

Education Quality and
Accountability Office



**Grade 9 Assessment of Mathematics
2011, Applied**

**Released Item-Specific Rubrics and
Sample Student Responses with
Annotations**

Guzzling Gas

Code	Descriptor
B	Blank: nothing written or drawn in response to the question
I	<ul style="list-style-type: none"> - 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	<p>Problem-solving process involving ratios to determine how much more it costs Shaunese to drive 450 km shows limited effectiveness due to</p> <ul style="list-style-type: none"> • 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 or conclusion presented without supporting evidence.
20	<p>Problem-solving process involving ratios to determine how much more it costs Shaunese to drive 450 km shows some effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process involving ratios to determine how much more it costs Shaunese to drive 450 km shows considerable effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process involving ratios to determine how much more it costs Shaunese to drive 450 km shows a high degree of effectiveness due to</p> <ul style="list-style-type: none"> • 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.

Guzzling Gas

David and Shaunese each take a 450 km trip.

- David drives a car and uses ~~7 L of gas per 100 km.~~
- Shaunese drives a truck and uses ~~12 L of gas per 100 km.~~

If gas costs \$0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

$$\text{David: } 7 \div 0.90 = \$7.77$$

$$\text{Shaunese: } 12 \div 0.90 = \$13.33$$

for Shaunese it will cost \$5.56 more
to drive 450 km.

Annotation:

Student demonstrates minimal evidence of a solution process; divides L/100km by \$0.90 instead of multiplying, and does not deal with 450 km but does determine the difference in their costs.

Guzzling Gas

David and Shaunese each take a 450 km trip.

- David drives a car and uses 7 L of gas per 100 km.
- Shaunese drives a truck and uses 12 L of gas per 100 km.

If gas costs \$0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

David - 7L per 100km
 14L per 200km
 21L per 300km
 28L per 400km
 31.5L per 450km

$$\frac{7}{2} = 3.5$$

Shaunese
 12L per 100km
 24L per 200km
 36L per 300km
 48L per 400km
 54L per 450km

$$\frac{12}{2} = 6$$

Annotation:

Student demonstrates an incomplete solution process; deals with some of the information in the question appropriately for each person; determines # of L for 450 km, but does not determine the total costs or their difference.

Guzzling Gas

David and Shaunese each take a 450 km trip.

- David drives a car and uses 7 L of gas per 100 km.
- Shaunese drives a truck and uses 12 L of gas per 100 km.

If gas costs \$0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

~~$$4 \times 500 \times 50 \div 0.90 =$$~~

$$7 \times 4.5 \div 0.90 = 35$$

$$\text{David} = 35\$$$

$$12 \times 4.5 \div 0.90 = 60$$

It will cost Shaunese
25\$ more than David

Annotation:

Student demonstrates a considerable understanding of the relationships between the important elements of the problem; deals with all information in the question appropriately (/100, x L/100km) but divides by \$0.90/L (instead of multiplies), however, does determine difference.

Guzzling Gas

David and Shaunese each take a 450 km trip.

- David drives a car and uses 7 L of gas per 100 km.
- Shaunese drives a truck and uses 12 L of gas per 100 km.

If gas costs \$0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

Shaunese	David
12×0.90	7×0.90
$= \$10.80$	$= \$6.30$
$\$10.80 \times 4$	$\$6.30 \times 2$
$= \$43.20$	$= \$12.60$
$\$10.80 \div 2$	$\$6.30 \times 4$
$= \$5.40$	$= \$25.20$
$\$43.20 + \5.40	$= \$25.20 + \3.15
$= \$48.60$	$= \$28.35$
	$\$48.60$
	$- \$28.35$
	<hr/>
	$\$20.25$

It will cost Shaunese \$20.25 more than David.

Annotation:

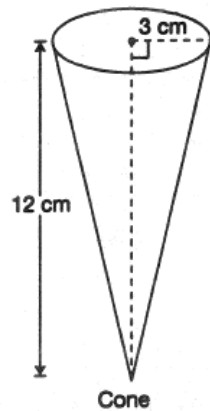
Student demonstrates a thorough understanding of the relationships between all of the important elements of the problem; determines the cost of gas for 100 km followed by the total costs of 450 km for David and Shaunese as well as the difference between these costs.

Juggling Juice

Code	Descriptor
B	Blank: nothing written or drawn in response to the question
I	<ul style="list-style-type: none">- 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	<p>Application of knowledge and skills of substitution into and solving of algebraic expressions involving exponents to determine which container holds more juice shows limited effectiveness due to</p> <ul style="list-style-type: none">• misunderstanding of concepts;• incorrect selection or misuse of procedures.
20	<p>Application of knowledge and skills of substitution into and solving of algebraic expressions involving exponents to determine which container holds more juice shows some effectiveness due to</p> <ul style="list-style-type: none">• partial understanding of the concepts;• errors and/or omissions in the application of the procedures.
30	<p>Application of knowledge and skills of substitution into and solving of algebraic expressions involving exponents to determine which container holds more juice shows considerable effectiveness due to</p> <ul style="list-style-type: none">• an understanding of most of the concepts;• minor errors and/or omissions in the application of the procedures.
40	<p>Application of knowledge and skills of substitution into and solving of algebraic expressions involving exponents to determine which container holds more juice shows a high degree of effectiveness due to</p> <ul style="list-style-type: none">• 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)

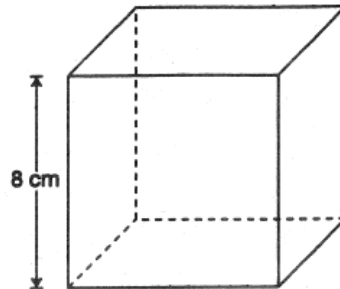
Juggling Juice

Juice is sold in two different containers, a cone and a cube, as shown below.



Cone

$$\text{Volume} = \frac{\pi r^2 h}{3}$$



Cube

$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one: Cone

Cube

Show your work.

