Grade 9 EQAO Assessment of Mathematics
Applied
Student Preparation Booklet

Name: _________________________
Teacher: _______________________
School: _________________________

Contents:
Key Words ........................................................................................................ 1
Strategies for Multiple Choice and Open Response Questions ................. 2
Open Response Rubric ..................................................................................... 3
EQAO Formula Sheet ....................................................................................... 5
Sample Questions from the 2014 Assessment ................................................. 7
Sample Questions from the 2013 Assessment ................................................. 25
Sample Questions from the 2012 Assessment ................................................. 47

Dufferin-Peel Catholic District School Board
2014-2015
**Key Words**

Throughout the assessment, key words are used to identify the type of response required from you. The Key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

**Compare:**
Tell what is the same and what is different.

**Describe:**
Use words to create a mental picture for the reader.

**Determine:**
Use mathematics to find a solution to the problem.

**List:**
Use point form.

**Explain:**
Use words and symbols to make your solution clear.

**Justify:**
Give reasons and evidence to show your answer is correct.

**Show your work:**
Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.
Tools you should have access to:

- Pencil, ruler and eraser
- Scientific or Graphing calculator (You may not share with another student)
- Manipulatives (examples: fraction pieces, algebra tiles, linking cubes, integer counters, 3D solids, 2D shapes...)

Strategies for Multiple Choice Questions:
1. Cover the question choices and read the question stem carefully and highlight key words with a highlighter, especially the key words on the previous page.
2. Look at the choices and eliminate any of the responses that are not possible.
3. There is only one answer per question. Choose the best possible answer and shade your choice on the answer sheet.
4. Answer every question; there are no penalties for guessing.
5. Questions that have a graph are drawn to scale. Questions that have a diagram are usually not drawn to scale.

Strategies for Open Response Questions:
1. These questions are asking you to show what you know and what you can do. Complete solutions including any rough work are expected for these questions. Give as much information as you can.
2. Read the question carefully and highlight any key words or information with a highlighter.
3. Write your solution in the space provided. Try to give a clear well-organized solution to illustrate your complete understanding and ability to communicate. Write your solutions so they can be understood by someone who does not know your work.
4. Don’t erase any of your calculations, drawing or reasoning. Scorers want to see all your work.
5. Use the list of key words on the previous page to help you decide what is expected in your answer. For example, “show your work” means, record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.
6. The problems in these questions often have more than one way of being solved. Be sure to clearly explain your solution using graphs, tables, pictures numbers or words.
7. When using a calculator, write down all the numbers you use and the operations you carry out. For example to find the area of a circle with diameter 7cm you need to write \[ A = \pi (3.5)^2 \approx 38.485 \text{cm}^2. \]
<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>
<tr>
<td>I</td>
<td>illegible: cannot be read; completely crossed out/erased; not written in English &lt;br&gt; irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, “?”, “!”, “I don’t know”) &lt;br&gt; off topic: no relationship of written work to the question</td>
</tr>
<tr>
<td>10</td>
<td>demonstration of limited understanding of concepts and/or procedures &lt;br&gt; application of knowledge and skills shows limited effectiveness due to &lt;br&gt; • misunderstanding of concepts &lt;br&gt; • incorrect selection or misuse of procedures &lt;br&gt; • problem-solving process shows limited effectiveness due to &lt;br&gt; • minimal evidence of a solution process &lt;br&gt; • limited identification of important elements of the problem &lt;br&gt; • too much emphasis on unimportant elements of the problem &lt;br&gt; • no conclusions presented &lt;br&gt; • conclusion presented without supporting evidence</td>
</tr>
<tr>
<td>20</td>
<td>demonstration of some understanding of concepts and/or procedures &lt;br&gt; application of knowledge and skills shows some effectiveness due to &lt;br&gt; • partial understanding of the concepts &lt;br&gt; • errors and/or omissions in the application of the procedures &lt;br&gt; • problem-solving process shows some effectiveness due to &lt;br&gt; • an incomplete solution process &lt;br&gt; • identification of some of the important elements of the problem &lt;br&gt; • some understanding of the relationships between important elements of the problem &lt;br&gt; • simple conclusions with little supporting evidence</td>
</tr>
<tr>
<td>30</td>
<td>demonstration of considerable understanding of concepts and/or procedures &lt;br&gt; application of knowledge and skills shows considerable effectiveness due to &lt;br&gt; • an understanding of most of the concepts &lt;br&gt; • minor errors and/or omissions in the application of the procedures &lt;br&gt; • problem-solving process shows considerable effectiveness due to &lt;br&gt; • a solution process that is nearly complete &lt;br&gt; • identification of most of the important elements of the problem &lt;br&gt; • a considerable understanding of the relationships between important elements of the problem &lt;br&gt; • appropriate conclusions with supporting evidence</td>
</tr>
<tr>
<td>40</td>
<td>demonstration of thorough understanding of concepts and/or procedures &lt;br&gt; application of knowledge and skills shows a high degree of effectiveness due to &lt;br&gt; • a thorough understanding of the concepts &lt;br&gt; • an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding) &lt;br&gt; • problem-solving process shows a high degree of effectiveness due to &lt;br&gt; • a complete solution process &lt;br&gt; • identification of all important elements of the problem &lt;br&gt; • a thorough understanding of the relationships between all of the important elements of the problem &lt;br&gt; • appropriate conclusions with thorough and insightful supporting evidence</td>
</tr>
</tbody>
</table>
## Geometric Figure

