Education Quality and Accountability Office

EQAO

Grade 9 Assessment of Mathematics

2014, Academic

Released Item-Specific Rubrics and Sample Student Responses with Annotations

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

Share the Profits

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 used to determine the share of the profit for each partner using ratios/rates shows limited effectiveness due to ● misunderstanding of concepts. ● incorrect selection or misuse of procedures;
20	Application of knowledge and skills used to determine the share of the profit for each partner using ratios/rates shows some effectiveness due to ● partial understanding of the concepts. ● errors and/or omissions in the application of the procedures;
30	Application of knowledge and skills used to determine the share of the profit for each partner using ratios/rates shows considerable effectiveness due to ● an understanding of most of the concepts. ● minor errors and/or omissions in the application of the procedures;
40	Application of knowledge and skills used to determine the share of the profit for each partner using ratios/rates shows a high degree of effectiveness due to ● a thorough understanding of the concepts. ● an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding);

Anchor - Code 10
Academic (Question 6) Item: Share the Profits

Share the Profits

Three partners, Luc, Deborah and Melanie, share the profits of a business in the ratio 2:3:7 respectively.

The profit for this year is $176 496.

Determine the share of the profit for each partner.

Show your work.

176496 ÷ 3 = 58832

Annotation:
Response demonstrates a limited identification of important elements of the problem; number of parts (12) not determined, no division by 12 and no multiplying by a percentage or 2, 3, 7.

Anchor - Code 20
Academic (Question 6) Item: Share the Profits

Share the Profits

Three partners, Luc, Deborah and Melanie, share the profits of a business in the ratio 2:3:7 respectively.

The profit for this year is $176 496.

Determine the share of the profit for each partner.

Show your work.

Luc = 20%

176 496 x .2 = $35 299

Deborah = 30%

141 197 x .30 = $42 359

Melanie = 70%

98 838 x .70 = $69 186

Annotation:
Response demonstrates an identification of some of the important elements of the problem; number of parts (12) not determined and no division by 12, but multiplied by percentages to determine profits for each partner (percentages were incorrect).

Anchor - Code 30
Academic (Question 6) Item: Share the Profits

Share the Profits

Three partners; Luc, Deborah and Melanie, share the profits of a business in the ratio 2:3:7 respectively.

The profit for this year is $176 496.

Determine the share of the profit for each partner.

Show your work.

2:3:7
=12

$\frac{176\,496}{12} = 14708$

Luc – $\frac{14708}{2} = 7354$ ∴ Lucs profit is 7354

Deborah – $\frac{14708}{3} = 4902.67$ ∴ Deborahs profit is 4902.67

Melanie – $\frac{14708}{7} = 2101.14$ ∴ Melanies profit is 2101.14

Annotation:
Response demonstrates a considerable understanding of the relationships between important elements of the problem; number of parts (12) determined, divided total by 12 but then divided by 2, 3, 7 instead of multiplying.

Anchor - Code 40
Academic (Question 6) Item: Share the Profits

Share the Profits

Three partners, Luc, Deborah and Melanie, share the profits of a business in the ratio 2:3:7 respectively.

The profit for this year is $176 496.

Determine the share of the profit for each partner.

Show your work.

176 496 ÷ 12 = 14 708

Luc: 14 708 × 2 = 29 416

Deborah: 14 708 × 3 = 44 124

Melanie: 14 708 × 7 = 102 956

29 416 + 44 124 + 102 956 = 176 496

∴ Luc will recieve $29 416, Deborah will recieve 44124, and Melanie will recieve $102 956 of the total profit.

Annotation:
Response demonstrates a thorough understanding of the relationships between all of the important elements of the problem; number of parts determined (12), divided total by 12 and multiplied by 2, 3, 7 to determine profits for each partner correctly.

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

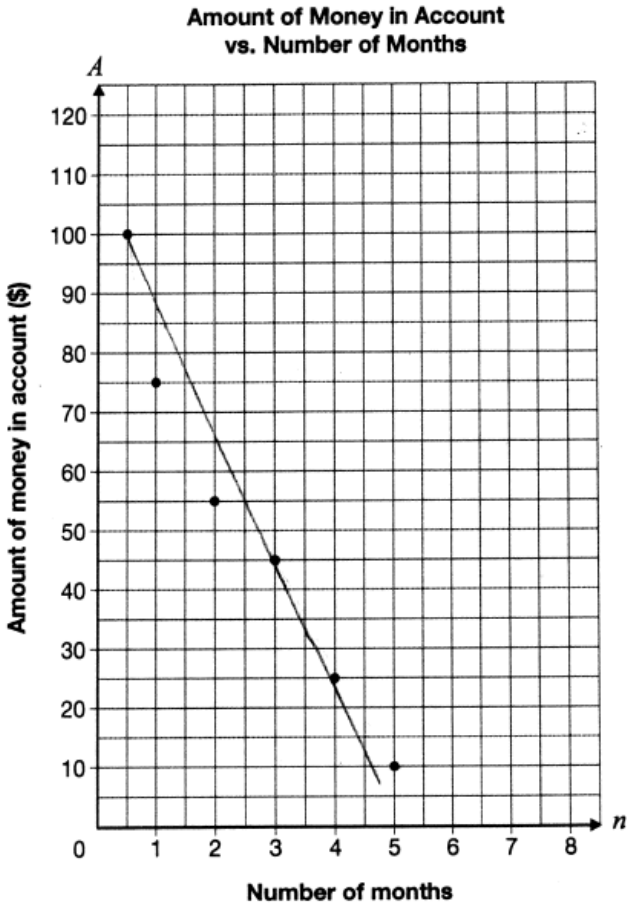
More Money Please!

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 draw a line of best fit and determine the equation of the line of best fit shows limited effectiveness due to ● misunderstanding of concepts. ● incorrect selection or misuse of procedures;
20	Application of knowledge and skills to draw a line of best fit and determine the equation of the line of best fit shows some effectiveness due to ● partial understanding of the concepts. ● errors and/or omissions in the application of the procedures;
30	Application of knowledge and skills to draw a line of best fit and determine the equation of the line of best fit shows considerable effectiveness due to ● an understanding of most of the concepts. ● minor errors and/or omissions in the application of the procedures;
40	Application of knowledge and skills to draw a line of best fit and determine the equation of the line of best fit shows a high degree of effectiveness due to ● a thorough understanding of the concepts. ● an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding);

Anchor - Code 10
Academic (Question 13) Item: More Money Please!