Cone

$$V = \frac{\pi r^2 h}{3}$$

$$V = \frac{\pi r^2 h}{3}$$

cube

$$V = l^3$$

$$V = 8^3$$

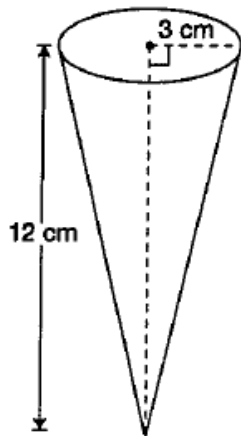
$$= 64$$

Annotation:

Student demonstrates an incorrect selection or misuse of procedures; errors and omissions in applying both volume formulas (incomplete for cone and calculates 8^2 instead of 8^3 for cube) and circles cube with little supporting evidence.

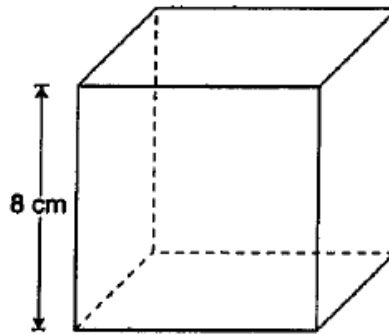
Juggling Juice

Juice is sold in two different containers, a cone and a cube, as shown below.



Cone

$$\text{Volume} = \frac{\pi r^2 h}{3}$$



Cube

$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one: Cone Cube

Show your work.

$$3.14 \times 12^2 \div 3$$

$$= 250.12$$

$$8 \times 8 \times 8$$

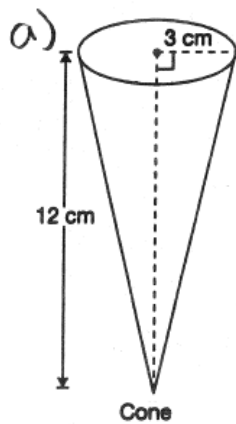
$$= 512$$

Annotation:

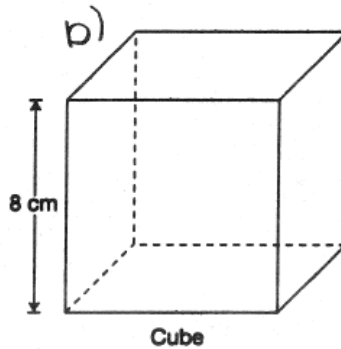
Student demonstrates errors in the application of the procedures; applies the formula for the volume of the cube correctly, errors applying the formula for the volume of the cone (does not substitute 3 for the radius, squares the height and answer does not match stated calculation) and makes no conclusion of which container holds more.

Juggling Juice

Juice is sold in two different containers, a cone and a cube, as shown below.



$$\text{Volume} = \frac{\pi r^2 h}{3}$$



$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one: Cone Cube

Show your work.

$$a) V = \frac{\pi r^2 h}{3}$$

$$V = \frac{(3.14) r^2 h}{3}$$

$$V = \frac{(3.14)(3)^2 h}{3}$$

$$V = \frac{(3.14)(3)^2(12)}{3}$$

$$V = 354.94$$

$$V = 8^3$$

$$V = 512$$

$$V = 512$$

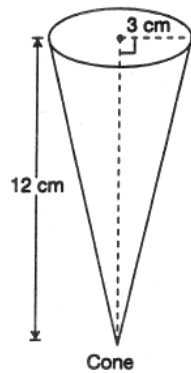
∴ The cube holds more juice.

Annotation:

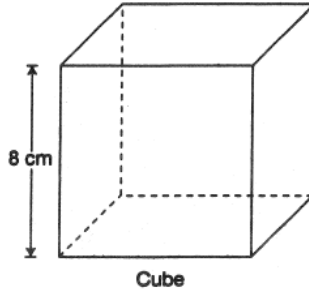
Student demonstrates a minor omission in the application of the procedures; applies formula for the volume of cube correctly but has a minor error in applying the formula for the volume of cone (multiplies Pi by the radius and then squares), however selects the container with the larger volume (cube).

Juggling Juice

Juice is sold in two different containers, a cone and a cube, as shown below.



$$\text{Volume} = \frac{\pi r^2 h}{3}$$



$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one: Cone Cube

Show your work.

CONE

$$\begin{aligned} V &= \frac{\pi r^2 h}{3} \\ &= \frac{3.14(3)^2(12)}{3} \\ &= \frac{3.14(9)(12)}{3} \\ &= \frac{339.12}{3} \\ &= 113.04 \text{ cm}^3 \end{aligned}$$

CUBE

$$\begin{aligned} V &= l^3 \\ &= 8^3 \\ &= 512 \text{ cm}^3 \end{aligned}$$

The cube can hold more solid juice ... I know this because I found the volume of both the cone, and the cube... and the cube could hold more because it had a bigger volume.

Annotation:

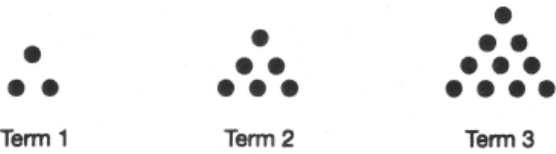
Student demonstrates a thorough understanding of the concepts; correctly applies formulas to determine the volumes of the cone and the cube with work shown and selects the cube as the container that holds more.

Stack It

Code	Descriptor
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.
10	Application of knowledge and skills to complete the table of values, graph the data and draw a line or curve of best fit shows limited effectiveness due to <ul style="list-style-type: none">● misunderstanding of concepts;● incorrect selection or misuse of procedures.
20	Application of knowledge and skills to complete the table of values, graph the data and draw a line or curve of best fit shows some effectiveness due to <ul style="list-style-type: none">● partial understanding of the concepts;● errors and/or omissions in the application of the procedures.
30	Application of knowledge and skills to complete the table of values, graph the data and draw a line or curve of best fit shows considerable effectiveness due to <ul style="list-style-type: none">● 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 complete the table of values, graph the data and draw a line or curve of best fit shows a high degree of effectiveness due to <ul style="list-style-type: none">● 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)

Stack It

Marissa draws the first three terms of a pattern as shown below.