<table>
<thead>
<tr>
<th>Geometric Figure</th>
<th>Perimeter</th>
<th>Area</th>
</tr>
</thead>
</table>
| **Rectangle**    | $P = l + l + w + w$  
|                  | or $P = 2(l + w)$   | $A = lw$ |
| **Parallelogram**| $P = b + b + c + c$  
|                  | or $P = 2(b + c)$   | $A = bh$ |
| **Triangle**     | $P = a + b + c$      | $A = \frac{bh}{2}$  
|                  | or $A = \frac{1}{2}bh$ |
| **Trapezoid**    | $P = a + b + c + d$  
|                  | $A = \frac{(a + b)h}{2}$  
|                  | or $A = \frac{1}{2}(a + b)h$ |
| **Circle**       | $C = \pi d$  
<p>|                  | or $C = 2\pi r$   | $A = \pi r^2$ |</p>
<table>
<thead>
<tr>
<th>Geometric Figure</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder</td>
<td>$V = (\text{area of base})(\text{height})$</td>
</tr>
<tr>
<td></td>
<td>$V = \pi r^2 h$</td>
</tr>
<tr>
<td>Sphere</td>
<td>$V = \frac{4}{3} \pi r^3$ or $V = \frac{4\pi r^3}{3}$</td>
</tr>
<tr>
<td>Cone</td>
<td>$V = \frac{(\text{area of base})(\text{height})}{3}$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{1}{3} \pi r^2 h$ or $V = \frac{\pi r^2 h}{3}$</td>
</tr>
<tr>
<td>Square-based pyramid</td>
<td>$V = \frac{(\text{area of base})(\text{height})}{3}$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{1}{3} b^2 h$ or $V = \frac{b^2 h}{3}$</td>
</tr>
<tr>
<td>Rectangular prism</td>
<td>$V = (\text{area of base})(\text{height})$</td>
</tr>
<tr>
<td></td>
<td>$V = lwh$</td>
</tr>
<tr>
<td>Triangular prism</td>
<td>$V = (\text{area of base})(\text{height})$</td>
</tr>
<tr>
<td></td>
<td>$V = \frac{1}{2} bh h$ or $V = \frac{bh h}{2}$</td>
</tr>
</tbody>
</table>
Grade 9 Assessment of Mathematics
2014

Released Assessment Questions: Applied

Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

• To indicate your answer, use a pencil to fill in the circle completely.
  • Like this: ⬜ Not like this: ☑ ☑ ☑ ☑
• Do not fill in more than one answer to a question.
• Do not leave a question blank.
• Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1.  a  b  c  d
2.  a  b  c  d
3.  a  b  c  d
4.  a  b  c  d
5.  a  b  c  d
6.  a  b  c  d
7.  a  b  c  d
8.  Respond in booklet.
9.  Respond in booklet.
10. a  b  c  d
11. a  b  c  d
12. a  b  c  d
13. a  b  c  d
14. a  b  c  d
15. a  b  c  d
16. a  b  c  d
17. a  b  c  d
18. a  b  c  d
19. a  b  c  d
20. a  b  c  d
22. Respond in booklet.
23. Respond in booklet.
24. a  b  c  d
25. a  b  c  d
26. a  b  c  d
27. a  b  c  d
28. a  b  c  d
29. a  b  c  d
30. Respond in booklet.
31. Respond in booklet.

End of Assessment

Print Student Name: _______________________________________

_________________________________________________________

Student Signature: ________________________________________
Grade 9 Assessment of Mathematics
2014

RELEASED ASSESSMENT QUESTIONS

Record your answers to the multiple-choice questions on the Student Answer Sheet (2014, Applied).

Please note: The format of this booklet is different from that used for the assessment. The questions themselves remain the same.
Multiple-Choice

1. Billy has 3 apples and 4 oranges. Which of the following has a ratio of apples to oranges equivalent to Billy’s?
   a 3 apples and 8 oranges
   b 4 apples and 3 oranges
   c 8 apples and 6 oranges
   d 9 apples and 12 oranges

2. The ratio of the width to the height of a television screen is 16:9. If the height of the screen is 52 cm, which is closest to the width?
   a 92 cm
   b 87 cm
   c 59 cm
   d 29 cm

3. A store gives reward points for every dollar spent. The number of reward points varies directly with the total amount spent.
   Sofia spends $300 and receives 15 reward points.
   Juan spends $900. He receives reward points at the same rate as Sofia.
   How many more reward points will Juan receive than Sofia?
   a 20
   b 30
   c 60
   d 90

