

Grade 9 Assessment of Mathematics, 2002–2003

Release Items


Booklet 3—Short Answer Academic Program



Education
Quality and
Accountability
Office

Directions to Students About Answering Short Answer Items

1. For this part of the assessment, make sure you have the following items along with *Booklet 3*:
 - a pencil and an eraser or a pen
 - a scientific or graphing calculator
 - a ruler and a protractor
2. Do all of your work (even rough work) in *Booklet 3*.
3. You will have 30 min to do these 10 items. That means you have about 3 min for each one. Give yourself time to answer all of the questions.
4. Figures in this section are not drawn to scale.
5. These questions are designed to get you to think deeply about the mathematics you know but they do not require you to write a great deal. Be sure to watch for the terms listed in the Key Words and Phrases in Instructions and do just what the prompt asks you to do.

For example, the question might ask you to “**Explain** your answer.” The Key Words and Phrases in Instructions sheet says, “**Explain** means to use words and symbols to make your solutions clear and understandable.” As soon as you can explain a mathematical reason for the answer, do so. You do not need to provide lots of calculations to illustrate your point.
6. In short answer questions, you do not have to provide lots of examples to illustrate your answer. Write a short answer.
7. You have **30 min** to work.
8. When you see the  sign, you have completed *Booklet 3*. Check your answers. Then wait quietly for directions from your teacher.

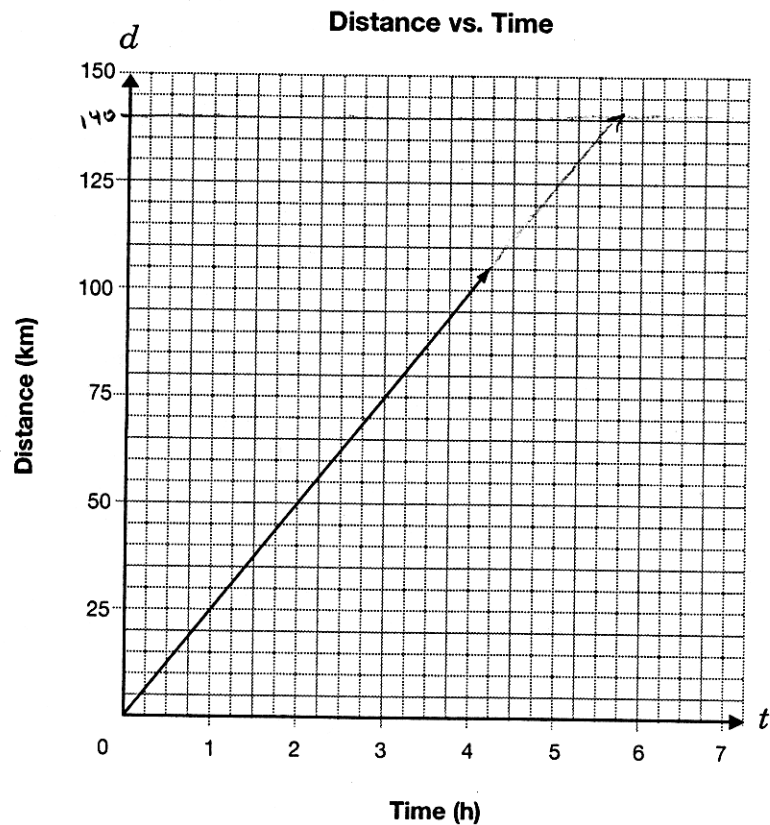
1. The relationship between the distance, d , in kilometres, travelled by a person on a bicycle and the time, t , in hours, is described in two ways:

- The equation is $d = 25t$.
- The graph is shown below.



Determine the time it will take to travel 140 km.

Show your work.



$$d = 25t$$

$$t = \frac{D}{r}$$

$$= \frac{140}{25}$$

$$= 5.6$$

It will take 5.6 hours
to travel 140 km.

b — blank: nothing at all is written for the solution

u — unrelated or unengaged: the student has written “I don’t know” or a question mark; the student has simply rewritten the question exactly as posed; the student has offered unrelated comments or drawn pictures; the student has not engaged in the problem solution

Erasures — Do not code erased work.