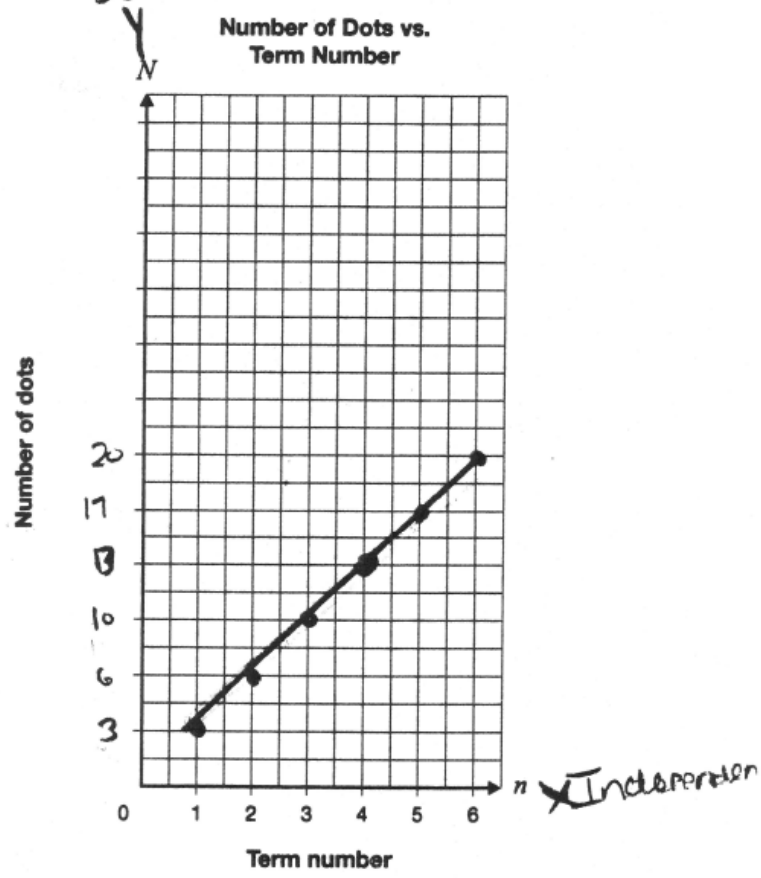


The pattern continues to grow in the same way. Complete the following table according to the pattern.

Term number, n	Number of dots, N
1	3
2	6
3	10
4	13
5	17
6	20

+3
+4
+3
+4
+3

Dependent



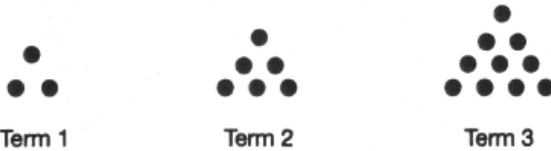
Graph the data from the table on the grid above. Add a scale for the N -axis.

Draw a line or curve of best fit for the data.

Annotation:
 Student demonstrates a misunderstanding of concepts; completes table of values incorrectly, plots the points using no scale (values from the table) and draws a line.

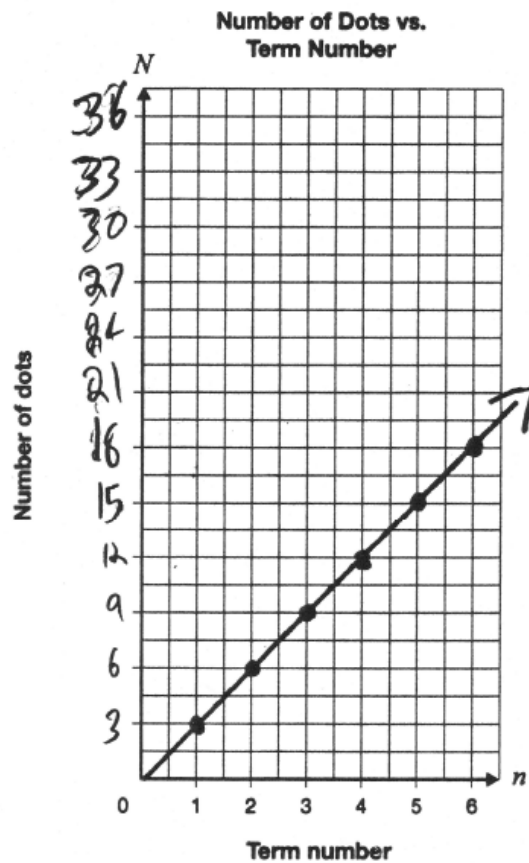
Stack It

Marissa draws the first three terms of a pattern as shown below.



The pattern continues to grow in the same way. Complete the following table according to the pattern.

Term number, n	Number of dots, N
1	3
2	6
3	9
4	12
5	15
6	18



Graph the data from the table on the grid above. Add a scale for the N -axis.

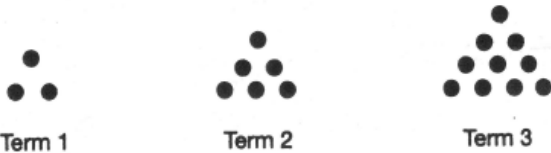
Draw a line or curve of best fit for the data.

Annotation:

Student demonstrates a partial understanding of the concepts; completes table of values incorrectly, however plots these points using an accurate scale, and draws a line of best fit.

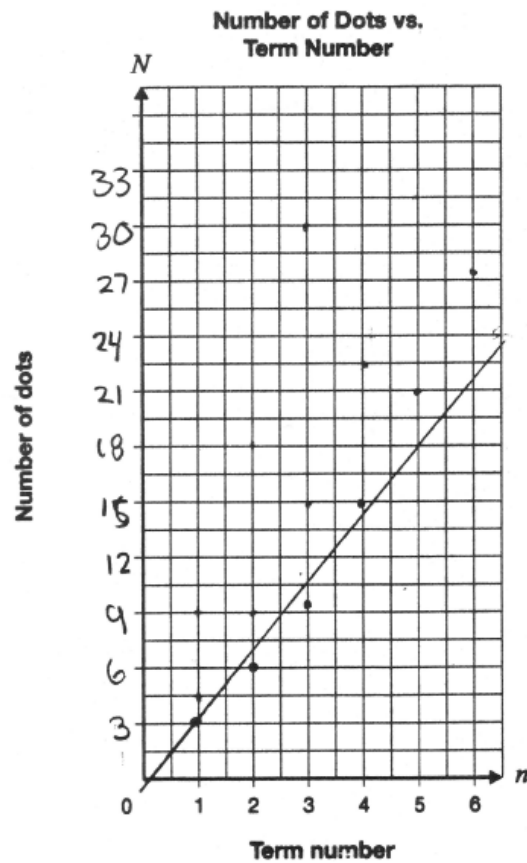
Stack It

Marissa draws the first three terms of a pattern as shown below.