4. Each year, a school sends 50 students to a conference. Last year, the cost was $12.50 per student. This year, the cost per student has increased by 16%.
   What is the total cost to send 50 students to the conference this year?
   a $625
   b $633
   c $725
   d $841

5. What is the value of $x$ in the equation $25 - \sqrt{x} = 9$?
   a 4
   b 16
   c 225
   d 256

6. The formula for the volume of a cylinder is $V = \pi r^2h$, where $r$ is the radius and $h$ is the height.
   A cylinder has a radius of 3 cm and a height of 10 cm.
   Which of the following is closest to the volume of the cylinder?
   a 188 cm$^3$
   b 283 cm$^3$
   c 888 cm$^3$
   d 8882 cm$^3$
A formula for the relationship between a person’s maximum heart rate, $H$, and the person’s age, $a$, is shown below.

$$H = 217 - 0.85a$$

According to the formula, which of the following is closest to Jasmin’s maximum heart rate if she is 14 years old?

a  203  

b  205  

c  229  

d  239
8 Orange-Gi

Gina is buying 24 oranges. Two stores offer the following deals:

   Store A: 12 oranges for $6.48
   Store B: 5 oranges for $2.65

Gina can buy oranges individually.

How much will Gina save if she buys 24 oranges at Store B?

Show your work.
9 Volumizer

The figure pictured below is made of a cylinder and a hemisphere.

Its volume can be determined using the following formula, in which $r$ is the radius and $h$ is the height of the cylinder.

\[ V = \frac{2}{3} \pi r^3 + \pi r^2 h \]

Determine the volume of the figure.

Show your work.
10 Five students plot their arm span and height on the graph below.

Which of the following describes one of these 5 students?

a  height: 166 cm; arm span: 162 cm
b  height: 170 cm; arm span: 164 cm
c  height: 180 cm; arm span: 165 cm
d  height: 195 cm; arm span: 188 cm

11 Each month, Alex’s cellphone plan costs $15, plus $0.10 per minute of use.

Which graph could represent Alex’s total monthly cost?

a
b

c

d
The scatter plot below shows data from an experiment.

Which of the following best represents the trend in this data?

a) a line that starts at (0, 10) and ends at (1.5, 0)
b) a line that starts at (0, 0) and ends at (1.6, 12)
c) a curve that starts at (0, 10) and ends at (1.5, 0)
d) a curve that starts at (0, 0) and ends at (1.6, 12)

Patterns are made using the square □.

For which of the following patterns is there a linear relationship between the number of squares in the term and the term number?

a) □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
   Term 1  Term 2  Term 3  Term 4

b) □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
   Term 1  Term 2  Term 3  Term 4

c) □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
   Term 1  Term 2  Term 3  Term 4

d) □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
   Term 1  Term 2  Term 3  Term 4
A graph representing the relationship between the amount of money in a bank account and time, in years, is shown below.

What is the rate of change for this relationship?

- $200 per year
- $160 per year
- $150 per year
- $100 per year

Halyna starts with $50 in her bank account, and she spends $3 per day from it.

Compared to Halyna, Manny starts with $5 more in his account and spends $1 more each day.

Which of the following equations represents the amount of money remaining in Manny’s account, $A$, at the end of each day, $d$?

- $A = 51d$
- $A = 59d$
- $A = 55 - 9d$
- $A = 55 - 4d$

The cost, $C$, in dollars, of a pizza with $n$ toppings is represented by the equation $C = 2n + 5$.

Which of the following statements is true?

- The base cost of the pizza is $2, and the cost per topping is $5.
- The base cost of the pizza is $5, and the cost per topping is $2.
- The base cost of the pizza is $7, and the cost per topping is $2.
- The base cost of the pizza is $7, and the cost per topping is $5.
Data in the table below is from a linear relationship.

<table>
<thead>
<tr>
<th>$n$</th>
<th>$C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

What is the value of $C$ when $n = 10$?

- a 24
- b 28
- c 34
- d 40

A movie-rental club charges a membership fee and a cost for each movie rented.

The table of values shows total costs for renting movies.

<table>
<thead>
<tr>
<th>Number of movies, $n$</th>
<th>Total cost, $C$ ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
</tr>
</tbody>
</table>

Which of the following equations correctly represents this relationship?

- a $C = 4n + 8$
- b $C = 4n + 12$
- c $C = 2n + 10$
- d $C = 2n + 12$

One night at 11 p.m., the temperature is 3.5 °C. Throughout the night, the temperature drops at a constant rate of 2 °C per hour.

At this rate, when will the temperature reach −7.5 °C?

- a 4:30 a.m.
- b 5:00 a.m.
- c 5:30 a.m.
- d 6:00 a.m.

Carla belongs to a movie subscription service. Her total monthly cost consists of a $16 fee and $1.50 per movie viewed.

Susan’s total monthly cost for a different movie subscription service has a fee that is $4 less than Carla’s, but the cost per movie viewed is the same.

Which of the following represents Susan’s total monthly cost, $C$, in dollars, where $n$ is the number of movies viewed?