More Money, Please!

The graph below shows information about the amount of money, A, in Shreya's bank account and the number of months, n, she has had the account.



Draw the line of best fit for the data.

Determine the equation of your line of best fit.

$y = 5x + 100$

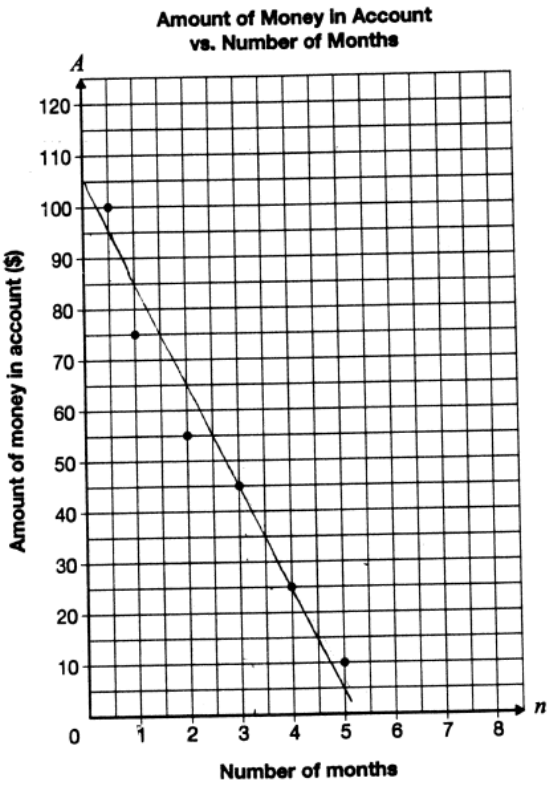
Show your work.

Annotation:
Response demonstrates misunderstanding of concepts; shows appropriate line of best fit. Equation set up correctly, but does not reflect A-intercept on graph and has incorrect slope (does not match counting boxes or actual slope). Rate of change not attempted for slope (appears used A-coordinate of first point as A-intercept and n-coordinate of last point as slope).

Anchor - Code 20
Academic (Question 13) Item: More Money Please!

More Money, Please!

The graph below shows information about the amount of money, A, in Shreya's bank account and the number of months, n, she has had the account.



Draw the line of best fit for the data.

Determine the equation of your line of best fit.

$y = 2x + 100$

Show your work.

the b variable is 100 because the amount starts at that.
the slope is 2.

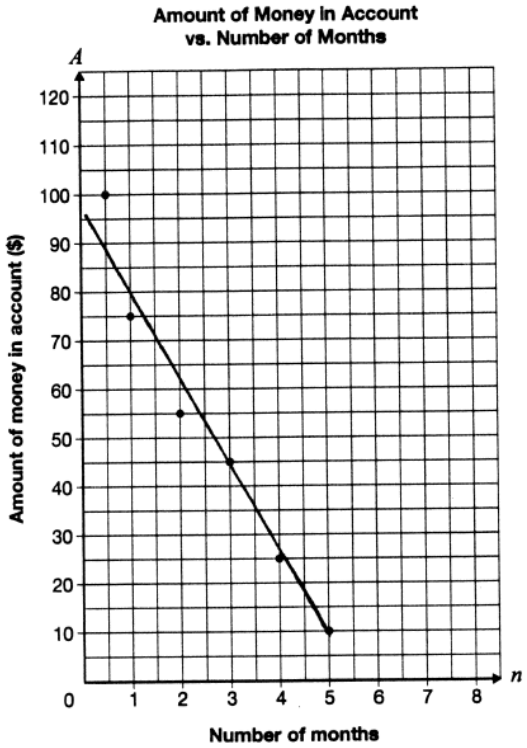
$y = 2x + 100$

Annotation:
Response demonstrates a partial understanding of the concepts; shows appropriate line of best fit, equation set up correctly but slope shows scale ignored (counting boxes) and equation does not reflect A-intercept on graph. Rate of change attempted as slope matches box counting on graph.

Anchor - Code 30
Academic (Question 13) Item: More Money Please!

More Money, Please!

The graph below shows information about the amount of money, A, in Shreya's bank account and the number of months, n, she has had the account.



Draw the line of best fit for the data.

Determine the equation of your line of best fit.

$y = -20x + 105$

Show your work.

x y
(3, 45)
(4, 25)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{45 - 25}{3 - 4}$

$= \frac{20}{-1} = -20$

$y = mx + b$

$45 = -20(3) + b$

$45 + 60 = -60 + b + 60$

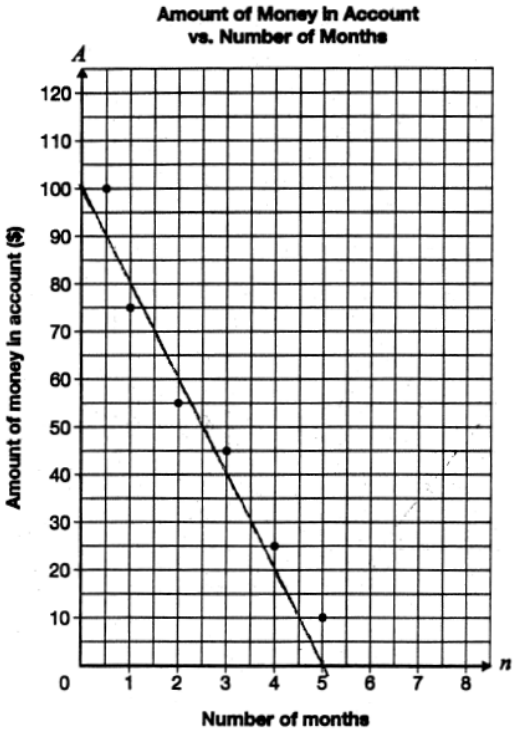
$105 = b$

Annotation:
Response demonstrates an understanding of most of the concepts; shows appropriate line of best fit and equation set up correctly that reflects slope, but A-intercept incorrect based on graph.

Anchor - Code 40
Academic (Question 13) Item: More Money Please!

More Money, Please!

The graph below shows information about the amount of money, A, in Shreya's bank account and the number of months, n, she has had the account.



Draw the line of best fit for the data.

Determine the equation of your line of best fit.

A = -20n + 100

Show your work.

