end{align*}
\]

\[
\begin{align*}
3.80 + 10.40 + 5.55 + 7.31 &= 27.06 \\
\text{Total} &= 27.06
\end{align*}
\]

First I wrote down all the amount of every thing and next I added it all up and got $27.06

The estimated total cost for the 30 students is $ 27.06.

**Annotation:**
Response demonstrates limited identification of the important elements of the problem; each cost not rounded to the nearest dollar, calculates the total per student without rounding ($27.06) but does not calculate the total for the class.
Mr. Scott plans a class trip for the 30 students in his class. He must pay the following costs per student:

- admission: $3.80
- bus: $10.40
- snack: $5.55
- supplies: $7.31

Round the costs to the nearest dollar and use them to estimate the total cost for the 30 students.

Show your work.

\[
\begin{align*}
&3.80 \\
&\hphantom{3.80}+ 10.40 \\
&\hphantom{3.80}+ 5.55 \\
&\hphantom{3.80}+ 7.31 \\
&\hphantom{3.80}--- \\
&\underline{27.06}
\end{align*}
\]

\[
27.06 \times 30 = 811.80
\]

The estimated total cost for the 30 students is \$811.80.

**Annotation:**
Response demonstrates identification of some of the important elements of the problem; each cost not rounded to the nearest dollar, but calculates the total per student ($27.06) and the total for the class ($811.80).
Mr. Scott plans a class trip for the 30 students in his class. He must pay the following costs per student:
- admission: $3.80
- bus: $10.40
- snack: $5.55
- supplies: $7.31

Round the costs to the nearest dollar and use them to estimate the total cost for the 30 students.

Show your work.

3.80 + 10.40 + 5.55 + 7.31 = 27.06 = 27.00
27.00 x 30 = $810

The estimated total cost for the 30 students is $810.

**Annotation:**
Response demonstrates identification of most of the important elements of the problem; each cost not rounded to the nearest dollar, but calculates the total per student ($27.06) and then correctly rounds the total to the nearest dollar ($27) and accurately calculates the total for the class ($810).
Mr. Scott plans a class trip for the 30 students in his class. He must pay the following costs per student:
- admission: $3.80
- bus: $10.40
- snack: $5.55
- supplies: $7.31

Round the costs to the nearest dollar and use them to estimate the total cost for the 30 students.

Show your work.

\[
\begin{align*}
4 & \times 30 \\
10 & \\
6 & \\
7 & \\
\hline
810 \\
27
\end{align*}
\]

The estimated total cost for the 30 students is $810.

**Annotation:**
Response demonstrates a complete solution process; correctly rounds each cost to the nearest dollar, accurately calculates the total per student ($27) and the total for the class ($810).
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| 10   | Problem-solving process to determine the fraction of money that is left over shows limited effectiveness due to  
- minimal evidence of a solution process  
- limited identification of important elements of the problem  
- too much emphasis on unimportant elements of the problem  
- no conclusions presented  
- conclusion presented without supporting evidence |
| 20   | Problem-solving process to determine the fraction of money that is left over shows some effectiveness due to  
- an incomplete solution process  
- identification of some of the important elements of the problem  
- some understanding of the relationships between important elements of the problem  
- simple conclusions with little supporting evidence |
| 30   | Problem-solving process to determine the fraction of money that is left over shows considerable effectiveness due to  
- a solution process that is nearly complete  
- identification of most of the important elements of the problem  
- a considerable understanding of the relationships between important elements of the problem  
- appropriate conclusions with supporting evidence |
| 40   | Problem-solving process to determine the fraction of money that is left over shows a high degree of effectiveness due to  
- a complete solution process  
- identification of all important elements of the problem  
- a thorough understanding of the relationships between all of the important elements of the problem  
- appropriate conclusions with thorough and insightful supporting evidence |
Annotation:
Response demonstrates minimal evidence of a solution process; shows one expense accurately converted to a common form (0.12 = $\frac{12}{100}$) with misconception in addition of fractions (total of the numerators over largest denominator) and no calculation of the left over amount.
A club has money for a trip. The expenses for the trip are shown below:

- lunches: $\frac{1}{4}$ of the money
- tickets: $\frac{2}{5}$ of the money
- snacks: 0.12 of the money
- transportation: 20% of the money

What fraction of the money is left over?
Show your work.

The fraction of the money left over is \[ \text{________} \].

Annotation:
Response demonstrates some understanding of the relationships between important elements of the problem; shows all of the expenses converted accurately to decimals with no total or left over amount stated.
A club has money for a trip. The expenses for the trip are shown below:

- lunches: \( \frac{1}{4} \) of the money
- tickets: \( \frac{2}{5} \) of the money
- snacks: 0.12 of the money
- transportation: 20\% of the money

What fraction of the money is left over?

