

6

MATHEMATICS

SAMPLE RESPONSES



Walk the line

This booklet is designed to help teachers make overall, on-balance judgments by providing examples of student responses. The responses are not an exhaustive set.

B samples

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B Sample: Response 1

Guide to making judgments — Year 6 Mathematics Student

Purpose: To use non-standard units of measure to estimate distances and to solve related mathematical problems.

Knowledge and understanding	Thinking and reasoning	Communicating
Uses non-standard units to measure. Uses standard units to measure and calculate lengths and times. Q 1, 2a, 2b, 4	Explains procedures and strategies used in making predictions, estimations and solving problems. Q 2c, 3, 5, 6	Uses mathematical language to communicate and justify thinking and reasoning. Q 1b, 2c, 3, 5d, 6
<div>Personal measurements, calculations and mud map tables are correctly completed. Step length calculations are correct and clear.</div> <div>Correctly calculates estimates of object length.</div>	<div>All predictions, estimated lengths, distances and directions are reasonable. Explanations are clear, showing an understanding of reasoning and error. Solves multi-step problems with explanation of thinking.</div> <div>Solves multi-step problems.</div>	<div>Clearly and consistently communicates and justifies thinking and reasoning using mathematical language, diagrams and correct units where necessary.</div> <div>Explanations and working are logical and well-reasoned.</div>
A		
B		
C		
D		
E		

Overall grade

The purpose of this QCAT is for students to use non-standard units of measure to estimate distances and to solve related mathematical problems. This response typically demonstrates a high level of communication, understanding and application of the use of non-standard units of measure to estimate distances and solve multi-step problems. On balance, this work is an overall B.

Knowledge and understanding

Demonstrates thorough knowledge and understanding of the use of non-standard units of measure to estimate distances, by clearly and correctly completing the step length calculation (Q 1) and mud map table (Q 4). The large range in values for the estimate of object length implies the personal measurements table (Q 2a) contains some cells that are inaccurate.

Thinking and reasoning

Not all estimates using personal measurements are reasonable. Some understanding is shown of error when using non-standard units, but the explanation of why the estimates are not all the same lacks depth. Correctly predicts and selects an appropriate alternative strategy to solve the multi-step problem based on own and teacher's step length. Correctly solves multi-step problem based on distances, steps and directions to school. Working and explanations clearly demonstrate the thinking and reasoning used.



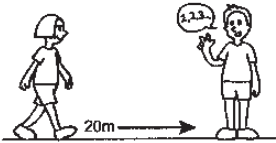
Communicating

Frequent use of units in answers. Explanations, justifications and working are logical and well reasoned.

B Sample: Response 1

Recording personal measurements

- 1 a) Complete the table below to find three personal measurements.
Use a ruler and round your measurements to the nearest centimetre.

Non-standard unit	Personal measurement
 <p>Hand span</p>	<p>My hand span is:</p> <p>.....19..... cm</p>
 <p>Shoe length</p>	<p>My shoe length is:</p> <p>.....24..... cm</p>
 <p>Number of steps taken to walk 20 metres. (Use the track marked out by your teacher for this.)</p>	<p>The number of steps I took is:</p> <p>.....29..... steps</p>

- 1 b) Find the length of one of your steps in centimetres.



- Divide the distance you walked (in centimetres) by the number of steps you took.
- Round your answer to the nearest centimetre.

Show all your working

$$2000_{cm} \div 29$$

One of my step lengths is about69..... centimetres

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

B Sample: Response 1

Now that you have recorded three personal measurements, you will use them to estimate other lengths.

Your teacher will provide an object for you to measure.

- 2 a) Measure the length of the object using your non-standard units. Record them in the table below.

Name of object: line

Non-standard unit	Number	Personal measurement (from page 4)
My hand span	<u>20</u> hand spans	<u>19</u> cm
My shoe length	<u>12</u> shoe lengths	<u>24</u> cm
My step length	<u>5</u> step lengths	<u>69</u> cm

- 2 b) Estimate the length of the object by converting your measurements of the object into centimetres.

My calculation of the length of the object:

- using my hand span is 380 cm
- using my shoe length is 280 cm
- using my step length is 345 cm

B Sample: Response 1

2 c) Complete the statements below.