- a $C = 20 + 1.5n$
- b $C = 12 + 1.5n$
- c $C = 13.5n$
- d $C = 12n$
Warming Up

The temperature outside at 6 a.m. is 4 °C. The temperature rises by 1.5 °C every hour. Complete the table of values for this relationship.

<table>
<thead>
<tr>
<th>Number of hours since 6 a.m.</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Graph the data on the grid below. Choose and label an appropriate scale for the $T$-axis.
Hot Air Balloons

A green hot air balloon is rising at a constant rate.

- After 2 minutes, it is at a height of 30 m.
- After 6 minutes, it is at a height of 75 m.

A blue hot air balloon is rising at twice the rate of the green balloon.

Determine the rate in metres per minute at which the blue balloon is rising.

Show your work. You may use the grid if you wish.
Two Tutors

Tianna and Liam both charge for tutoring. Information about Liam’s total charge for tutoring is shown on the grid below.

![Graph showing total charge vs. time spent tutoring]

Tianna’s total charge is made up of a base fee of $40, and $10 per hour of tutoring.

They both start a tutoring session at the same time one day, and they both spend the same amount of time tutoring.

If Tianna’s and Liam’s charges were the same, how many hours did they each spend tutoring?

Justify your answer.

Tianna and Liam each spent _____________ hours tutoring.
24 A rectangular area will be enclosed on all 4 sides.

Four options are shown below.

<table>
<thead>
<tr>
<th>Option</th>
<th>Area (m²)</th>
<th>Width (m)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>256</td>
<td>2</td>
<td>128</td>
</tr>
<tr>
<td>2</td>
<td>256</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>3</td>
<td>256</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>256</td>
<td>32</td>
<td>8</td>
</tr>
</tbody>
</table>

Which option has the smallest perimeter?

a) Option 1  
b) Option 2  
c) Option 3  
d) Option 4

25 The diagram below represents the front view of a house.

Which is closest to the height, \( h \), of the house?

a) 3 m  
b) 7 m  
c) 10 m  
d) 12 m

26 The cone and cylinder pictured below have the same height and radius.

![Diagram of a cone and a cylinder]

\[ V = 96 \text{ cm}^3 \]

The volume of the cone is 96 cm³.

What is the volume of the cylinder?

a) 32 cm³  
b) 96 cm³  
c) 192 cm³  
d) 288 cm³

27 The diagram below shows a spherical globe in a cube-shaped box. The globe fits tightly in the box.

![Diagram of a sphere in a cube]

Which is closest to the volume of empty space in the box?

a) 244 cm³  
b) 268 cm³  
c) 512 cm³  
d) 780 cm³
28 What is the value of y in the diagram below?

![Diagram with angles 105°, 65°, 112°, y, and 110°.]

- a 65°
- b 75°
- c 78°
- d 102°

29 What is the value of x in the diagram below?

![Diagram with angles 72°, 52°, 72°, and x.]

- a 56°
- b 72°
- c 108°
- d 124°
30 Flat Shape

The shape below is made of a semicircle and a triangle.

Determine the area of this shape.

Show your work.
**31 Sign Design**

A sign is strung between two posts as shown below.

![Diagram of sign design with angles](image)

Complete the table below with the values of $x$ and $y$.

Justify your answers using geometric properties.

<table>
<thead>
<tr>
<th>Value</th>
<th>Justification using geometric properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x =$</td>
<td></td>
</tr>
<tr>
<td>$y =$</td>
<td></td>
</tr>
</tbody>
</table>
Grade 9 Assessment of Mathematics
2013

Released Assessment Questions: Applied

Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.
• To indicate your answer, use a pencil to fill in the circle completely.
  Like this: ●  Not like this: ☒ ☒ ☒ ☒
• Do not fill in more than one answer to a question.
• Do not leave a question blank.
• Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
8. Respond in booklet.
9. Respond in booklet.
10. a b c d
11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
16. a b c d
17. a b c d
18. a b c d
19. a b c d
20. a b c d
22. Respond in booklet.
23. Respond in booklet.
24. a b c d
25. a b c d
26. a b c d
27. a b c d
28. a b c d
29. a b c d
30. Respond in booklet.
31. Respond in booklet.

End of Assessment

Print Student Name: ____________________________________________

________________________________________

Student Signature: ____________________________________________
Grade 9 Assessment of Mathematics

2013

RELEASED ASSESSMENT QUESTIONS

Record your answers to the multiple-choice questions on the Student Answer Sheet (2013, Applied).

Please note: The format of this booklet is different from that used for the assessment. The questions themselves remain the same.
The design for a rectangular garden has a length-to-width ratio of 7:5.

Which of the following could be used to determine the width of the garden if the length is 6.5 m?

a $\frac{5}{7} = \frac{6.5}{x}$

b $\frac{7}{5} = \frac{x}{6.5}$

c $\frac{6.5}{7} = \frac{5}{x}$

d $\frac{6.5}{x} = \frac{7}{5}$

What is the value of $k$ in the proportion below?