The line starts at 100. Since the line is constant and linear, the amount of money she loses is the same the whole time.

n	A
1	80
2	60
3	40
4	20

Annotation:
Response demonstrates a thorough understanding of the concepts; shows appropriate line of best fit and equation is set up correctly that matches A-intercept and slope on graph.

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

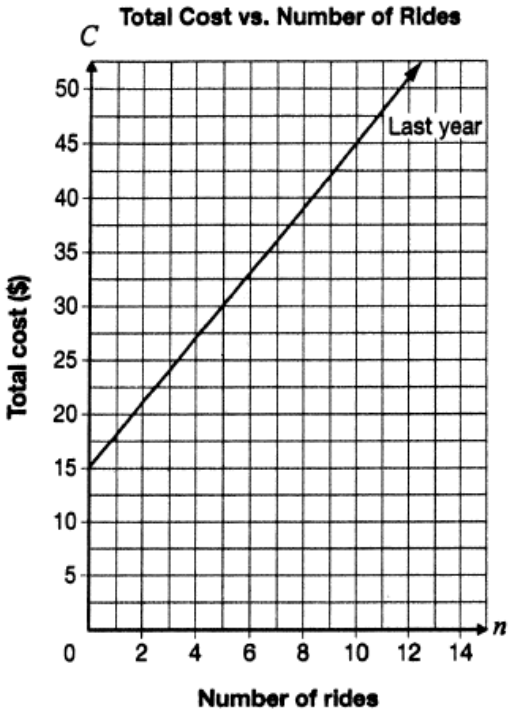
Roll with It!

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	Problem-solving process using given conditions to determine a possible equation for the total cost this year shows limited effectiveness due to • minimal evidence of a solution process. • limited identification of important elements of the problem. • too much emphasis on unimportant elements of the problem. • no conclusions presented or conclusion presented without supporting evidence;
20	Problem-solving process using given conditions to determine a possible equation for the total cost this year shows some effectiveness due to • an incomplete solution process. • identification of some of the important elements of the problem. • some understanding of the relationships between important elements of the problem. • simple conclusions with little supporting evidence;
30	Problem-solving process using given conditions to determine a possible equation for the total cost this year shows considerable effectiveness due to • a solution process that is nearly complete. • identification of most of the important elements of the problem. • a considerable understanding of the relationships between important elements of the problem. • appropriate conclusions with supporting evidence;
40	Problem-solving process using given conditions to determine a possible equation for the total cost this year shows a high degree of effectiveness due to • a complete solution process. • identification of all important elements of the problem. • a thorough understanding of the relationships between all of the important elements of the problem. • appropriate conclusions with thorough and insightful supporting evidence;

Anchor - Code 10
Academic (Question 14) Item: Roll with It!

Roll with It!

The total cost at an amusement park is made up of an admission fee and a cost per ride. Information about the total cost for n rides last year is shown below.



This year, the cost per ride is reduced from last year, but the total cost for 10 rides is the same.

Determine a possible equation for the total cost, C, for this year. Include an admission fee and a cost per ride.

Justify your answer.

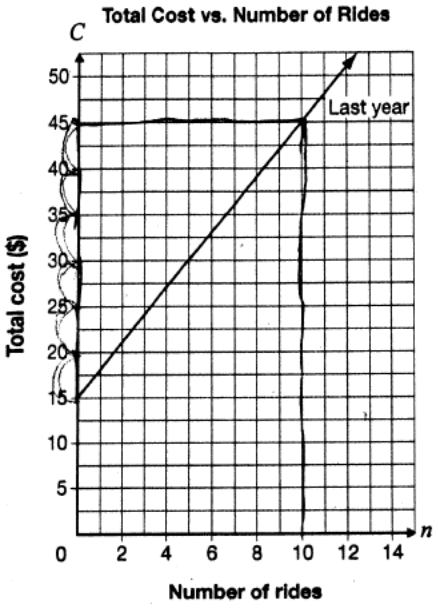
$C = 1.20n + 15$

Annotation:
Response demonstrates a limited identification of important elements of the problem; equation determined but no evidence of slope calculation. (10,45) is not used in solution process and equation does not satisfy (10,45).

Anchor - Code 20
Academic (Question 14) Item: Roll with It!

Roll with It!

The total cost at an amusement park is made up of an admission fee and a cost per ride. Information about the total cost for n rides last year is shown below.



15 - constant Rate

$30 - every 10 rides

$\frac{30}{10}$ = per ride

$3 = per ride

This year, the cost per ride is reduced from last year, but the total cost for 10 rides is the same.

Determine a possible equation for the total cost, C, for this year. Include an admission fee and a cost per ride.

Justify your answer.

Y = mx + b

C = 3n + 15

Let C = cost for year

Let n = number of rides

$C = 3n + 15$

Example $C = 3n + 15$

$C = 3(10) + 15$

$C = 30 + 15$

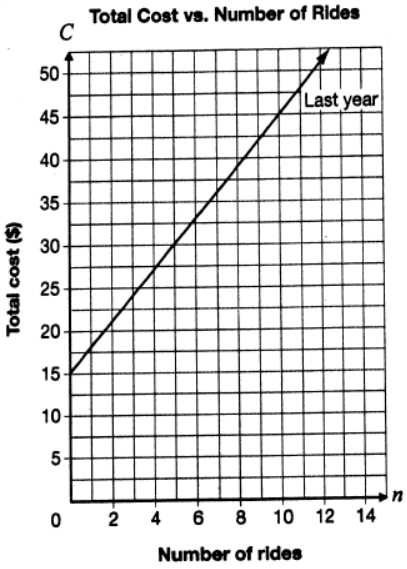
$= \$45$

Annotation:
Response demonstrates an identification of some of the important elements of the problem; equation for the total cost for last year determined correctly.

Anchor - Code 30
Academic (Question 14) Item: Roll with It!

Roll with It!

The total cost at an amusement park is made up of an admission fee and a cost per ride. Information about the total cost for n rides last year is shown below.



This year, the cost per ride is reduced from last year, but the total cost for 10 rides is the same.

Determine a possible equation for the total cost, C, for this year. Include an admission fee and a cost per ride.

Justify your answer.