The pattern continues to grow in the same way. Complete the following table according to the pattern.

Term number, n	Number of dots, N
1	3
2	6
3	10
4	15
5	21
6	28



Graph the data from the table on the grid above. Add a scale for the N -axis.

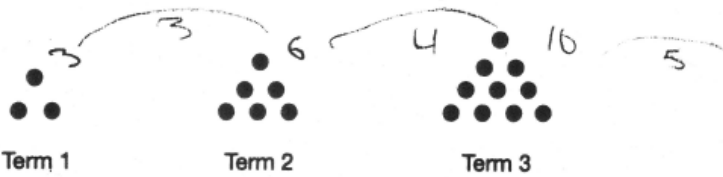
Draw a line or curve of best fit for the data.

Annotation:

Student demonstrates a minor error in the application of procedures; completes table of values correctly and plots points using an accurate scale, however draws a line instead of a curve of best fit .

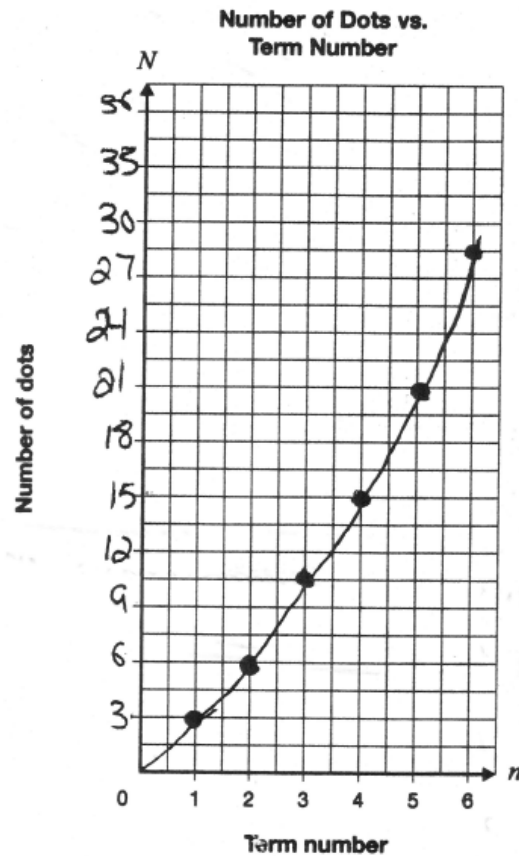
Stack It

Marissa draws the first three terms of a pattern as shown below.



The pattern continues to grow in the same way. Complete the following table according to the pattern.

Term number, n	Number of dots, N
1	3
2	6
3	10
4	15
5	21
6	28



Graph the data from the table on the grid above. Add a scale for the N -axis.

Draw a line or curve of best fit for the data.

Annotation:

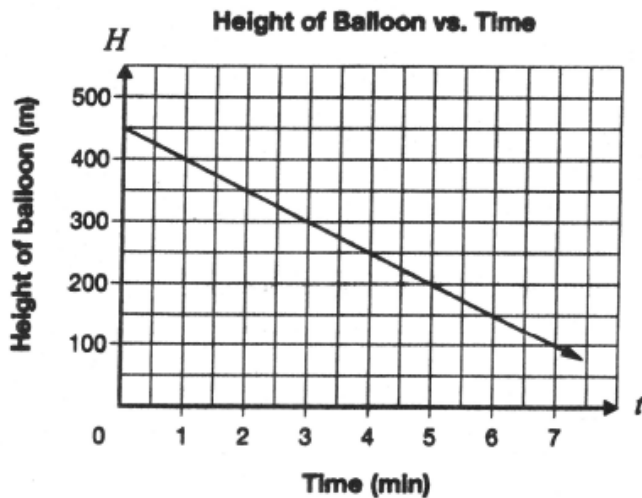
Student demonstrates a thorough understanding of the concepts; completes table of values correctly, plots points (Note: minor plotting inaccuracies) using an accurate scale and draws a curve a best fit.

Balloon Ride

Code	Descriptor
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.
10	Application of knowledge and skills to determine an equation to represent the relationship between the height of the balloon and time shows limited effectiveness due to <ul style="list-style-type: none">● misunderstanding of concepts;● incorrect selection or misuse of procedures.
20	Application of knowledge and skills to determine an equation to represent the relationship between the height of the balloon and time shows some effectiveness due to <ul style="list-style-type: none">● partial understanding of the concepts;● errors and/or omissions in the application of the procedures.
30	Application of knowledge and skills to determine an equation to represent the relationship between the height of the balloon and time shows considerable effectiveness due to <ul style="list-style-type: none">● 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 an equation to represent the relationship between the height of the balloon and time shows a high degree of effectiveness due to <ul style="list-style-type: none">● 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)

Balloon Ride

The relationship between the height of a hot-air balloon, H , in metres, and time, t , in minutes, is represented below.



Determine an equation to represent the relationship between the height of the balloon and time.

$$H = \underline{100n + 50}$$

Show your work.

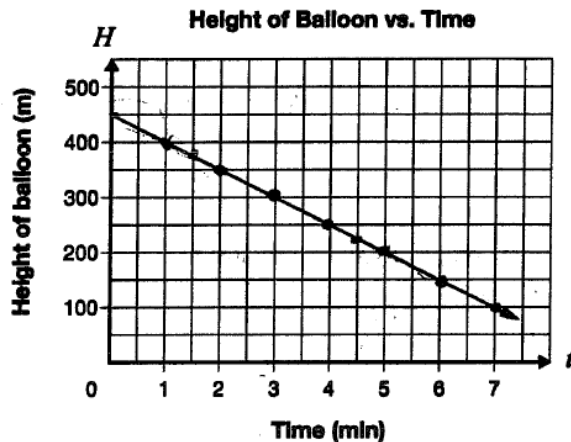
$$\begin{aligned} H &= 100n + 50, \\ &= 100(1) + 50 \\ &= 150 \end{aligned}$$

Annotation:

Student demonstrates a misunderstanding of the concepts; creates equation with incorrect initial value and rate of change with no work shown.

Balloon Ride

The relationship between the height of a hot-air balloon, H , in metres, and time, t , in minutes, is represented below.



Determine an equation to represent the relationship between the height of the balloon and time.

$$H = \underline{\hspace{4cm}}$$

Show your work.