$\frac{9}{k} = \frac{24}{32}$

a 12

b 15

c 16

d 17

Last week, Tenisha paid $65.72 for 62 kg of potatoes for her restaurant. Today, the price of potatoes is $0.02/kg lower.

How much will Tenisha pay for 50 kg of potatoes today?

a $46$

b $47$

c $52$

d $53$

A bicycle has a regular price of $175. It is on sale for 20% off.

Which of the following is closest to the total cost, including 13% tax?

a $140$

b $158$

c $163$

d $168$

The volume of the cylinder shown below is 408 cm$^3$.

Which of the following is closest to the radius of the cylinder?

a 4 cm

b 8 cm

c 14 cm

d 16 cm

What value of $x$ makes the equation $4x - 5 = -6x + 15$ true?

a 2

b 1

c $-5$

d $-10$
An equation representing the height of a burning candle is \( H = 2d - \frac{1}{2} t \), where

- \( H \) is the height, in centimetres,
- \( d \) is the diameter, in centimetres, and
- \( t \) is the amount of time that the candle has been burning, in minutes.

A candle has a diameter of 6 cm.

If the candle burns for 2 minutes, what will its height be?

a) 1 cm  

b) 4 cm  

c) 11 cm  

d) 13 cm
More Apples

Two stores are advertising specials on apples.

<table>
<thead>
<tr>
<th>Store A</th>
<th>Store B</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 apples for $4.40</td>
<td>12 apples for $5.76</td>
</tr>
</tbody>
</table>

Apples are sold individually.

How much less would 30 apples cost at Store B than at Store A?

Justify your answer.
The cylinder pictured below has a volume of 807 cm³.

The formula for determining the volume of a cylinder is

\[ V = \pi r^2 h, \]

where \( r \) is the radius and \( h \) is the height.

Determine the height of the cylinder.

Show your work.
Which scatter plot shows data with no trend?

a

b

c

d
Kim owes her mother $100. She will pay her back $5 each week.

Which table shows data about the amount Kim still owes for the first 5 weeks of payments?

**a**

<table>
<thead>
<tr>
<th>Week</th>
<th>Amount still owing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>1</td>
<td>$5</td>
</tr>
<tr>
<td>2</td>
<td>$10</td>
</tr>
<tr>
<td>3</td>
<td>$15</td>
</tr>
<tr>
<td>4</td>
<td>$20</td>
</tr>
<tr>
<td>5</td>
<td>$25</td>
</tr>
</tbody>
</table>

**b**

<table>
<thead>
<tr>
<th>Week</th>
<th>Amount still owing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$100</td>
</tr>
<tr>
<td>1</td>
<td>$105</td>
</tr>
<tr>
<td>2</td>
<td>$110</td>
</tr>
<tr>
<td>3</td>
<td>$115</td>
</tr>
<tr>
<td>4</td>
<td>$120</td>
</tr>
<tr>
<td>5</td>
<td>$125</td>
</tr>
</tbody>
</table>

**c**

<table>
<thead>
<tr>
<th>Week</th>
<th>Amount still owing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$100</td>
</tr>
<tr>
<td>1</td>
<td>$80</td>
</tr>
<tr>
<td>2</td>
<td>$60</td>
</tr>
<tr>
<td>3</td>
<td>$40</td>
</tr>
<tr>
<td>4</td>
<td>$20</td>
</tr>
<tr>
<td>5</td>
<td>$0</td>
</tr>
</tbody>
</table>

**d**

<table>
<thead>
<tr>
<th>Week</th>
<th>Amount still owing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$100</td>
</tr>
<tr>
<td>1</td>
<td>$95</td>
</tr>
<tr>
<td>2</td>
<td>$90</td>
</tr>
<tr>
<td>3</td>
<td>$85</td>
</tr>
<tr>
<td>4</td>
<td>$80</td>
</tr>
<tr>
<td>5</td>
<td>$75</td>
</tr>
</tbody>
</table>
Consider the four different relationships represented below.

How many are linear relationships?

- a 1
- b 2
- c 3
- d 4
Which of the relationships represented below has a constant rate of change?

a)

b)

c)

d)
14 Each of the three points on the grid below gives information about the altitude of a hot air balloon at a certain time.

If the relationship between altitude and time is linear, what was the altitude of the balloon at 4 minutes?

a  1250 m  
b  1500 m  
c  1750 m  
d  2000 m

15 Dakota and Jamie have part-time jobs.

The graphs below represent the relationship between earnings and the time each of them works.

Whose graph represents a partial variation, and what is the initial value of the relationship?

a  Dakota’s, $0  
b  Dakota’s, $15  
c  Jamie’s, $30  
d  Jamie’s, $40
For babysitting, Becky charges according to the equation \( C = 5n + 9 \), where \( C \) is the amount charged, in dollars, and \( n \) is the number of hours she babysits.

Which statement about this situation is correct?

a. Becky charges $14 per hour.

b. Becky charges a flat fee of $14.

c. Becky charges an initial fee of $5, plus $9 per hour.

d. Becky charges an initial fee of $9, plus $5 per hour.

Each week, Marissa withdraws the same amount from her bank account.