Show your work.

\[
\begin{align*}
\text{Lunches: } & \quad 25\% \\
\text{Tickets: } & \quad 40\% \\
\text{Snacks: } & \quad 12\% \\
\text{Transportation:} & \quad 20\% \\
\end{align*}
\]

If I convert everything to percent, I could add it all up to get the answer. All I have to do is convert it.

\[
\begin{align*}
\frac{25}{100} & = \frac{1}{4} \\
\frac{40}{100} & = \frac{2}{5} \\
\frac{12}{100} & = 0.12 \\
\frac{20}{100} & = 20\% \\
\end{align*}
\]

\[
\frac{70}{100} = \frac{97}{100}
\]

The fraction of the money left over is \( \frac{97}{100} \).

**Annotation:**
Response demonstrates a solution process that is nearly complete; shows all expenses converted accurately to a common form (\%) with the correct total percent expressed as a fraction as the left over amount.
A club has money for a trip. The expenses for the trip are shown below:

- lunches: $\frac{1}{4}$ of the money
- tickets: $\frac{2}{5}$ of the money
- snacks: 0.12 of the money
- transportation: 20% of the money

What fraction of the money is left over?

Show your work.

\[
\begin{align*}
25\% + 40\% + 12\% + 20\% \\
25\% + 40\% \\
12\% + 20\% \\
\hline
97\% + 3\% \\
\end{align*}
\]

The fraction of the money left over is ___________.

**Annotation:**
Response demonstrates a complete solution process; shows all expenses accurately converted to a common form (%), with the correct total and the correct left over amount stated as a percent.
Question 24

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10  
Thinking process to determine how much money the class will gain per apple shows limited effectiveness due to  
• minimal evidence of a solution process  
• limited identification of important elements of the problem  
• too much emphasis on unimportant elements of the problem  
• no conclusions presented  
• conclusion presented without supporting evidence

20  
Thinking process to determine how much money the class will gain per apple shows some effectiveness due to  
• an incomplete solution process  
• identification of some of the important elements of the problem  
• some understanding of the relationships between important elements of the problem  
• simple conclusions with little supporting evidence

30  
Thinking process to determine how much money the class will gain per apple shows considerable effectiveness due to  
• a solution process that is nearly complete  
• identification of most of the important elements of the problem  
• a considerable understanding of the relationships between important elements of the problem  
• appropriate conclusions with supporting evidence

40  
Thinking process to determine how much money the class will gain per apple shows a high degree of effectiveness due to  
• a complete solution process  
• identification of all important elements of the problem  
• a thorough understanding of the relationships between all of the important elements of the problem  
• appropriate conclusions with thorough and insightful supporting evidence
Question 24

Code 10

A Grade 6 class is having a fundraiser.
The class buys 3 bags of apples. Each bag has 24 apples. The total cost of the 3 bags of apples is $12.24.
The class sells the apples for $0.75 each.
How much money will the class gain per apple?
Show your work.

- 3 bags of apples → 24 each

- 24 x 3 = 72

- 3 bags = $12.24

- 72 apples cost $12.24

- 0.75 ÷ 24 → 3

The class gains $0.75 per apple.

Annotation:
Response demonstrates minimal evidence of a solution process; accurate calculation is shown for the total number of apples (72) but inaccurate calculations are shown to determine the amount gained per apple.
Question 24

Code 20

A Grade 6 class is having a fundraiser.
The class buys 3 bags of apples. Each bag has 24 apples. The total cost of the 3 bags of apples is $12.24.
The class sells the apples for $0.75 each.
How much money will the class gain per apple?
Show your work.

24 \times 3 = 72 \quad 0.75 \times 72 = 54 \div 72 = 0.75

Per apple they gain 0.75¢

The class gains ______ per apple.

Annotation:
Response demonstrates some understanding of the relationships between important elements of the problem; accurate calculations are shown for the total number of apples (72), amount charged for all apples ($54) but no calculations shown for the cost per apple or the amount gained per apple.
Question 24

**Code 30**

A Grade 6 class is having a fundraiser.
The class buys 3 bags of apples. Each bag has 24 apples. The total cost of the 3 bags of apples is $12.24.
The class sells the apples for $0.75 each.
How much money will the class gain per apple?
Show your work.

\[
\begin{align*}
12.24 &= 72 \text{ Apples} \\
0.75 \times 72 &= 54 \\
54 - 12.24 &= 41.76 \\
\hline
41.76
\end{align*}
\]

The class gains ___________ per apple.

**Annotation:**
Response demonstrates a solution process that is nearly complete; accurate calculations are shown for the total number of apples (72), amount charged for all apples ($54), and money gained for all apples ($41.76) but no calculation shown for the amount gained per apple.
A Grade 6 class is having a fundraiser.
The class buys 3 bags of apples. Each bag has 24 apples. The total cost of the 3 bags of apples is $12.24.
The class sells the apples for $0.75 each.
How much money will the class gain per apple?
Show your work.

72 apples for $12.24
in total they will make $96
$12.24 \div 72 = 0.17 \text{ therefore each apple from the store costs}
$0.17
$0.75 - $0.17 = $0.58.
That means they will gain $0.58 per 1 apple they sell.

The class gains $0.58 per apple.

Annotation:
Response demonstrates a complete solution process; accurate calculations are shown for the total number of apples (72), cost per apple (17 cents), and amount gained per apple (58 cents).