Question Number	Codes			Category and Strand
	0	1	2	
1	<ul style="list-style-type: none"> selects inappropriate tool and/or procedure 	<ul style="list-style-type: none"> selects appropriate tool (e.g., graph or formula), with one error in fitting to the context (e.g., in reading the value from the graph or in substituting values into the formula), resulting in incorrect answer or correct answer, with no work shown 	<ul style="list-style-type: none"> selects appropriate tool and fits it correctly to the context to calculate <i>t</i> properly (e.g., answers in the range 5.5 h–5.8 h) <p>Note: Units are not required.</p>	AP-R

Question	Code	Rationale
1	2	selects the equation as the tool and correctly solves to get an answer of 5.6 h

2. Veza uses the equation $C = 43n + 50$ to model the cost of soccer shirts for the team, where

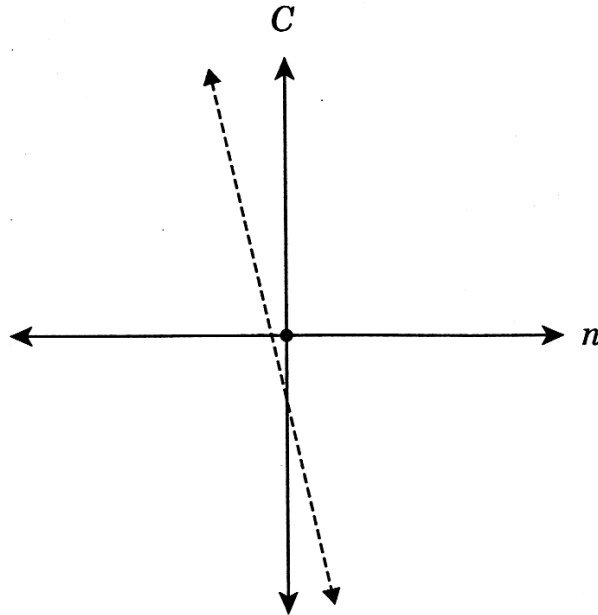
C represents the total cost in dollars,
and
 n represents the number of soccer shirts.



Veza sketches the graph of this relationship.

Explain why the graph shown **cannot** represent the total cost of soccer shirts.

List at least two reasons.



• y intercept - in the equation the y intercept (or "b" value) is a positive number, on the graph however it is negative. If the graph was correct it would look like this



• slope - in the equation - as the number of shirts increases so does the cost. Therefore the graph should show a positive correlation, not a negative one



b — blank: nothing at all is written for the solution

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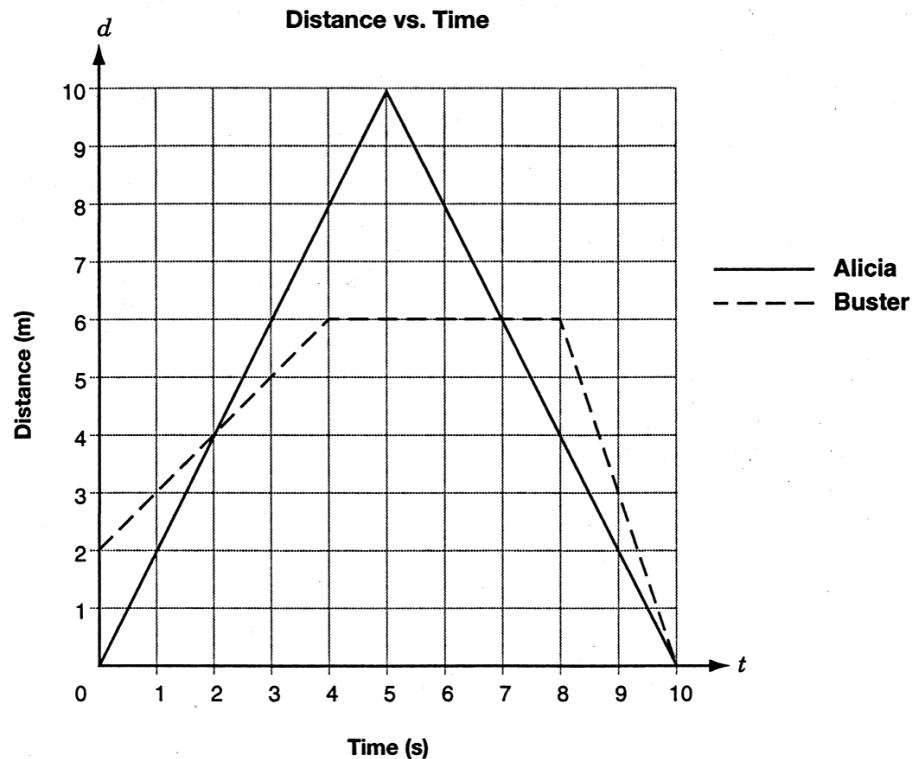
Erasures — Do not code erased work.