The equation \( A = 1550 - 90w \) represents the relationship between the amount of money remaining in her account, \( A \), in dollars, and the number of weeks of withdrawing, \( w \).

For how many weeks has Marissa made withdrawals when the amount remaining in the account is $110?

a. 14

b. 16

c. 17

d. 18

22 Water is being pumped to empty a swimming pool.

At 6 a.m., the water level is 150 cm. Every 2 hours, the water level drops by 30 cm.

What is the earliest time when the pool will be empty?

a. 10 a.m.

b. 11 a.m.

c. 4 p.m.

d. 5 p.m.
Data about the total monthly cost to rent video games from two online game sites are shown on the graph below.

Which of the following statements is true?

a  It costs more to rent from Sir Game-A-Lot after 6 games.

b  It costs less to rent from Mighty Gamers after 30 games.

c  It costs the same amount to rent 6 games from the two sites.

d  It costs the same amount to rent 30 games from the two sites.
24 Drippy Drops

Water is leaking from a bottle at a constant rate. Julia draws the line on the graph below to model the relationship between the volume of water remaining and time.

Determine whether each of the 3 points shown on the line is possible in this situation.
Write an interpretation of the meaning of each point.

<table>
<thead>
<tr>
<th>Point</th>
<th>Is this point possible?</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Circle one:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Circle one:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Circle one:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes  No</td>
<td></td>
</tr>
</tbody>
</table>
Fun Fair

The graph below shows the linear relationship between the total cost of a day at a fair, \( C \), and the number of rides taken, \( n \).

![Graph showing total cost vs. number of rides taken]

Complete the table below with information about this relationship.

<table>
<thead>
<tr>
<th>Initial value:</th>
<th>Rate of change:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning of initial value in this situation</td>
<td>Meaning of rate of change in this situation</td>
</tr>
</tbody>
</table>
Happy Trails

The total cost of horseback riding at a horse ranch is made up of a fixed fee and a cost per hour. The table below shows information about the total cost.

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>Total cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>7</td>
<td>125</td>
</tr>
</tbody>
</table>

Graph the data in the table on the grid below.

Write an equation that relates the total cost of a ride, \( C \), to the time spent riding, \( t \).

\[ C = \text{__________________________} \]

Show your work.
Some students use 24 large square tiles to create a dance floor. They arrange the tiles to make a rectangular area with the smallest possible perimeter.
Which arrangement creates an area with the smallest possible perimeter?

- a 1 row of 24 tiles
- b 2 rows of 12 tiles
- c 3 rows of 8 tiles
- d 4 rows of 6 tiles

A wire is attached from the top of a 10 m pole to a spot on the ground 4 m away from the base of the pole, as shown below.

Which of the following is closest to the length of the wire?

- a 11 m
- b 14 m
- c 20 m
- d 28 m

The figure below is made of a square-based prism and a cone.

Which of the following is closest to the volume of the figure?

- a 3675 cm$^3$
- b 4041 cm$^3$
- c 5067 cm$^3$
- d 5581 cm$^3$
27 The sphere pictured below has a diameter of 10 cm.

![Sphere Diagram]

Which expression represents the volume of the sphere?

a \( \frac{4\pi(5)(3)}{3} \)

b \( \frac{4\pi(5)^3}{3} \)

c \( \frac{4\pi(10)^3}{3} \)

d \( \frac{4\pi(10)(3)}{3} \)

28 What is the value of \( x \) in the diagram below?

![Triangle Diagram]

a 91°

b 89°

c 55°

d 34°

29 What is the value of \( x \) in the diagram below?

![Triangle Diagram]

a 40°

b 62°

c 78°

d 118°
Hole in the Wall

Terry is painting the shaded area of the rectangular wall shown below.

The average cost of paint is $0.40/m².

Determine the total cost of the paint needed to cover the shaded area of the wall.

Show your work.
Outside Angles

Look at the following diagram.

Complete the chart below with the values of $x$ and $y$. Justify your answers using geometric properties.

<table>
<thead>
<tr>
<th>Value</th>
<th>Justification using geometric properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x =$</td>
<td></td>
</tr>
<tr>
<td>$y =$</td>
<td></td>
</tr>
</tbody>
</table>
# Released Assessment Questions: Applied

## Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, **use a pencil to fill in the circle completely.**
  - Like this: ●  Not like this: ◯  ◯  ◯  ◯
- Do not fill in more than one answer to a question.
- Do not leave a question blank.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>2.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>3.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>4.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>5.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>6.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>7.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>8.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>11.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>12.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>13.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>14.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>15.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>16.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>17.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>18.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>19.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>20.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>22.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>25.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>26.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>27.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>28.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>29.</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>30.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Respond in booklet.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**End of Assessment**

---

Print Student Name: 

__________________________________________

Student Signature: 

__________________________________________
Record your answers to the multiple-choice questions on the Student Answer Sheet (2012, Applied).
Multiple-Choice

1. Consider the proportion below.
\[
\frac{3}{4} = \frac{a}{24}
\]
What is the value of \(a\) in the proportion?
- a. 6
- b. 8
- c. 18
- d. 72