10rides = $45

C = 4n + 5

= (4)(number of rides = n) + (5)

(4) ↑ cost per ride

(5) admission fee

∴ C = 4n + 5

For 10 rides — check

4(10) + 5

= 40 + 5

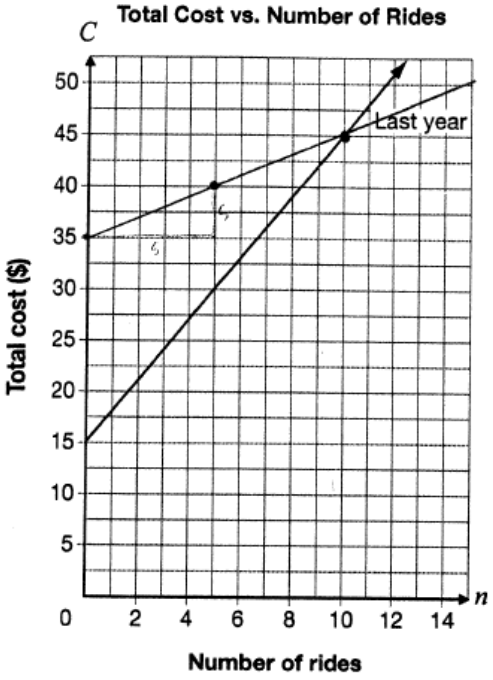
C = 45

Annotation:
Response demonstrates an identification of most of the important elements of the problem; equation determined with a rate that is higher than last year (instead of lower) and with a corresponding initial value so that line passes through (10,45). Shows (10,45) satisfies the equation.

Anchor - Code 40
Academic (Question 14) Item: Roll with It!

Roll with It!

The total cost at an amusement park is made up of an admission fee and a cost per ride. Information about the total cost for n rides last year is shown below.



This year, the cost per ride is reduced from last year, but the total cost for 10 rides is the same.

Determine a possible equation for the total cost, C, for this year. Include an admission fee and a cost per ride.

Justify your answer.

$C = ln + 35$

admission fee = 35

$1 per ride

The cost for ten rides is the same because I reduced the cost per ride but also raised the admission fee.

Annotation:
Response demonstrates an identification of all important elements of the problem; equation determined with a possible rate that is lower than last year and with a corresponding initial value so that line passes through (10,45). Shows (10,45) satisfies the equation through graphing.

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

Is It a Line?

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 whether the relations are linear or non-linear with justification shows limited effectiveness due to ● misunderstanding of concepts. ● incorrect selection or misuse of procedures;
20	Application of knowledge and skills to determine whether the relations are linear or non-linear with justification shows some effectiveness due to ● partial understanding of the concepts. ● errors and/or omissions in the application of the procedures;
30	Application of knowledge and skills to determine whether the relations are linear or non-linear with justification shows considerable effectiveness due to ● an understanding of most of the concepts. ● minor errors and/or omissions in the application of the procedures;
40	Application of knowledge and skills to determine whether the relations are linear or non-linear with justification shows a high degree of effectiveness due to ● a thorough understanding of the concepts. ● an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding);

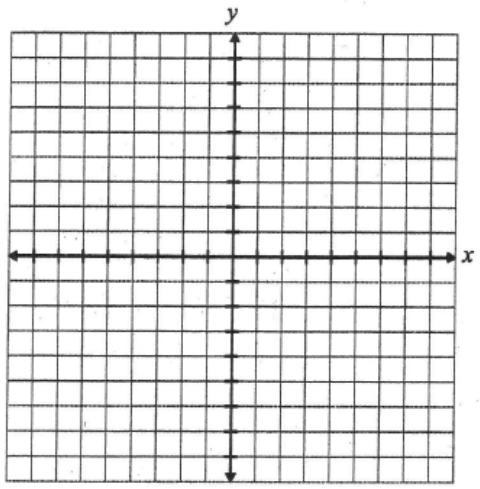
Anchor - Code 10
Academic (Question 22) Item: Is It a Line?

Is It a Line?

Determine whether each of the relations in the chart below is linear or non-linear.

Justify your answers. You may use the grid if you wish.

$-2x + 6y = 18$	$y = 4x^2 + 3$
Circle one: (Linear) Non-linear	**Circle one:** Linear (Non-linear)
Justification 2 and 6 can go into 18 evenly	**Justification** $4x^2+3$



Annotation:
Response demonstrates an incorrect selection of procedures; linear/non-linear circled correctly but justification does not show an understanding of linear or non-linear as no graph, rearranging, or reference to exponent or first differences for either.

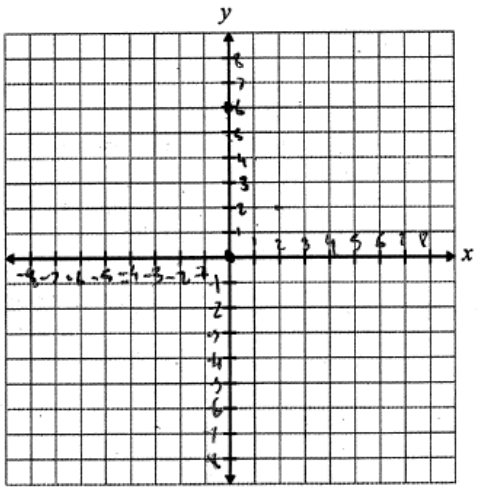
Anchor - Code 20
Academic (Question 22) Item: Is It a Line?

Is It a Line?

Determine whether each of the relations in the chart below is linear or non-linear.

Justify your answers. You may use the grid if you wish.

$-2x + 6y = 18$	$y = 4x^2 + 3$
Circle one: (Linear) Non-linear	**Circle one:** Linear (Non-linear)
Justification: It is linear because it is a straight line	**Justification:** This is not a linear line because it does not pass through the (0, 0) points.



Annotation:
Response demonstrates a partial understanding of the concepts; both circled correctly with some (or full) justification for only one (references a straight line but not graphed, and illogical jusitifcation for non-linear).

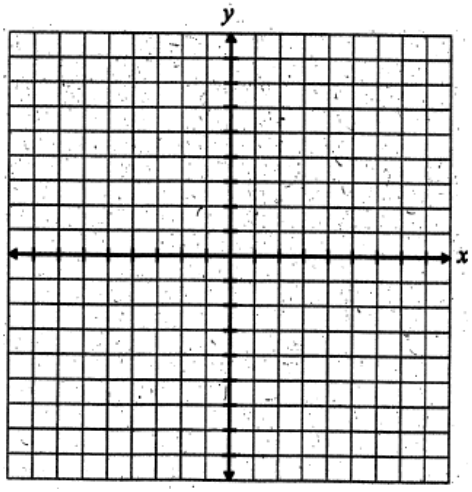
Anchor - Code 30
Academic (Question 22) Item: Is It a Line?