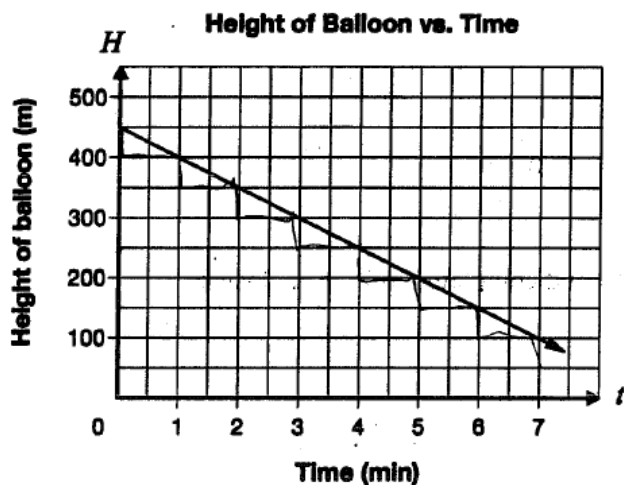
every minute the balloon goes down 50m.

Annotation:

Student demonstrates a partial understanding of the concepts; does not create an equation, but states the correct rate of change.

Balloon Ride

The relationship between the height of a hot-air balloon, H , in metres, and time, t , in minutes, is represented below.



Determine an equation to represent the relationship between the height of the balloon and time.

$$H = \underline{\hspace{10em}}$$

Show your work.

$$H = 450_m - .5mint$$

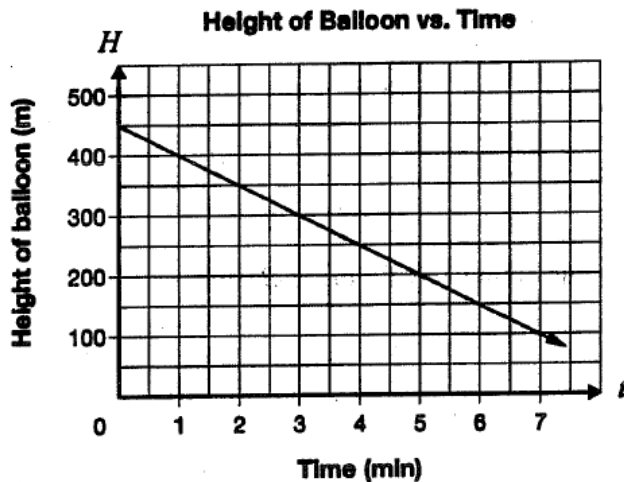
$$\begin{aligned} \text{slope} &= \frac{\text{rise}}{\text{run}} \\ &= \frac{1}{2} \\ &= -5\text{min} \end{aligned}$$

Annotation:

Student demonstrates an understanding of most of the concepts; creates an equation with correct initial value and incorrect rate of change with work shown (disregards scale and counts boxes).

Balloon Ride

The relationship between the height of a hot-air balloon, H , in metres, and time, t , in minutes, is represented below.



Determine an equation to represent the relationship between the height of the balloon and time.

$$H = 450 - 50t$$

Show your work.

Time (min)	Height (m)	
0	450	
1	400	$450 - 400 = 50$
2	350	$400 - 350 = 50$
3	300	$350 - 300 = 50$

Annotation:

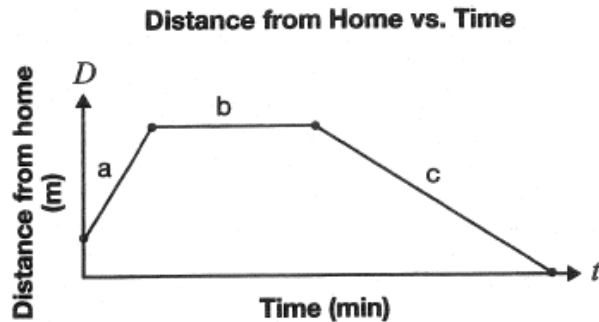
Student demonstrates a thorough understanding of the concepts; creates equation with correct initial value and correct rate of change and includes work for rate of change (table of values).

Walk This Way

Code	Descriptor
B	Blank: nothing written or drawn in response to the question
I	<ul style="list-style-type: none"> - 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	<p>Problem-solving process to compare the various segments of Mauro’s walk shows limited effectiveness due to</p> <ul style="list-style-type: none"> • 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 or conclusion presented without supporting evidence.
20	<p>Problem-solving process to compare the various segments of Mauro’s walk shows some effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process to compare the various segments of Mauro’s walk shows considerable effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process to compare the various segments of Mauro’s walk shows a high degree of effectiveness due to</p> <ul style="list-style-type: none"> • 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.

Walk This Way

Mauro takes a walk. The graph below shows the relationship between Mauro's distance from home and his walking time.



In the table below, compare Mauro's distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

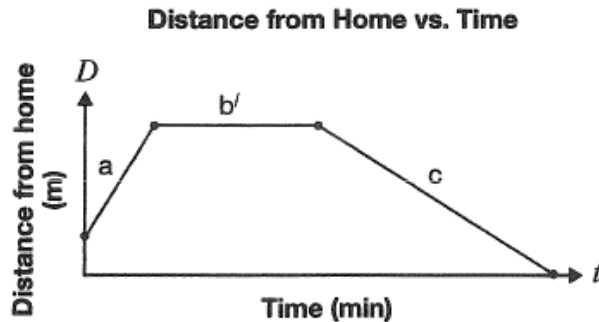
Segment of graph	Comparison to other segments
a	He is running away from his house to school.
b	then he is walking normal speed.
c	then he is walking slower.

Annotation:

Student demonstrates a limited identification of important elements of the problem; correctly compares speed in parts a and c but unclear in part b (if moving, must state stays same distance away from home or state standing still), correctly compares direction in part a but does not state direction for part c and starting/ending points (distance from home) not discussed.

Walk This Way

Mauro takes a walk. The graph below shows the relationship between Mauro's distance from home and his walking time.