2. A small case of pop, with 12 cans, costs $3.96. A large case has 18 cans. The cost per can in the large case is $0.02 less than in the small case.
What is the cost of a large case?
- a. $3.60
- b. $3.72
- c. $5.58
- d. $5.94

3. In the first year of a fundraising campaign, donations are collected at a rate of $700 each day for 8 days.
In the second year, the daily rate doubles and the campaign is 3 days longer.
How much money is raised in the second year?
- a. $4200
- b. $7700
- c. $11 200
- d. $15 400

4. In an election for student council president, 480 students vote.
Jade receives 55% of the votes. Ericka receives the rest of the votes.
How many votes does Ericka receive?
- a. 216
- b. 264
- c. 425
- d. 435

5. Consider the following equation:
\[c^2 = 6^2 + 10^2\]
Which is closest to the value of \(c\)?
- a. 4
- b. 6
- c. 12
- d. 16

6. Which expression is a simplified form of
\[3x^2 - 4x + 5 - x^2 + 2x - 1\]
- a. \(2x^2 - 2x + 4\)
- b. \(2x^2 + 2x + 6\)
- c. \(4x^2 - 6x + 4\)
- d. \(4x^2 + 6x + 6\)
For which of the following is $x = -7$ not a solution?

a) $4 = x + 11$

b) $3x = x - 28$

c) $5 = -2x - 9$

d) $5x = 2x - 21$
Road Trip!

Paul drives from home to his friend’s house and then back home.

- The distance from Paul’s home to his friend’s house is about 720 km.
- On average Paul’s car uses 6.8 L of gas for every 100 km.
- Gas costs 96.5 cents a litre.

How much does Paul pay in total for gas to his friend’s house and back home?

Show your work.
9 Stage Show

A stage in the shape of a semicircle is shown below.

The area of the stage is 200 m$^2$.
Determine the measure of the diameter.
Show your work.

Hint:
Area of semicircle $= \frac{\pi r^2}{2}$
The graph below represents the relationship between the circumference and the radius of a circle.

Circumference vs. Radius

Which of the following is represented by this graph?

a  radius = 20 cm; circumference = 3.0 cm
b  radius = 10 cm; circumference = 1.6 cm
c  radius = 9 cm; circumference = 50 cm
d  radius = 7 cm; circumference = 44 cm
Sanjay makes $20 per day plus $8 for every magazine subscription he sells.

Which of the following tables shows data from the relationship between his total daily pay and the number of subscriptions he sells?

a

<table>
<thead>
<tr>
<th>Number of subscriptions sold</th>
<th>Total daily pay ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>52</td>
</tr>
</tbody>
</table>

b

<table>
<thead>
<tr>
<th>Number of subscriptions sold</th>
<th>Total daily pay ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

c

<table>
<thead>
<tr>
<th>Number of subscriptions sold</th>
<th>Total daily pay ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>3</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>88</td>
</tr>
</tbody>
</table>

d

<table>
<thead>
<tr>
<th>Number of subscriptions sold</th>
<th>Total daily pay ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
</tr>
</tbody>
</table>
William belongs to a music downloading club. He pays $8 a month plus $0.50 per song downloaded.

Which of the following shows information about the relationship between the total monthly cost, in dollars, and the number of songs downloaded?

a

<table>
<thead>
<tr>
<th>Number of songs</th>
<th>Total monthly cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>8.00</td>
</tr>
<tr>
<td>20</td>
<td>13.00</td>
</tr>
<tr>
<td>30</td>
<td>18.00</td>
</tr>
<tr>
<td>40</td>
<td>23.00</td>
</tr>
</tbody>
</table>

b

<table>
<thead>
<tr>
<th>Number of songs</th>
<th>Total monthly cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8.00</td>
</tr>
<tr>
<td>10</td>
<td>8.50</td>
</tr>
<tr>
<td>20</td>
<td>9.00</td>
</tr>
<tr>
<td>30</td>
<td>9.50</td>
</tr>
</tbody>
</table>

c

![Graph showing Total Monthly Cost vs. Number of Songs]

d

![Graph showing Total Monthly Cost vs. Number of Songs]
A restaurant charges $3 for a cheese pizza plus $2 per additional topping.

Which of the following shows two models that represent the relationship between the total cost of a pizza, \( C \), and the number of additional toppings on it, \( n \)?

a) \[
\begin{array}{|c|c|}
\hline
\text{Number of toppings, } n & \text{Total cost, } C \\
\hline
0 & 3 \\
2 & 7 \\
4 & 11 \\
6 & 15 \\
\hline
\end{array}
\]

b) \( C = 3n + 2 \)

c) \[
\begin{array}{|c|c|}
\hline
\text{Number of toppings, } n & \text{Total cost, } C \\
\hline
0 & 2 \\
2 & 8 \\
4 & 14 \\
6 & 20 \\
\hline
\end{array}
\]

d) \( C = 2n + 3 \)
14 A limousine company charges customers according to the graph shown below.