My estimates of the object may not be all the same because my hands
and shoes and steps are different sizes

I predict the non-standard unit that would give the most accurate estimate over this distance is:

my shoelength
because my step may get bigger or smaller
and my hand span could also get
bigger or smaller and my shoe always
stays the same measurement

B Sample: Response 1

Write your teacher's step length here: 87 cm

Suppose you and your teacher walked 1000 metres together.

3 a) Who would take the most steps? I would

3 b) How many more steps would that person take? 300 steps

Explain how you worked this out.
Show all working.

First I worked out how many steps the teacher took in 20m which is 23 steps. Then I worked out how many 20m is in a 1000m which was 50 so I would times my teachers steps by fifty and that would be how many steps he took in a 1000m which is 1150 steps.

Then I did the same to my amount of steps which worked out to be 1450.

Then I minuse 1150 from 1450 to find out how many more step I took then my teacher which was 300.

$$\begin{array}{r}
 \times 20 \\
 \times 50 \\
 \hline
 1000 \text{ m}
 \end{array}
 \quad
 \begin{array}{r}
 23 \\
 \times 5 \\
 \hline
 1150
 \end{array}
 \quad
 \begin{array}{r}
 29 \\
 \times 5 \\
 \hline
 1450
 \end{array}
 \quad
 \begin{array}{r}
 1450 \\
 - 1150 \\
 \hline
 0300
 \end{array}$$

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

B Sample: Response 1

4. Complete the table below using information from page 8.

Section	Distance walked in section (steps)	Distance walked in section (metres)	Time arrived at end of section	Time taken for section (minutes)
1. school front gate to corner Danzig Rd & Bridge Rd	1450	870	3:29 pm	14
2. corner of Danzig Rd to western end of the bridge	500	300	3:37 pm	8
3. western to the eastern end of the bridge	200	120	3:41 pm	4
4. eastern end of the bridge to corner Park St & Church Ave	450	270	3:45 pm	4
5. corner of Park St to corner Church Ave & View St	1150	690	4:01 pm	16
6. corner of Church Ave to home	1000	600	4:09 pm	8

5 a) Circle the section that is the shortest distance: 1 2 (3) 4 5 6

5 b) How long did it take Jack to walk home? 54 minutes

5 c) How far does Jack walk home in metres? 2850 metres

5 d) Where is Jack when he has walked half the distance home? Circle your answer below.

On Danzig Rd

On Bridge Rd

On the bridge

(On Park St)

On Church Ave

Explain how you worked this out.

I worked out where Jack was halfway by going $2850 \div 2$ which was 1425m.

I then added up the distances in the table until I got near 1425m and he was on Park street

B Sample: Response 1

- 6 a) Work out the distance (in metres) between the school gate and Jack's home along the new road.

Show all your working.

Bridge + Bridge Rd

$$\begin{array}{r} 2150 \\ - 1450 \\ \hline 0700 \text{ steps} \end{array}$$

Church Ave

$$\begin{array}{r} 3750 \\ - 2600 \\ \hline 1150 \text{ steps} \end{array}$$

Distance home

$$\begin{array}{r} 1150 \\ + 700 \\ \hline 1850 \text{ steps} \end{array}$$

$$\begin{array}{r} 1850 \\ \times 0.6 \\ \hline 1110 \text{m} \end{array}$$

- 6 b) State the direction of the school from Jack's house.west.....

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B Sample: Response 2

Guide to making judgments — Year 6 Mathematics Student

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Knowledge and understanding	Thinking and reasoning	Communicating		
Uses non-standard units to measure. Uses standard units to measure and calculate lengths and times. Q 1, 2a, 2b, 4	Explains procedures and strategies used in making predictions, estimations and solving problems. Q 2c, 3, 5, 6	Uses mathematical language to communicate and justify thinking and reasoning. Q 1b, 2c, 3, 5d, 6		
<div>Personal measurements, calculations and mud map tables are correctly completed. Step length calculations are correct and clear.</div> <div>Correctly calculates estimates of object length.</div>	<div>All predictions, estimated lengths, distances and directions are reasonable. Explanations are clear, showing an understanding of reasoning and error. Solves multi-step problems with explanation of thinking.</div> <div>Solves multi-step problems.</div>	<div>Clearly and consistently communicates and justifies thinking and reasoning using mathematical language, diagrams and correct units where necessary.</div> <div>Explanations and working are logical and well-reasoned.</div>		
A	B	C	D	E

Overall grade

This response shows a very high level of understanding of the use of non-standard units of measure to estimate distances. However, it demonstrates only a proficient application of effective strategies to solve mathematical problems, and mathematical language is not used consistently. Considering the purpose of the task, on balance, this work is an overall B.