Is It a Line?

Determine whether each of the relations in the chart below is linear or non-linear.

Justify your answers. You may use the grid if you wish.

$-2x + 6y = 18$	$y = 4x^2 + 3$
Circle one: (Linear) Non-linear	**Circle one:** Linear (Non-linear)
Justification $-2x+6y=18$ $-2x+6y-18=0$ $\frac{-6y}{-6} = \frac{-2x}{-6} - \frac{18}{-6}$ $y = \frac{1}{3}x + 3$	**Justification** x | y 1 | 17 (12) 2 | 29 (20) 3 | 39 First differences are not consistant



Annotation:
Response demonstrates a minor omission in the application of the procedures; linear and non-linear circled correctly for both with a minor omission in justification (calculates first differences and references not equal ('not consistent') and converts to y = mx + b form but does not make reference to it).

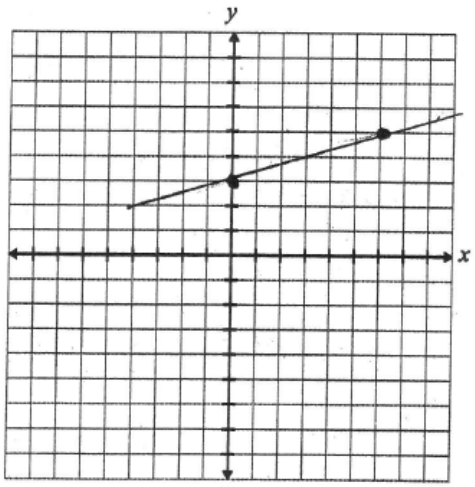
Anchor - Code 40
Academic (Question 22) Item: Is It a Line?

Is It a Line?

Determine whether each of the relations in the chart below is linear or non-linear.

Justify your answers. You may use the grid if you wish.

$-2x + 6y = 18$	$y = 4x^2 + 3$
Circle one: (Linear) Non-linear	**Circle one:** Linear (Non-linear)
Justification $-2x + 6y = 18$ $\frac{6y}{6} = \frac{2x}{6} + \frac{18}{6}$ $y = \frac{2}{6}x + 3$ It is linear because it can be in the form $y = mx + b$ which is the form of an equation of a line.	**Justification** $y = 4x^2 + 3$ It is non linear because it is not in the form $y = mx + b$, there is an exponent on the x which makes it non-linear.



Annotation:
Response demonstrates a thorough understanding of the concepts; linear and non-linear circled correctly and full justification for both (references y = mx + b with equation rearranged correctly and references exponent on the variable x even though does not mention other than 1).

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

Movie Night

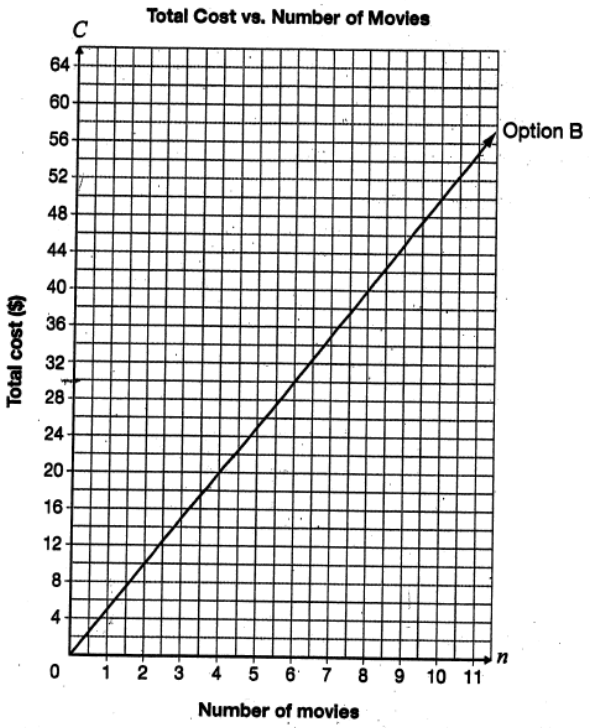
Code	Descriptor
B	Blank: nothing written or drawn in response to the question
I	- Illegible: cannot be read; completely crossed out/erased; not written in English; - Irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, “?”, “!”, “I don’t know”); - Off topic: no relationship of written work to the question.
10	Problem-solving process involving the point of intersection and its interpretation to determine the conditions under which a person should select each option shows limited effectiveness due to • minimal evidence of a solution process. • limited identification of important elements of the problem. • too much emphasis on unimportant elements of the problem. • no conclusions presented or conclusion presented without supporting evidence;
20	Problem-solving process involving the point of intersection and its interpretation to determine the conditions under which a person should select each option shows some effectiveness due to • an incomplete solution process. • identification of some of the important elements of the problem. • some understanding of the relationships between important elements of the problem. • simple conclusions with little supporting evidence;
30	Problem-solving process involving the point of intersection and its interpretation to determine the conditions under which a person should select each option shows considerable effectiveness due to • a solution process that is nearly complete. • identification of most of the important elements of the problem. • a considerable understanding of the relationships between important elements of the problem. • appropriate conclusions with supporting evidence;
40	Problem-solving process involving the point of intersection and its interpretation to determine the conditions under which a person should select each option shows a high degree of effectiveness due to • a complete solution process. • identification of all important elements of the problem. • a thorough understanding of the relationships between all of the important elements of the problem. • appropriate conclusions with thorough and insightful supporting evidence;

Anchor - Code 10
Academic (Question 23) Item: Movie Night

Movie Night

There are two payment options for downloading movies from a Web site.

- Option A: Pay $30 for a membership and $2 per movie downloaded.
- Option B: Shown on the grid below.



Determine under which conditions a person should select Option A and under which conditions a person should select Option B.

Justify your answer.

O1 = $30 + $2 x 11 movies

30 + 22

$52 for 11 movies

O2 = $55 for 11 movies

A person should choose option A because it is cheaper for 11 movies than Option B which no one should choose.