What rate does the company charge per kilometre?

- a $1.25
- b $2.50
- c $200.00
- d $400.00

15 A basketball club offers two types of memberships.
- Membership Y: No registration fee and $15 per hour for court time.
- Membership Z: $40 registration fee and $5 per hour for court time.

Which of these relationships is a partial variation, and what is its initial cost?

- a Membership Y; $0
- b Membership Y; $15
- c Membership Z; $5
- d Membership Z; $40
16 An arcade charges each customer an admission fee plus a cost to play each game. The relationship between the total cost, $C$, and the number of games played, $n$, is shown on the grid below.

Which equation below represents this relationship?

a $C = 0.5n + 5$

b $C = 0.5n + 7.5$

c $C = 2.5n + 5$

d $C = 2.5n + 7.5$

17 The table below shows information about the linear relationship between the total cost per month of Sylvie's cellphone plan and the number of text messages she sends.

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of text messages</th>
<th>Total cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>60</td>
<td>28</td>
</tr>
<tr>
<td>February</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>March</td>
<td>30</td>
<td>?</td>
</tr>
</tbody>
</table>

According to this relationship, what is Sylvie’s total cost for March?

a $14$

b $20$

c $25$

d $26$

18 The table below shows the relationship between the cost to rent a bicycle, $C$, and the number of hours, $n$.

<table>
<thead>
<tr>
<th>Number of hours, $n$</th>
<th>Rental cost, $C$ ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
</tr>
</tbody>
</table>

Which equation represents this relationship?

a $C = 3n$

b $C = 10n$

c $C = 3 + 10n$

d $C = 10 + 3n$
A taxi charges a flat fee of $3.75, plus $1.50 per kilometre driven.

What is the total cost of a 10 km trip?

a $15.00
b $18.75
c $39.00
d $52.50
Kris is considering a new text message plan. The graph below shows information about Plan A.

Plan B has the same total monthly cost for 250 messages.

Which of the following graphs could represent Plan B?

- a
- b
- c
- d
Cam, Beth and Amrit are paid at an hourly rate for their time worked.

The graph below shows the amount paid and the time worked for these three students.

Determine which student is paid the highest hourly rate.

Justify your answer.

The student who is paid the highest hourly rate is ________________.
22 Rental Rates

The total cost of a banquet includes a fixed fee to rent the hall and a cost per person. Information about the total cost at two different halls is shown below.

<table>
<thead>
<tr>
<th>Number of people, $n$</th>
<th>Total cost, $C$ ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>275</td>
</tr>
<tr>
<td>20</td>
<td>450</td>
</tr>
<tr>
<td>30</td>
<td>625</td>
</tr>
</tbody>
</table>

Which hall’s total cost includes a lower cost per person?

Circle one: Hall A  Hall B

Justify your answer.
Erin rents a car. The relationship between the total cost of the rental and the distance driven is shown by the graph below.

Use the graph to estimate the total cost of the rental if Erin drives 27 km. Show your work on the graph.

The estimated cost for 27 km is ______________.

Using the equation $C = 20 + 0.5d$, where $C$ represents the total cost, in dollars, and $d$ represents the distance Erin drives, in kilometres, determine the total cost of driving 27 km.

Show your work.

The actual cost for 27 km is ______________.

There could be a difference in the total cost of driving 27 km when you use the graph rather than the equation.

Explain why there could be a difference.
24 Ollie constructs a rectangular deck. He builds the deck around a garden in his yard as shown below.

What is the area of the deck?

a  48 m$^2$

b  42 m$^2$

c  20 m$^2$

d  18 m$^2$

25 Consider the cylinder below.

Which of the following is closest to the volume of the cylinder?

a  126 m$^3$

b  132 m$^3$

c  264 m$^3$

d  396 m$^3$

26 Air is pumped to fill a spherical balloon. Each time air is pumped, 300 cm$^3$ of air enters the balloon.

Which of the following is closest to the number of times air must be pumped to fill an empty spherical balloon to a radius of 10 cm?

a  4

b  14

c  30

d  42
27 A container that stores grain is in the shape of a cylinder and cone as shown below.

Which is closest to the volume of the container?

- a 88 m$^3$
- b 113 m$^3$
- c 132 m$^3$
- d 170 m$^3$

28 Consider the diagram below.

What is the value of $x$?

- a 30°
- b 60°
- c 120°
- d 150°

29 A regular pentagon is shown below.

What is the value of $x$?

- a 60°
- b 72°
- c 108°
- d 180°
School’s In

Chandra uses the map below to determine the distance from home to school.

Determine the total distance she will travel from home to school if she walks along the dark, solid lines shown on the map.

Show your work.
Consider the diagram below.

![Diagram with angles]

Complete the chart below with the values for $p$ and $r$. Justify your answers using geometric properties.

<table>
<thead>
<tr>
<th>Value</th>
<th>Justification using geometric properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>$p = __________$</td>
<td></td>
</tr>
<tr>
<td>$r = _________$</td>
<td></td>
</tr>
</tbody>
</table>