In the table below, compare Mauro's distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

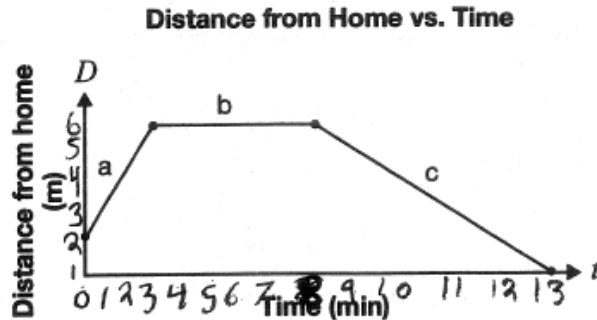
Segment of graph	Comparison to other segments
a	in point(s) a to b Mauro sprints
b	in point(s) b to e Mauro stops and takes a rest
c	in point(s) c Mauro decides to walk.

Annotation:

Student demonstrates some understanding of the relationships between important elements of the problem; correctly compares Mauro's speed for all three parts of the graph but does not include direction or starting and ending points (distance from home).

Walk This Way

Mauro takes a walk. The graph below shows the relationship between Mauro's distance from home and his walking time.



In the table below, compare Mauro's distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

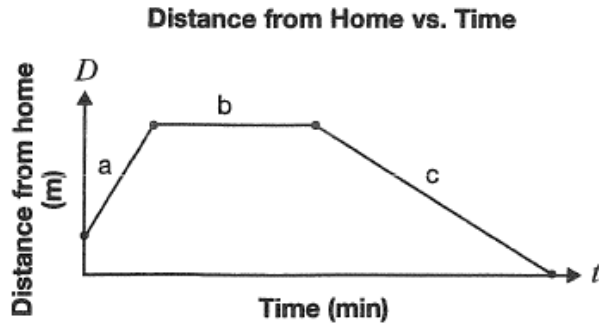
Segment of graph	Comparison to other segments
a	Mauro starts at about 2m away from home, then he starts walking to the park, he gets there in about 3 mins.
b	Mauro saw his friend so he stayed there for about 5 mins,
c	Then Mauro's mom had called him on his phone and told him they have to go to the store, so Mauro ran back home and got there in about 5 mins.

Annotation:

Student demonstrates a considerable understanding of the relationship between important elements of the problem; compares direction (walking to the park, stayed there, back home) and distance from home (starting about 2 m away from home, and got back home), however error in comparing speeds as states part a is slower (walking) than part c (ran).

Walk This Way

Mauro takes a walk. The graph below shows the relationship between Mauro's distance from home and his walking time.



In the table below, compare Mauro's distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

Segment of graph	Comparison to other segments
a	mauro was not at home he was a bit far and started to run away from his home.
b	he was pretty far from home, he is not moving, he stays in the same spot for a bit
c	he walked home in a steady walking speed.

Annotation:

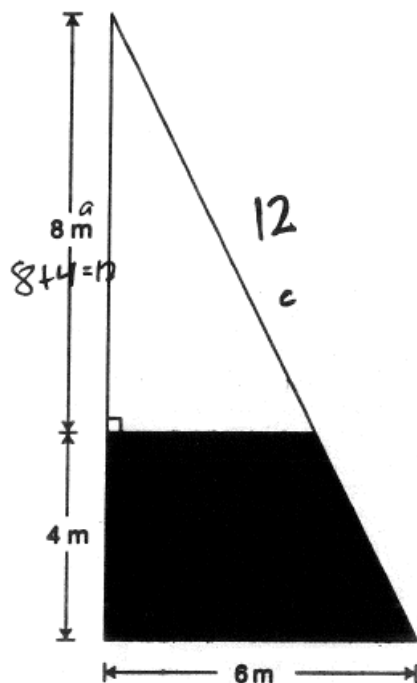
Student demonstrates a thorough understanding of the relationships between all of the important elements of the problem; compares speed (run, not moving, walk), direction and includes that he starts away from home and ends at home (not at home and walked home).

Wind in My Sails

Code	Descriptor
B	Blank: nothing written or drawn in response to the question
I	<ul style="list-style-type: none"> - 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	<p>Problem-solving process involving the area of a triangle and a trapezoid to determine the total cost of the sail shows limited effectiveness due to</p> <ul style="list-style-type: none"> • 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 or conclusion presented without supporting evidence.
20	<p>Problem-solving process involving the area of a triangle and a trapezoid to determine the total cost of the sail shows some effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process involving the area of a triangle and a trapezoid to determine the total cost of the sail shows considerable effectiveness due to</p> <ul style="list-style-type: none"> • 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	<p>Problem-solving process involving the area of a triangle and a trapezoid to determine the total cost of the sail shows a high degree of effectiveness due to</p> <ul style="list-style-type: none"> • 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.

Wind in My Sails

A sail for a sailboat is represented below.



The unshaded part of the sail is made with material that costs $\$32/\text{m}^2$.
The shaded part of the sail is made with material that costs $\$125/\text{m}^2$.

Determine the total cost of the sail.

Show your work.

$$32 + 125 = 157$$

$$P = a + b + c$$

$$8 \times 4 = 32/\text{m}^2$$

$$P = 8 + 4 = 12$$

$$P = 8 + 4 = 12$$

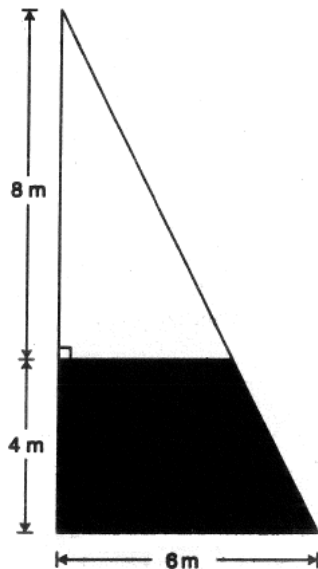
$$P = 4 - 8 = -4$$

Annotation:

Student demonstrates minimal evidence of a solution process; starts calculation for the area of the unshaded part but does not divide by 2 and does not attempt to calculate the area of shaded part or either of their costs or the total cost.

Wind in My Sails

A sail for a sailboat is represented below.



The unshaded part of the sail is made with material that costs \$32/m².
The shaded part of the sail is made with material that costs \$125/m².

Determine the total cost of the sail.