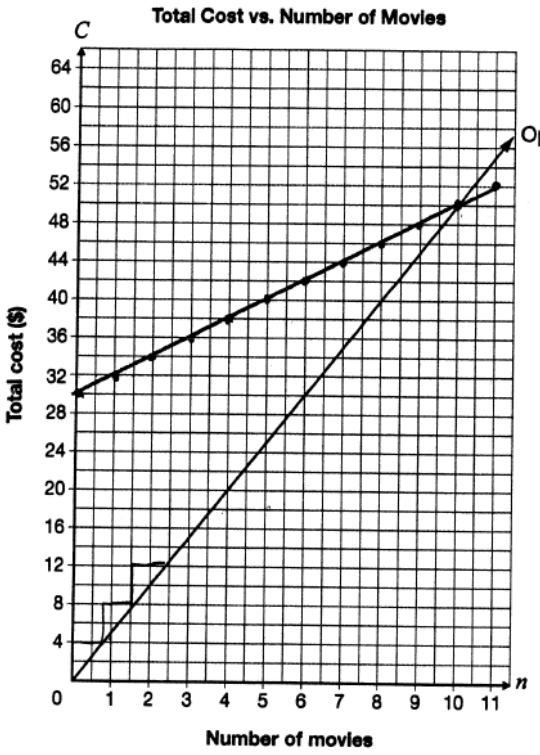
Annotation:
Response demonstrates a limited identification of important elements of the problem; no evidence of graphing Option A and conclusion is based on calculations for only one point. Point of intersection not identified and no reference to when Option B is cheaper.

Anchor - Code 20
Academic (Question 23) Item: Movie Night

Movie Night

There are two payment options for downloading movies from a Web site.

- Option A: Pay $30 for a membership and $2 per movie downloaded.
- Option B: Shown on the grid below.



Option A
$C = \frac{2}{1}n + 30$

Option B
$C = \frac{4}{1}n$

Determine under which conditions a person should select Option A and under which conditions a person should select Option B.

Justify your answer.

optiona) A person who would select optionA wouldbe prominent viewer of movies.

optionB) A person who would select option B would be a person watches movies when he/she chooses.

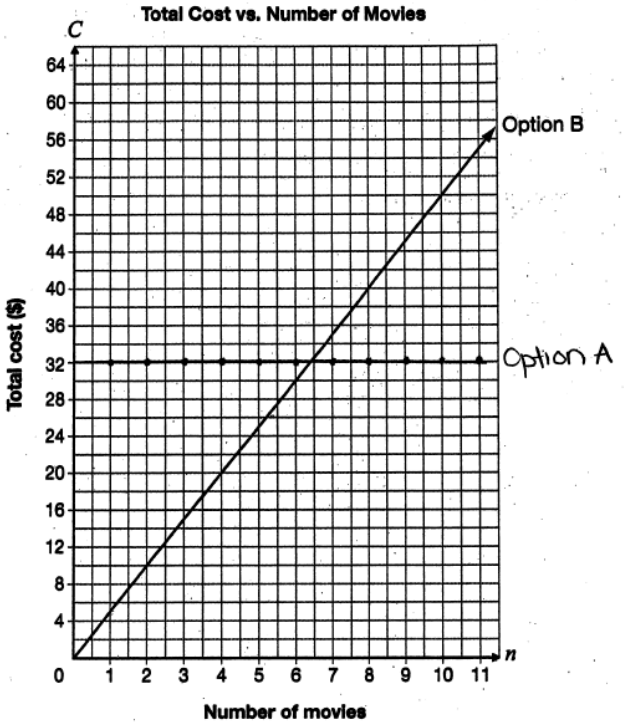
Annotation:
Response demonstrates some understanding of the relationships between important elements of the problem; graph of Option A drawn correctly but point of intersection not identified or interpreted as justification does not reference less than or more than 10 movies.

Anchor - Code 30
Academic (Question 23) Item: Movie Night

Movie Night

There are two payment options for downloading movies from a Web site.

- Option A: Pay $30 for a membership and $2 per movie downloaded.
- Option B: Shown on the grid below.



Determine under which conditions a person should select Option A and under which conditions a person should select Option B.

Justify your answer.

A person should select option A if they tend or want to watch a lot of movies because the price stays constant. A person should select option B if then don't tend or don't want to watch many movies because then the price stays lower. A person should choose option A if they watch 7 or more movies and a person should choose option B if they watch 6 or less movies.

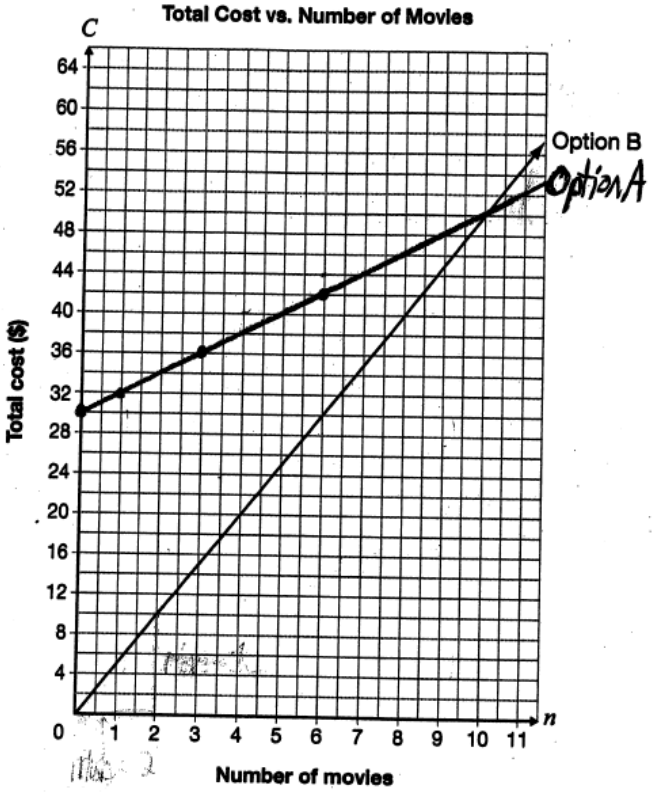
Annotation:
Response demonstrates an identification of most of the important elements of the problem; error(s) graphing Option A (slope incorrect) but point of intersection identified and interpreted correctly as justification includes reference to both 6 or less movies and 7 or more movies.

Anchor - Code 40
Academic (Question 23) Item: Movie Night

Movie Night

There are two payment options for downloading movies from a Web site.

- Option A: Pay $30 for a membership and $2 per movie downloaded.
- Option B: Shown on the grid below.



