

# Grade 9

Assessment of Mathematics, Applied Program

RELEASED  
**SAMPLE ASSESSMENT  
QUESTIONS**

SPRING 2007

Education Quality and  
Accountability Office



## Trip Planning (Spring 2007)

B = Blank: nothing written or drawn in response to the question

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

Codes	Description
10	Application of knowledge and skills involving ratios and rates to determine the total cost of gas shows limited effectiveness due to <ul style="list-style-type: none"><li>• misunderstanding of concepts</li><li>• incorrect selection or misuse of procedures</li></ul>
20	Application of knowledge and skills involving ratios and rates to determine the total cost of gas shows some effectiveness due to <ul style="list-style-type: none"><li>• partial understanding of the concepts</li><li>• errors and/or omissions in the application of the procedures</li></ul>
30	Application of knowledge and skills involving ratios and rates to determine the total cost of gas shows considerable effectiveness due to <ul style="list-style-type: none"><li>• an understanding of most of the concepts</li><li>• minor errors and/or omissions in the application of the procedures</li></ul>
40	Application of knowledge and skills involving ratios and rates to determine the total cost of gas shows a high degree of effectiveness due to <ul style="list-style-type: none"><li>• a thorough understanding of the concepts</li><li>• an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding)</li></ul>

# ANCHOR

Applied Spring 2007 Q7

Name: Trip Planning

CODE: 10

The Lucas family is going on a trip to Manitoba and back. It is 1624 km from home to Manitoba.

Determine the total cost of the gas for the Lucas family's trip to Manitoba and back, if the cost of gas is 83¢ per litre and the car uses 9.7 litres per 100 kilometres.

Show your work.

$$\begin{aligned}
 \text{Distance to Manitoba from home} &= 1624 \\
 \text{CP per gas} &= 83 \text{¢ per litre} \\
 \text{Amount of litre of gas} &= 9.7 \text{ per } 100 \text{ km} \\
 &= 9.7 \times 83 \\
 &= 805.1 \\
 &= 1624 \\
 &\times 83 \\
 &\hline
 &134792 \\
 &= 134792 \\
 &+ 805.1 \\
 \text{gas price} &= 135397.1
 \end{aligned}$$

Rationale:

Student demonstrates a misuse of procedures; shows one correct procedure (multiplies 9.7 x 83 to determine cents per 100 km), but uses numbers and operations incorrectly in procedures.

## ANCHOR

Applied Spring 2007 Q7

Name: Trip Planning

CODE: 20

The Lucas family is going on a trip to Manitoba and back. It is 1624 km from home to Manitoba.

Determine the total cost of the gas for the Lucas family's trip to Manitoba and back, if the cost of gas is 83¢ per litre and the car uses 9.7 litres per 100 kilometres.

Show your work.

$$\text{Total km} = 1624 \text{ km}$$

$$\text{Cost of gas } 83 \text{¢ per litre}$$

$$\text{Car uses } 9.7 \text{ litres per } 100 \text{ km}$$

$$1624 \text{ km} \div 100 \text{ km} = 16.24$$

$$9.7 \times 16.24$$

$$= 157.52$$

$$\text{Total Cost is } \$157.52$$

Rationale:

Student demonstrates partial understanding of the concepts; determines total number of litres required but calls this the total cost. Student omits using 83¢ per litre in procedures.

**ANCHOR**

Applied Spring 2007 Q7

Name: Trip Planning

CODE: 30

The Lucas family is going on a trip to Manitoba and back. It is 1624 km from home to Manitoba.

Determine the total cost of the gas for the Lucas family's trip to Manitoba and back, if the cost of gas is 83¢ per litre and the car uses 9.7 litres per 100 kilometres.

Show your work.

$$\begin{aligned}1624 &\div 100 \\ &= 16.24 \\ &= 16.24 \times 9.7 \\ &= 157.5 \\ &= 157.5 \times 83 \\ &= 13072.5\end{aligned}$$

∴ Lucas would have to pay \$13072.5 for his trip to manitoba and back

**Rationale:**

Student demonstrates a minor omission in the application of the procedures; uses 9.7L/100 km and 83¢ per litre in calculations. Correctly determines number of groups of 100 km, total number of km and total cost in cents; however, does not convert cents to dollars. Final answer is the cost in cents (13072.5¢), written as dollars. Omitting doubling does not detract from the demonstration of a considerable understanding.