Question Number	Codes			Category and Strand
	0	1	2	
2	<ul style="list-style-type: none"> • explanation is unclear and incomplete 	<ul style="list-style-type: none"> • explanation is somewhat clear and complete (e.g., gives one of the reasons listed under code 2 or refers to both slope and y-intercept, without further explanation) 	<ul style="list-style-type: none"> • explanation is clear and complete (e.g., gives two of the following reasons: the slope should be positive, but the line shown has a negative slope; the C-intercept should be positive, but the graph shows a negative C-intercept; for positive values of n and C, the line should be in Quadrant 1, but the line is in Quadrant 2) <p>Note: The response does not have to be correct.</p>	CM-G

Question	Code	Rationale
2	2	explanation is clear and complete; reasons involve discussion of slope and y -intercept

3. Alicia and Buster walked in front of a motion detector. The graph below shows the relationship between the distance from the detector, d , in metres, and time, t , in seconds.

When was Buster moving faster than Alicia? Give reasons for your answer.



Buster was moving faster than Alicia from 8 seconds to 10 seconds after they started, when they were walking back towards the motion detector because in Buster's line that section is steeper than Alicia's line during that section. Buster during those two seconds covered more distance than Alicia but in the same amount of time.

b — blank: nothing at all is written for the solution

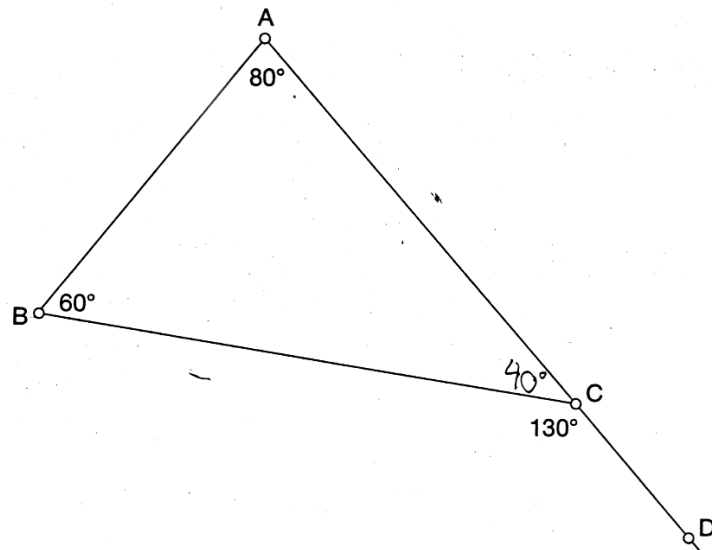
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Question Number	Codes			Category and Strand
	0	1	2	
3	<ul style="list-style-type: none"> incorrect answer stated, with reasons given or not 	<ul style="list-style-type: none"> correct answer stated, with incorrect or no reasons given 	<ul style="list-style-type: none"> correct answer stated (i.e., from 8 to 10 s), with correct reasons given (e.g., Buster’s line is steeper during that time interval, so his speed is greater) 	KU-G

Question	Code	Rationale
3	2	correct answer stated, supported by a comparison of the slopes of the lines