Determine under which conditions a person should select Option A and under which conditions a person should select Option B.

Justify your answer. : you should choose Option B if you plan to buy less than 10 movies, either if you plan on buying 10 movies, and Option A if you plan to buy more than 10 movies.

Annotation:
Response demonstrates a through understanding of the relationships between all of the important elements of the problem; graph of Option A correct and point of intersection interpreted accurately as justification includes reference to less than and more than 10 movies. Note: reference to exactly 10 movies not required.

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

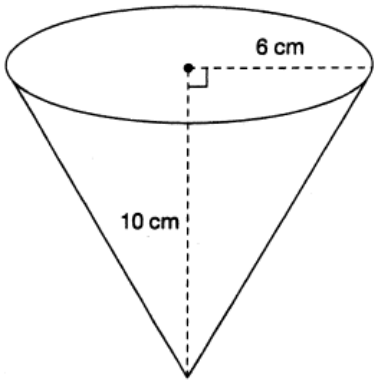
Coated Cones

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	Problem-solving process to determine the slant height of the cone using Pythagorean Theorem and the area of the surface that is coated in chocolate shows limited effectiveness due to • minimal evidence of a solution process. • limited identification of important elements of the problem. • too much emphasis on unimportant elements of the problem. • no conclusions presented or conclusion presented without supporting evidence;
20	Problem-solving process to determine the slant height of the cone using Pythagorean Theorem and the area of the surface that is coated in chocolate shows some effectiveness due to • an incomplete solution process. • identification of some of the important elements of the problem. • some understanding of the relationships between important elements of the problem. • simple conclusions with little supporting evidence;
30	Problem-solving process to determine the slant height of the cone using Pythagorean Theorem and the area of the surface that is coated in chocolate shows considerable effectiveness due to • a solution process that is nearly complete. • identification of most of the important elements of the problem. • a considerable understanding of the relationships between important elements of the problem. • appropriate conclusions with supporting evidence;
40	Problem-solving process to determine the slant height of the cone using Pythagorean Theorem and the area of the surface that is coated in chocolate shows a high degree of effectiveness due to • a complete solution process. • identification of all important elements of the problem. • a thorough understanding of the relationships between all of the important elements of the problem. • appropriate conclusions with thorough and insightful supporting evidence;

Anchor - Code 10
Academic (Question 30) Item: Coated Cones

Coated Cones

An ice cream store offers chocolate-coated cones as shown in the diagram below.



The cone is open topped, and the entire outside is coated in chocolate.

Determine the area of the surface that is coated in chocolate.

Show your work.

Surface Area: πr^2

$= \pi \times 6^2$

$= 113.09 cm^2$

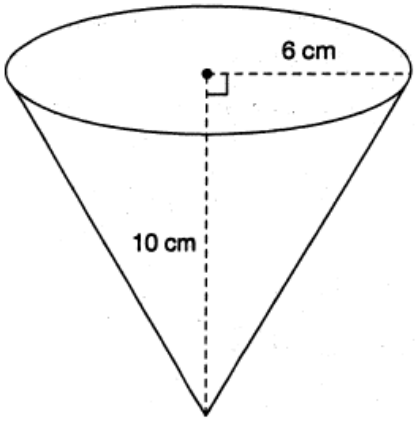
The surface area of the cone is $113.09 cm^2$

Annotation:
Response demonstrates limited identification of important elements of the problem; lateral surface area formula not selected (area of circle calculated) and no evidence of determining slant height (no Pythagorean theorem).

Anchor - Code 20
Academic (Question 30) Item: Coated Cones

Coated Cones

An ice cream store offers chocolate-coated cones as shown in the diagram below.



The cone is open topped, and the entire outside is coated in chocolate.

Determine the area of the surface that is coated in chocolate.

Show your work.

$\frac{10}{2} = 5$

$SA = \pi rs + \pi r^2$

$= \pi(6)(5) + \pi(6)^2$

$= 207.3\ cm^3$

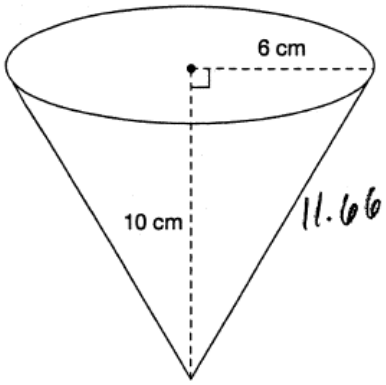
∴ the area that is coated in chocolate is $207.3\ cm^3$

Annotation:
Response demonstrates some understanding of the relationships between important elements of the problem; shows formula for surface area selected, but not adapted to account for open top and no evidence of determining slant height (no Pythagorean theorem, height of cone used). Surface area calculated based on errors.

Anchor - Code 30
Academic (Question 30) Item: Coated Cones

Coated Cones

An ice cream store offers chocolate-coated cones as shown in the diagram below.



The cone is open topped, and the entire outside is coated in chocolate.

Determine the area of the surface that is coated in chocolate.

Show your work.

$\pi rs + \pi r^2$

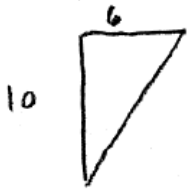
$\pi rs - \pi r^2$

$\pi(6)(11.66) - \pi(6)^2$

$= 219.78 - 113.09$

$= 106.69 cm^2$

To find s



$(a)^2 + (6)^2 = (c)^2$

$(6)^2 + (10)^2 = (c)^2$

$36 + 100 = (c)^2$

$\sqrt{136} = c$

$11.66 = c$

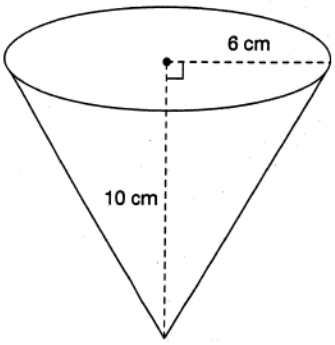
$\therefore$ The surface area coated in choclate is $106.69 cm^2$

Annotation:
Response demonstrates a considerable understanding of the relationships between important elements of the problem; shows formula for surface area selected and adapted (with error) to account for open top, slant height determined using Pythagorean theorem and surface area calculated correctly based on error.

Anchor - Code 40
Academic (Question 30) Item: Coated Cones

Coated Cones

An ice cream store offers chocolate-coated cones as shown in the diagram below.