## ANCHOR

Applied Spring 2007 Q7

Name: Trip Planning

CODE: 40

The Lucas family is going on a trip to Manitoba and back. It is 1624 km from home to Manitoba.

Determine the total cost of the gas for the Lucas family's trip to Manitoba and back, if the cost of gas is 83¢ per litre and the car uses 9.7 litres per 100 kilometres.

Show your work.

\$	L	km
0.83	1	1624
8.05	9.7	100

$$T = \frac{0.83(9.7)}{1}$$

$$= 8.051$$

$$C = \frac{8.05 \times 1624}{100}$$

$$= \frac{13073.2}{100}$$

$$= \underline{\underline{\$130.73}}$$

$\therefore$  The total cost is  
\$130.73

Rationale:

Student demonstrates a thorough understanding of concepts and procedures; omission of trip home from Manitoba does not detract from the demonstration of a thorough understanding.

## Up in the Air (Spring 2007)

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• Off topic: no relationship of written work to the question

Codes	Description
10	Application of knowledge and skills shows limited effectiveness due to <ul style="list-style-type: none"><li>• misunderstanding of the properties of linear relations</li><li>• incorrect selection or misuse of procedures to justify if the relationship is linear or non-linear</li></ul>
20	Application of knowledge and skills shows some effectiveness due to <ul style="list-style-type: none"><li>• partial understanding of the properties of linear relations</li><li>• errors and/or omissions in the application of procedures to justify if the relationship is linear or non-linear</li></ul>
30	Application of knowledge and skills shows considerable effectiveness due to <ul style="list-style-type: none"><li>• an understanding of the properties of linear relations</li><li>• minor errors and/or omissions in the application of procedures to justify that the relationship is non-linear</li></ul>
40	Application of knowledge and skills shows a high degree of effectiveness due to <ul style="list-style-type: none"><li>• a thorough understanding of the properties of linear relations</li><li>• an accurate application of procedures to justify that the relationship is non-linear (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding)</li></ul>

Madiha throws a ball into the air one time. The height of the ball above ground is measured at six different times. The table below shows the data that Madiha collects.

Height vs. Time

Time (sec)	Height (m)
0	1.6
0.5	7.9
1.0	11.7
1.5	13.0
2.0	11.8
2.5	8.1

Determine whether the relationship represented by the table is linear or non-linear. Justify your answer.

0      1.6  
 0.5    7.9  
       11.7  
 1.0    13.0  
 1.5    11.8  
 2.0    8.1  
 2.5

1.5 = 13.0  
 2.5 = 8.1

The table is non linear because the numbers don't all go up

Rationale:  
 Student demonstrates a misunderstanding of the properties of linear relations; provides correct answer but justification detracts from a demonstration of understanding of linear and non-linear relations.

**ANCHOR**

Applied Spring 2007 Q16

Name: Up in the Air

CODE: 20

Madiha throws a ball into the air one time. The height of the ball above ground is measured at six different times. The table below shows the data that Madiha collects.

**Height vs. Time**

Time (sec)	Height (m)
0	1.6
0.5	7.9
1.0	11.7
1.5	13.0
2.0	11.8
2.5	8.1

Determine whether the relationship represented by the table is linear or non-linear. Justify your answer. *The relationship represented by the table is non-linear, because there is no pattern.*

Rationale:

Student demonstrates an omission in the application of procedures to justify that the relation is non-linear; pattern is not described.

**ANCHOR**

Applied Spring 2007 Q16

Name: Up in the Air

CODE: 30

Madiha throws a ball into the air one time. The height of the ball above ground is measured at six different times. The table below shows the data that Madiha collects.

**Height vs. Time**

Time (sec)	Height (m)
0	1.6
0.5	7.9
1.0	11.7
1.5	13.0
2.0	11.8
2.5	8.1

Determine whether the relationship represented by the table is linear or non-linear. Justify your answer. It is non-linear b/c the difference is not the same so it not a linear line.

**Rationale:**

Student demonstrates a minor omission in the application of the procedure to justify that the relation is non-linear; does not show evidence of the differences not being the same.