Knowledge and understanding

Demonstrates comprehensive knowledge and understanding of the use of non-standard units of measure to estimate distances, by clearly and correctly completing all questions.

Thinking and reasoning

Explanation demonstrates an understanding of error when using non-standard units. Correctly predicts and selects the correct strategy to solve the multi-step problem based on own and teacher's step length, however the solution is incorrect due to a conversion error. Correctly solves multi-step problem based on distances, steps and directions to school. Working and explanations clearly demonstrate the thinking and reasoning used.



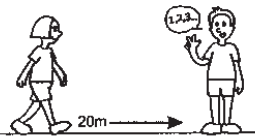
Communicating

Frequent use of units in answers. Explanations, justifications and working are logical and well reasoned.

B Sample: Response 2

Recording personal measurements

- 1 a) Complete the table below to find three personal measurements.
Use a ruler and round your measurements to the nearest centimetre.

Non-standard unit	Personal measurement
 Hand span	My hand span is: 20..... cm
 Shoe length	My shoe length is: 25..... cm
 Number of steps taken to walk 20 metres. (Use the track marked out by your teacher for this.)	The number of steps I took is: 25..... steps

- 1 b) Find the length of one of your steps in centimetres.



- Divide the distance you walked (in centimetres) by the number of steps you took.
- Round your answer to the nearest centimetre.

Show all your working

$$\begin{aligned}
 20\text{ m} &= 2000\text{ cm} \\
 2000\text{ cm} &= 25\text{ steps} \\
 2000 \div 25 &= 80 \\
 1\text{ step} &= 80\text{ cm}
 \end{aligned}$$

One of my step lengths is about80..... centimetres

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

B Sample: Response 2

Now that you have recorded three personal measurements, you will use them to estimate other lengths.

Your teacher will provide an object for you to measure.

- 2 a) Measure the length of the object using your non-standard units. Record them in the table below.

Name of object: Whiteboard

Non-standard unit	Number	Personal measurement (from page 4)
My hand span12..... hand spans20..... cm
My shoe length9..... shoe lengths25..... cm
My step length3.2..... step lengths80..... cm

- 2 b) Estimate the length of the object by converting your measurements of the object into centimetres.

My calculation of the length of the object:

- using my hand span is240..... cm
- using my shoe length is225..... cm
- using my step length is256..... cm

B Sample: Response 2

2 c) Complete the statements below.

My estimates of the object may not be all the same because ...if you slightly curve rather than going in a straight line your answer will not be accurate. Also, the steps are always going to be different and your step length is only an average I predict the non-standard unit that would give the most accurate estimate over this distance is:

hand spans

because if you stretch out to your full extent every time the estimate will be very accurate. Steps always change and if you don't follow a straight line it won't be accurate. length of your feet can change if you don't follow a straight line.

B Sample: Response 2

Write your teacher's step length here: 42 cm

Suppose you and your teacher walked 1000 metres together.

3 a) Who would take the most steps? My teacher

3 b) How many more steps would that person take? 113.1 steps

Explain how you worked this out.
Show all working.

$$\begin{aligned}
 1000\text{ m} &= 10\ 000\text{ cm} \\
 10\ 000 &\div 42 = \text{teacher's step} \\
 \text{Teacher's step} &= 238.1\ \text{steps} \\
 10\ 000 &\div 80 = \text{my steps} \\
 \text{my steps} &= 125\ \text{steps}
 \end{aligned}$$

$$\begin{array}{r}
 238.1 \\
 - 125.0 \\
 \hline
 113.1\ \text{steps}
 \end{array}$$