The cone is open topped, and the entire outside is coated in chocolate.

Determine the area of the surface that is coated in chocolate.

Show your work.

$SA_{LATERAL\ SURFACE} = \pi rs$

$= \pi(6)(\sqrt{136})$

$= 219.82 cm^2$

$a^2 + b^2 = s^2$

$10^2 + 6^2 = s^2$

$s = \sqrt{136}$

$s = 11.6$

The area of the surface coated in chocolate is $219.82 cm^2$

Annotation:
Response demonstrates a thorough understanding of the relationships between all of the important elements of the problem; shows formula for lateral surface area selected, slant height determined using Pythagorean theorem and correct lateral surface area calculated.

Assessment of Mathematics
Grade 9 Academic Program
Specific Open-Response Scoring Guide

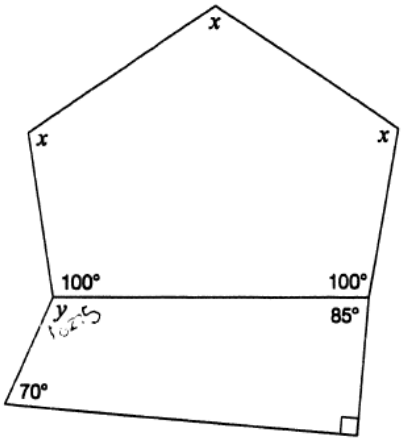
Daring Diagram

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 with justification using geometric properties including the sum of interior angles for various polygons shows limited effectiveness due to ● misunderstanding of concepts. ● incorrect selection or misuse of procedures;
20	Application of knowledge and skills to determine the values of x and y with justification using geometric properties including the sum of interior angles for various polygons shows some effectiveness due to ● partial understanding of the concepts. ● errors and/or omissions in the application of the procedures;
30	Application of knowledge and skills to determine the values of x and y with justification using geometric properties including the sum of interior angles for various polygons shows considerable effectiveness due to ● an understanding of most of the concepts. ● minor errors and/or omissions in the application of the procedures;
40	Application of knowledge and skills to determine the values of x and y with justification using geometric properties including the sum of interior angles for various polygons shows a high degree of effectiveness due to ● a thorough understanding of the concepts. ● an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding);

Anchor - Code 10
Academic (Question 31) Item: Daring Diagram

Daring Diagram

A diagram is shown below.



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

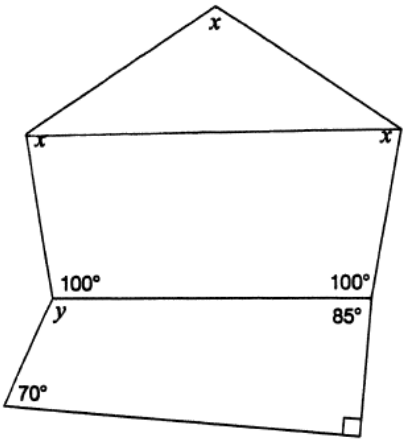
Value	Justification using geometric properties
$x =$ 160	All sides must of a 4 or more side shape must add up to 360°
$y =$ 102.5	y equals to 102.5 because It will add up to the (remaining 360°

Annotation:
Response demonstrates a misunderstanding of concepts; values of x and y both incorrect with illogical justification for x (no reference to 540, subtracting 200 or dividing by 3) but 360 used (incorrectly) to determine y.

Anchor - Code 20
Academic (Question 31) Item: Daring Diagram

Daring Diagram

A diagram is shown below.



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

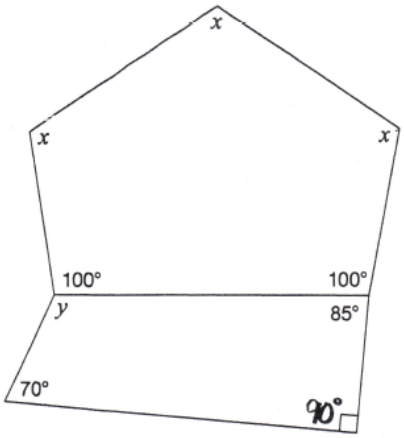
Value	Justification using geometric properties
$x =$ 180°	180° and x are opposite angles ∴ the same value
$y =$ 115°	all angles in a quadrilateral = 360° 70 + 85 + 90 + y = 360° 245 + y = 360 y = 360 − 245 y = 115°

Annotation:
Response demonstrates a partial understanding of the concepts; value of x incorrect with illogical justification (no reference to 540, 340 or dividing by 3) but value of y correct with appropriate justification (given angles subtracted from 360).

Anchor - Code 30
Academic (Question 31) Item: Daring Diagram

Daring Diagram

A diagram is shown below.



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

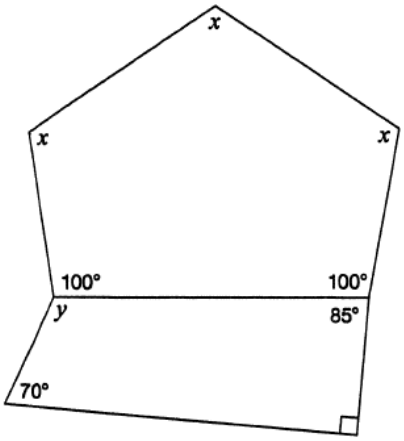
Value	Justification using geometric properties
$x =$ 53.3°	360 − 200 = 160 160 ÷ 3 = 53.3°
$y =$ 115°	70° + 90° + 85° = 245° 360° − 245° = 115°

Annotation:
Response demonstrates minor error in the application of the procedures; value of x incorrect but at least one of: 540, subtraction of 200, or division by 3 included (subtracts 200 and divides by 3). Value of y correct with justification (given angles subtracted from 360 to determine y).

Anchor - Code 40
Academic (Question 31) Item: Daring Diagram

Daring Diagram

A diagram is shown below.



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

Value	Justification using geometric properties
$x =$ 113°	I know this because a pentagon sum up to 540°. So I subtract 200 from 540 and divide by 3 to find the value of x.
$y =$ 115°	I know this because a quadrilateral sum up to 115°. So I subtract 245 from 360 to find the value of y.

Annotation:
Response demonstrates a thorough understanding of the concepts; both values of x and y are correct with justification (340 degrees divided by 3 to determine x and given angles subtracted from 360 to determine y).