# ANCHOR

Applied Spring 2007 Q16

Name: Up in the Air

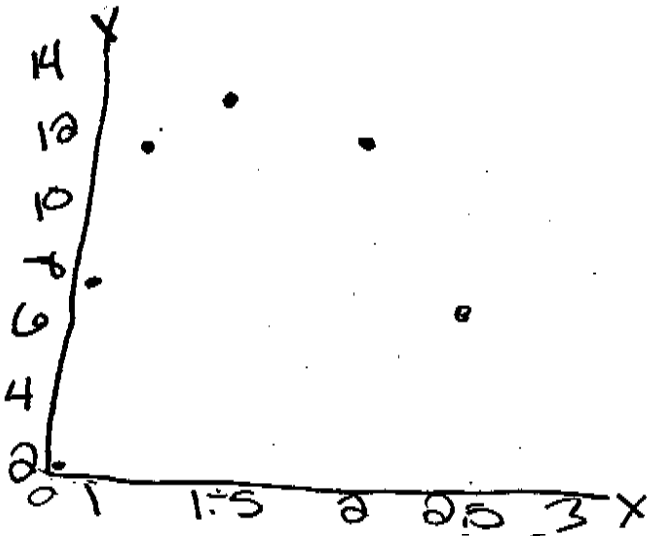
CODE: 40

Madiha throws a ball into the air one time. The height of the ball above ground is measured at six different times. The table below shows the data that Madiha collects.

**X Height vs. Time**

Time (sec)	Height (m)
0	1.6
0.5	7.9
1.0	11.7
1.5	13.0
2.0	11.8
2.5	8.1

Determine whether the relationship represented by the table is linear or non-linear. Justify your answer.



This is a non-linear relationship because the data does not go in a straight line.

Rationale:

Student demonstrates an accurate application of procedures to justify the relationship is non-linear; graph drawn shows a thorough understanding.

## Deck Boards (Spring 2007)

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• Off topic: no relationship of written work to the question

Codes	Description
10	Application of knowledge and skills involving properties of interior angles to determine the required values shows limited effectiveness due to <ul style="list-style-type: none"><li>• misunderstanding of concepts</li><li>• incorrect selection or misuse of procedures</li></ul>
20	Application of knowledge and skills involving properties of interior angles to determine the required values shows some effectiveness due to <ul style="list-style-type: none"><li>• partial understanding of the concepts</li><li>• errors and/or omissions in the application of the procedures</li></ul>
30	Application of knowledge and skills involving properties of interior angles to determine the required values shows considerable effectiveness due to <ul style="list-style-type: none"><li>• an understanding of most of the concepts</li><li>• minor errors and/or omissions in the application of the procedures</li></ul>
40	Application of knowledge and skills involving properties of interior angles to determine the required values shows a high degree of effectiveness due to <ul style="list-style-type: none"><li>• a thorough understanding of the concepts</li><li>• an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding)</li></ul>

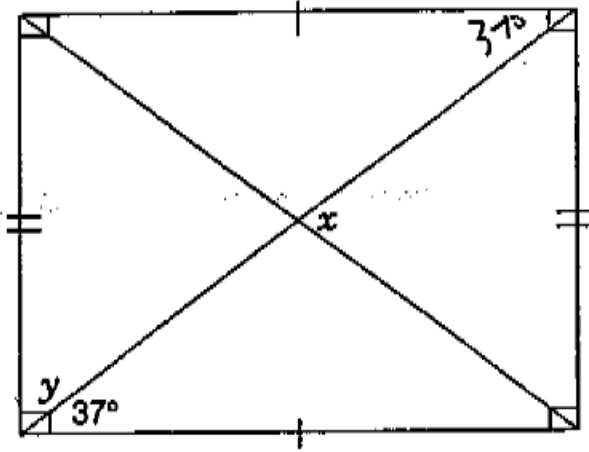
# ANCHOR

Applied Spring 2007 Q21

Name: Deck Boards

CODE: 10

Sonya is building a rectangular deck in her backyard. The deck will have support beams running through the centre, making 4 isosceles triangles, as shown below.



$$180^\circ - 37^\circ = 143^\circ$$

$$y = 143^\circ$$

$$x = 180 \div 4 = 45^\circ$$

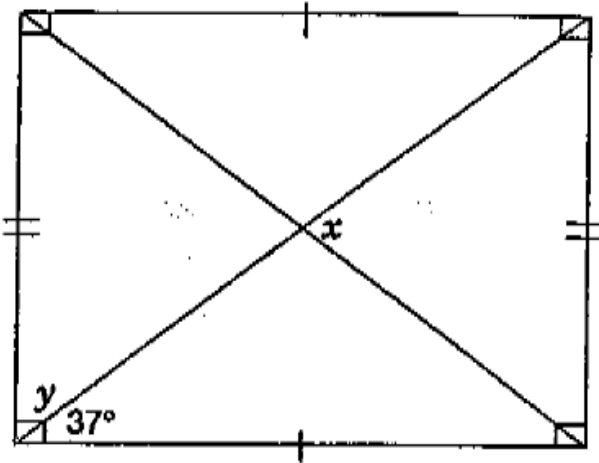
$$x = 45^\circ$$

Determine the values of  $x$  and  $y$ . Justify your answers.