Show your work.

$$\begin{aligned} \triangle &= A = \frac{bh}{2} \\ &= \frac{(4)(8)}{2} \\ &= \frac{32}{2} \\ &= 16 \end{aligned}$$

$$\begin{aligned} \text{Total} \\ 20 + 16 \\ &= \\ \underline{36} \end{aligned}$$

$$\begin{aligned} \square &= A = \frac{(a+b)h}{2} \\ &= \frac{(4+6)(4)}{2} \\ &= \frac{(10)(4)}{2} \\ &= \frac{40}{2} \\ &= 20 \end{aligned}$$

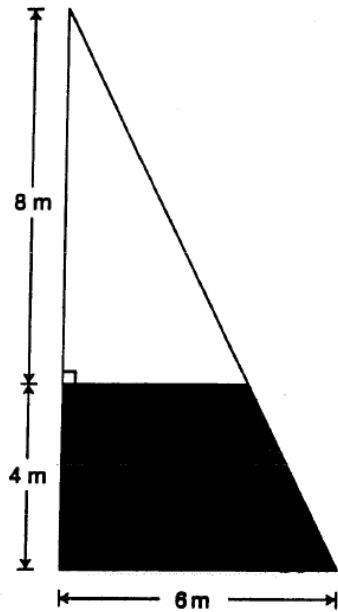
∴ The total cost of the sail is \$36.00

Annotation:

Student demonstrates an incomplete solution process; correctly calculates the areas of both parts but does not determine their costs and states the sum of the areas as total cost.

Wind in My Sails

A sail for a sailboat is represented below.



The unshaded part of the sail is made with material that costs \$32/m².
The shaded part of the sail is made with material that costs \$125/m².

Determine the total cost of the sail.

Show your work.

$$\begin{aligned}
 &\text{shaded} \\
 A &= \frac{(a+b)h}{2} \\
 &= \frac{6+6}{2} \times 4 \\
 &= \frac{12}{2} \times 4 \\
 &= 6 \times 4 \\
 &= 24\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 &\text{unshaded} \\
 A &= \frac{bh}{2} \\
 &= \frac{6 \times 4}{2} \\
 &= \frac{24}{2} \\
 &= 12\text{m}^2
 \end{aligned}$$

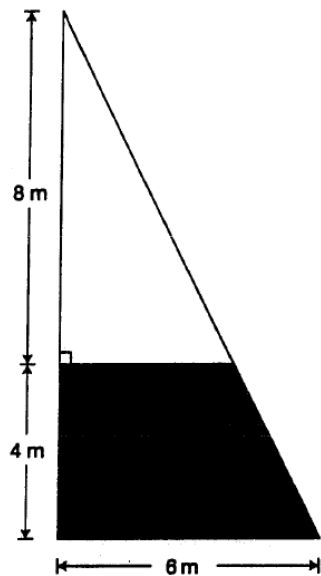
$$\begin{array}{r}
 \text{unshaded} \\
 \$32/\text{m}^2 \\
 \times 12\text{m}^2 \\
 \hline
 \$384 \\
 \text{shaded} \\
 \$125/\text{m}^2 \\
 \times 24\text{m}^2 \\
 \hline
 \$3000 \\
 \hline
 \$3384
 \end{array}$$

Annotation:

Student demonstrates a considerable understanding of the relationships between most of the important elements of the problem; calculates correct area and cost of each part but does not determine the total cost.

Wind in My Sails

A sail for a sailboat is represented below.



The unshaded part of the sail is made with material that costs \$32/m².
The shaded part of the sail is made with material that costs \$125/m².

Determine the total cost of the sail.

Show your work.

$$\begin{aligned} A &= \frac{bh}{2} \\ &= \frac{6 \times 12}{2} \\ &= \frac{72}{2} \\ &= 36 \end{aligned}$$

$$\begin{aligned} A &= \frac{bh}{2} \\ &= \frac{4 \times 6}{2} \\ &= \frac{24}{2} \\ &= 12 \end{aligned}$$

$$\begin{aligned} 16 \times 32 &= 512 \\ 20 \times 125 &= 2500 \\ &2500 \\ &+ 512 \\ \hline &3012 \end{aligned}$$

$$\begin{aligned} A &= 36 - 16 \\ &= 20 \end{aligned}$$

The total cost of the sail is \$3012.

Annotation:

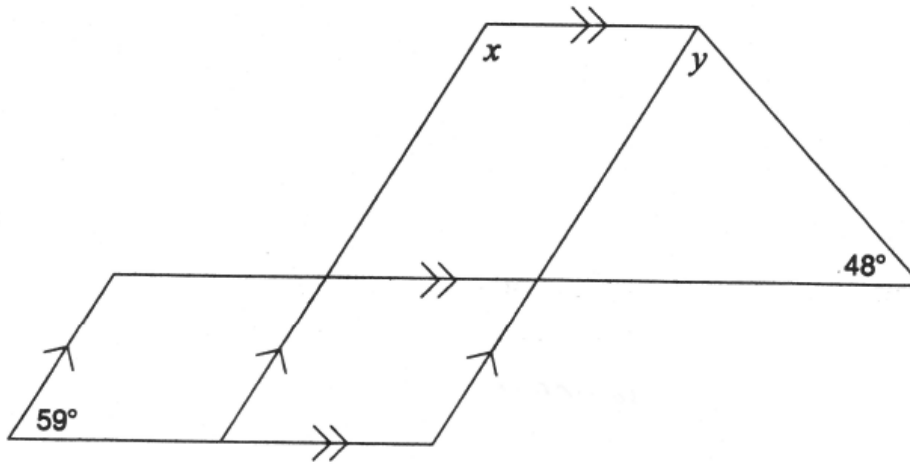
Student demonstrates a complete solution process; determines correct area for each part of the sail (uses 2 triangles and subtraction), correct cost for each part and correct total cost of the sail.

Designing

Code	Descriptor
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.
10	Application of knowledge and skills to determine the values of x and y using geometric properties, including properties of parallel lines, shows limited effectiveness due to <ul style="list-style-type: none">• misunderstanding of concepts;• incorrect selection or misuse of procedures.
20	Application of knowledge and skills to determine the values of x and y using geometric properties, including properties of parallel lines, shows some effectiveness due to <ul style="list-style-type: none">• partial understanding of the concepts;• errors and/or omissions in the application of the procedures.
30	Application of knowledge and skills to determine the values of x and y using geometric properties, including properties of parallel lines, shows considerable effectiveness due to <ul style="list-style-type: none">• 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 values of x and y using geometric properties, including properties of parallel lines, shows a high degree of effectiveness due to <ul style="list-style-type: none">• 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)

Designing

Consider the design below.