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

B Sample: Response 2

4. Complete the table below using information from page 8.

Section	Distance walked in section (steps)	Distance walked in section (metres)	Time arrived at end of section	Time taken for section (minutes)
1. school front gate to corner Danzig Rd & Bridge Rd	1450	870	3:29 pm	14
2. corner of Danzig Rd to western end of the bridge	500	300	3:37 pm	8
3. western to the eastern end of the bridge	200	120	3:41 pm	4
4. eastern end of the bridge to corner Park St & Church Ave	450	270	3:45 pm	4
5. corner of Park St to corner Church Ave & View St	1150	690	4:01 pm	16
6. corner of Church Ave to home	1000	600	4:09 pm	8

5 a) Circle the section that is the shortest distance: 1 2 3 4 5 6

5 b) How long did it take Jack to walk home? 54 minutes

5 c) How far does Jack walk home in metres? 2850m

5 d) Where is Jack when he has walked half the distance home? Circle your answer below.

On Danzig Rd On Bridge Rd On the bridge On Park St On Church Ave

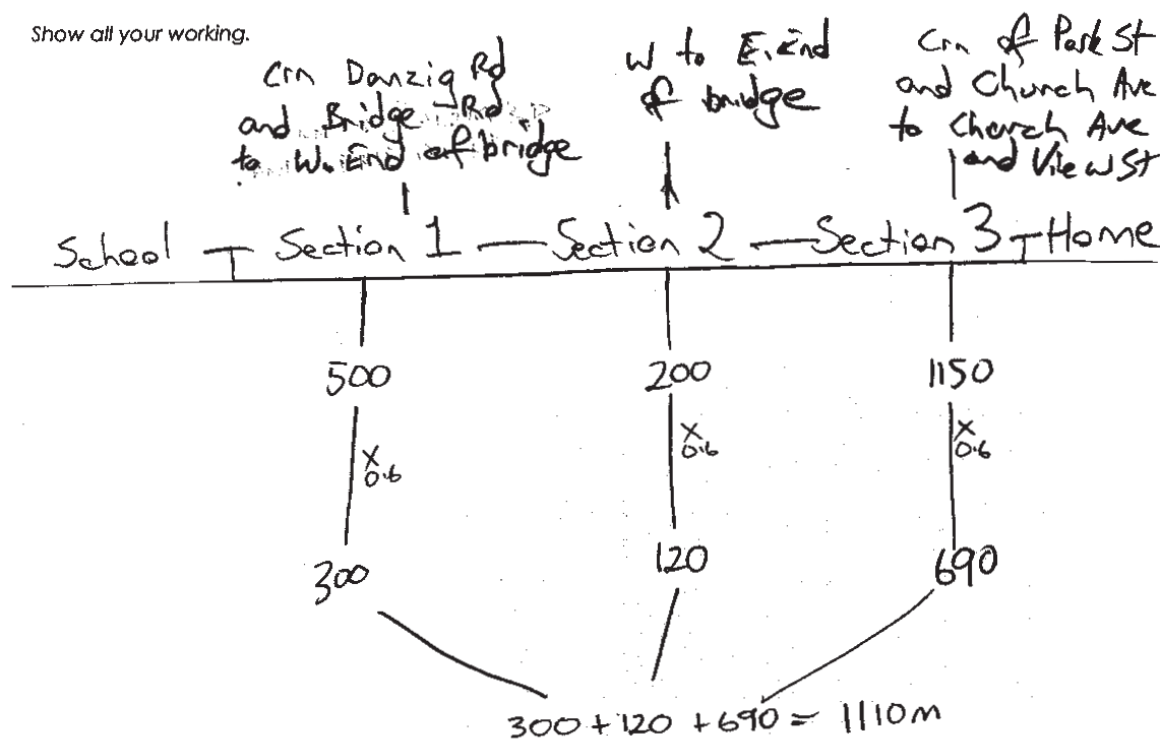
Explain how you worked this out.

First I divided 2850m by 2, then I worked out that 1425m would mean he was on section 4 by adding the metres together until I got 1425m.

B Sample: Response 2

- 6 a) Work out the distance (in metres) between the school gate and Jack's home along the new road.

Show all your working.



- 6 b) State the direction of the school from Jack's house. West