Rationale:

Student demonstrates limited effectiveness due to incorrect selection of procedures; calculations does not demonstrate understanding of geometric properties.

Sonya is building a rectangular deck in her backyard. The deck will have support beams running through the centre, making 4 isosceles triangles, as shown below.



Determine the values of  $x$  and  $y$ . Justify your answers.

$$\begin{aligned} x &= 360 \div 4 \\ &= 90^\circ \end{aligned}$$

$$\begin{aligned} y &= 90 - 37^\circ \\ &= 90 - 37 \\ &= 53^\circ \end{aligned}$$

Rationale:

Student demonstrates partial understanding of the concepts; determines correct value of  $y$  with appropriate justification, but value of  $x$  and justification are incorrect.

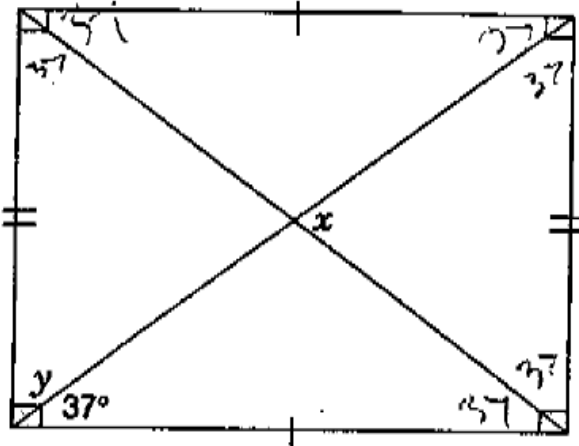
# ANCHOR

Applied Spring 2007 Q21

Name: Deck Boards

CODE: 30

Sonya is building a rectangular deck in her backyard. The deck will have support beams running through the centre, making 4 isosceles triangles, as shown below.



Determine the values of  $x$  and  $y$ . Justify your answers.

$$y = 37^\circ$$

$$x = 106 \text{ because } \dots 180 - 37^\circ = 106^\circ$$

Rationale:

Student demonstrates considerable effectiveness due to minor error in the application of procedures; correctly determines  $x$  with appropriate justification using the incorrectly calculated value for  $y$ . (Ignore error in writing  $180 - 37^\circ = 106$ , answer demonstrates that 37 is multiplied by 2, 2 is not used as an exponent).

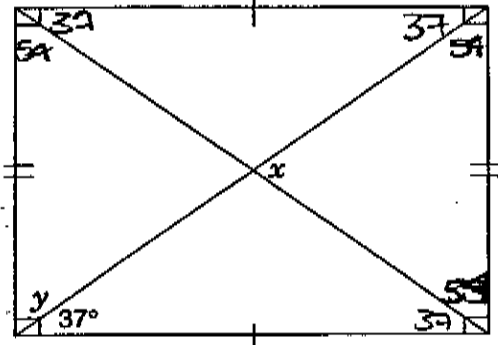
ANCHOR

Applied Spring 2007 Q21

Name: Deck Boards

CODE: 40

Sonya is building a rectangular deck in her backyard. The deck will have support beams running through the centre, making 4 isosceles triangles, as shown below.



Determine the values of  $x$  and  $y$ . Justify your answers.

$$y = 90^\circ - 37^\circ$$

$$y = 54^\circ$$

$$54 + 54 + x = 180$$

$$108 + x = 180$$

$$108 - 108 + x = 180 - 108$$

$$x = 72^\circ$$

$\therefore y$  is equal to  $54^\circ$ , because when you subtract  $90^\circ$  from  $37^\circ$  you get  $54^\circ$ .

$x$  is  $72^\circ$  because

when you add the angles up ~~at~~ you get  $54 + 54 + x = 180$ . When you isolate  $x$  you end up with  $72^\circ$ .

Rationale:

Student demonstrates a high degree of effectiveness due to a thorough understanding of the concepts; minor arithmetic error ( $90 - 37 = 54$ ) does not detract from student's demonstration of an understanding of the concepts, as justification is appropriate for determining  $x$  and  $y$ .