4. There is an error in this diagram. Describe the error and give reasons for your answer.



The angles of a triangle all add up to 180° so the missing angle is 40° . But, that doesn't work because it is a supplementary angle ^(equal 180°) and the other angle is 130° , so it doesn't add up correctly.

b — blank: nothing at all is written for the solution

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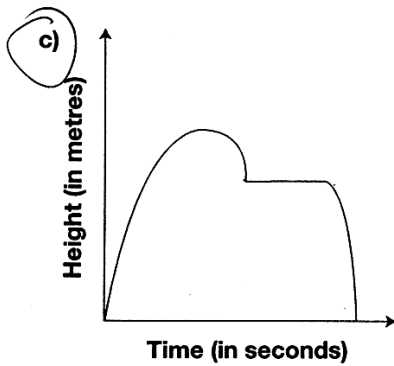
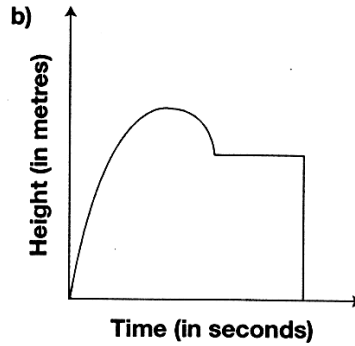
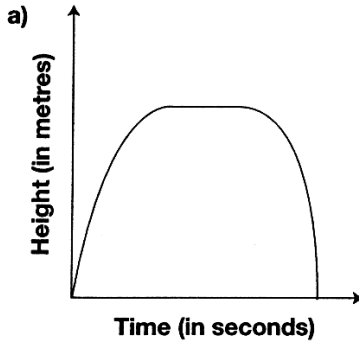
Erasures — Do not code erased work.

Question Number	Codes			Category and Strand
	0	1	2	
4	<ul style="list-style-type: none"> inappropriate choice of tool(s), fitted incorrectly to the context 	<ul style="list-style-type: none"> appropriate choice of tool(s) (e.g., supplementary angles, angle sums in a triangle, exterior angle theorem), fitted incorrectly to the context (e.g., “$\angle BCD$, $\angle B$, and $\angle A$ should add up to 180°, because the angles in a triangle add up to 180°”) or inappropriate choice of tool(s) (e.g., measures the angles), fitted correctly to the context (e.g., “The measure of $\angle BCD$ is incorrect, because I measured it”) 	<ul style="list-style-type: none"> appropriate choice of tool(s) (e.g., supplementary angles, angle sums in a triangle, exterior angle theorem), fitted correctly to the context (e.g., “$\angle BCD = \angle B + \angle A$ is incorrect because $\angle BCA$ and $\angle BCD$ are supplementary; $\angle BCA = 180^\circ - 130^\circ = 50^\circ$; but $\angle B + \angle A + \angle BCA$ must add up to 180°”) 	AP-M

Question	Code	Rationale
4	2	selects supplementary angles and sum of angles in a triangle and correctly describes the error

5. Sergio hits a golf ball.
 As the ball is **falling**, it gets caught in a tree.
 After a few seconds, the ball falls out of the tree.

Circle the height vs. time graph that models the path of Sergio's ball.



Give reasons for your choice.

The distance in height of the golf ball keeps increasing + then decreases. So, that eliminate answer 'A', then it's stuck in a tree so the distance doesn't change as the time passes. Then, it falls out of the tree, but it can't fall without passing any times like diagram B shows. So, it's C.

b — blank: nothing at all is written for the solution

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Question Number	Codes			Category and Strand
	0	1	2	
5	<ul style="list-style-type: none"> communication of reasoning is not clear and not complete 	<ul style="list-style-type: none"> communication of reasoning is either not clear or not complete 	<ul style="list-style-type: none"> communication of reasoning is clear and complete (e.g., circles a graph, then supports the choice) <p>Note: Consider the communication of the student’s reasoning, not the correctness of his or her choice.</p>	CM-R

Question	Code	Rationale
5	2	communication of reasoning behind choice of graph is clear and complete