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

Justify your answers using geometric properties.

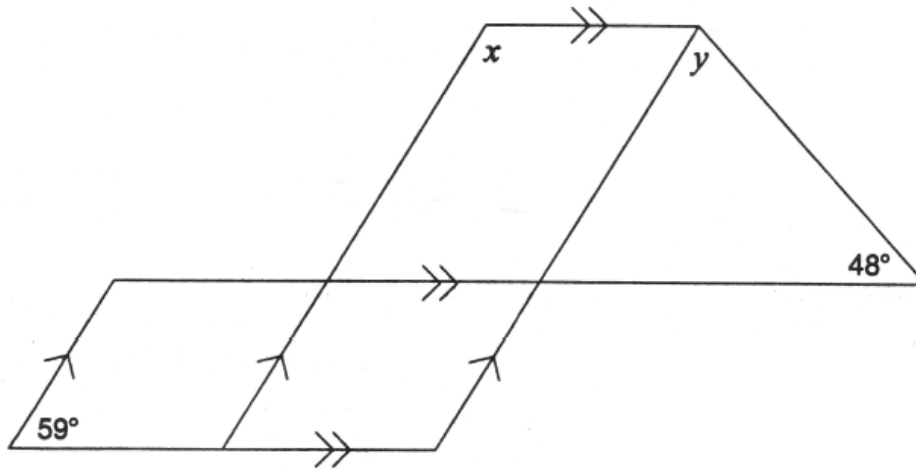
Value	Justification using geometric properties
$x = \underline{59^\circ}$	use the lines and it goes with x
$y = \underline{48^\circ}$	48° is in the same box with y

Annotation:

Student demonstrates a misunderstanding of the concepts; both angles incorrect with inappropriate justification.

Designing

Consider the design below.



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

Justify your answers using geometric properties.

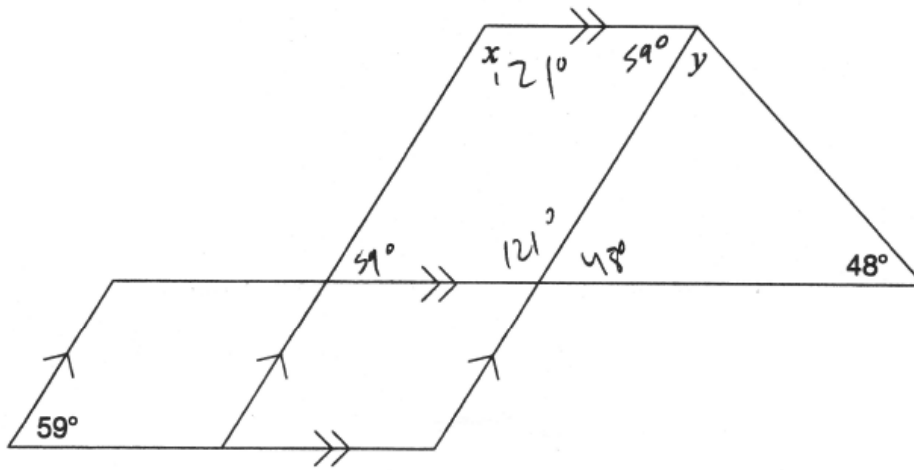
Value	Justification using geometric properties
$x = \underline{121^\circ}$	$180 - 59 = 121^\circ$
$y = \underline{132^\circ}$	$180 - 48 = 132^\circ$

Annotation:

Student demonstrates a partial understanding of the concepts; determines correct value for x with sufficient justification, incorrect value for y with inappropriate justification.

Designing

Consider the design below.

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

Justify your answers using geometric properties.

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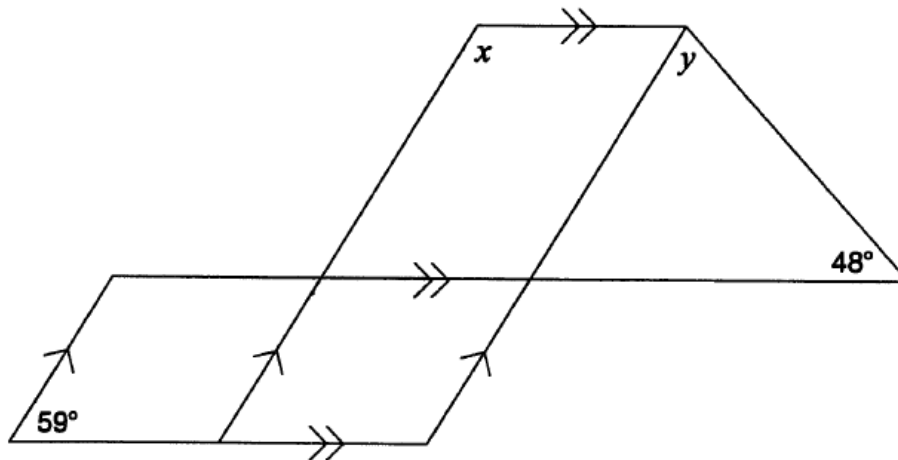
Value	Justification using geometric properties
$x = \underline{121^\circ}$	<p>4 sides equal = 360°</p> <p>if 59° is parallel to the top, the top is 59°</p> <p>$\therefore 360 - 59 - 59 = 242 \div 2 = 121^\circ$</p>
$y = \underline{84^\circ}$	<p>triangle = 180°</p> <p>$\therefore 180 - 48 - 48 = 84^\circ$</p>

Annotation:

Student demonstrates an understanding of most of the concepts; value for x correct with justification, however, error determining y ; uses sum of angles in a triangle, but assumes an isosceles triangle.

Designing

Consider the design below.

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

Justify your answers using geometric properties.

Value	Justification using geometric properties
$x = \underline{121^\circ}$	$59^\circ + 59^\circ = 118^\circ$ $360^\circ - 118^\circ = \frac{242^\circ}{2}$ $= 121^\circ$
$y = \underline{73^\circ}$	$48^\circ + 59^\circ = 107^\circ$ $180^\circ - 107^\circ = 73^\circ$

Annotation:

Student demonstrates a thorough understanding of the concepts; both values correct with justification included.