

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.

A samples

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A 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

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 very 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 A.

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

Working and explanations of predictions, procedures and strategies clearly demonstrate the thinking and reasoning used, and show an understanding of error when using non-standard units. Correctly solves multi-step problems based on distances, steps and directions.

Communicating

Consistent use of appropriate mathematical language and units. Explanations, justifications and working are comprehensive, logical and well reasoned.

A

B

C



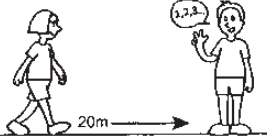
D

E

A 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>.....25..... 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>.....30..... 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

$$20\text{m} = 2000\text{cm}$$

$$2000\text{cm} \div 30\text{ steps} = 66.6\text{cm/step}$$

$$\approx 67\text{cm for 1 step length}$$

One of my step lengths is about67..... centimetres

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

A 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: the whiteboard

Non-standard unit	Number	Personal measurement (from page 4)
My hand span $12\frac{1}{2}$ hand spans19..... cm
My shoe length $9\frac{1}{2}$ shoe lengths25..... cm
My step length $3\frac{1}{2}$ step lengths67..... 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 is238..... cm
- using my shoe length is238..... cm
- using my step length is235..... cm

A Sample: Response 1

2 c) Complete the statements below.

My estimates of the object may not be all the same because *it is very hard to spread your hand apart the same distance and step the same length each time. You may have been wearing different shoes on the day you measured your shoe length.*

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

my shoe length

because *your shoe length won't change as you use it when placing one shoe in front of the other*

.....
.....

A Sample: Response 1

Write your teacher's step length here:74..... cm

Suppose you and your teacher walked 1000 metres together.

- 3 a) Who would take the most steps? I would take the most steps cause my steps are smaller.
- 3 b) How many more steps would that person take? 142 steps

Explain how you worked this out.

Show all working.

$$1000 \text{ m} = 100000 \text{ cm}$$

teacher's number of steps

$$100000 \text{ cm} \div 74 \text{ cm} = 1351.4 \text{ steps}$$

my number of steps

$$100000 \text{ cm} \div 67 \text{ cm} = 1492.5 \text{ steps}$$

how many more

$$\begin{array}{r} 1493 \\ -1351 \\ \hline 142 \text{ steps} \end{array}$$

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

A 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

2850

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 m

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 figured out how many steps he took by looking at home on the map (4750) and then divided it by 2 to get halfway (2375) and then found the point that was closest to 2375 steps

A 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.

The distance between corner of Danzig road and the eastern side of the bridge is 420m.

$$\begin{array}{r} 2150 \\ - 1450 \\ \hline 0700 \text{ steps} \end{array} \quad \begin{array}{r} 700 \\ \times 60 \\ \hline 42000 \text{ cm} \end{array}$$

The corner of church and view street is 690m.
(from the table)

$$\begin{array}{r} 420\text{m} \\ + 690\text{m} \\ \hline 1110\text{m} \end{array}$$

The distance Jack will walk on the new road is 1110m.

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

A Sample: Response 2

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

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

Working and explanations of predictions and strategies clearly demonstrate the thinking and reasoning used. 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 solves multi-step problems based on distances, steps and directions.

Communicating

Frequent use of units in answers. Most explanations, justifications and working are logical and well reasoned, but lack clarity.



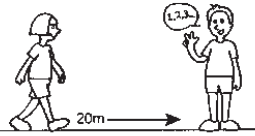
Overall grade

This response shows a very high level of understanding and application of the use of non-standard units of measure to estimate distances and solve multi-step problems. However, mathematical language is not used clearly and consistently. Considering the purpose of the task, on balance, this work is an overall A.

A 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
 <p>Hand span</p>	<p>My hand span is:</p> <p>.....16..... cm</p>
 <p>Shoe length</p>	<p>My shoe length is:</p> <p>.....21..... 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

$$20\text{ m} = 2000\text{ cm}$$

$$2000 \div 29 = 69\text{ cm}$$

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

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

A 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: blackboard

Non-standard unit	Number	Personal measurement (from page 4)
My hand span	<u>15</u> hand spans	<u>16</u> cm
My shoe length	<u>11</u> shoe lengths	<u>21</u> cm
My step length	<u>3</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 240 cm
- using my shoe length is 231 cm
- using my step length is 207 cm

A Sample: Response 2

2 c) Complete the statements below.

My estimates of the object may not be all the same because

my hand span, shoe length and step length
are all different lengths.

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

Shoe length
because your shoes do not get
bigger or smaller.

A Sample: Response 2

Write your teacher's step length here:72..... cm

Suppose you and your teacher walked 1000 metres together.

3 a) Who would take the most steps?Me.....

3 b) How many more steps would that person take?60 steps.....

Explain how you worked this out.

Show all working.

1000 divided by teachers stride length
equals 1389 steps

$$\begin{array}{r} 1389 \\ 72 \overline{)1000} \end{array}$$

1000 divided by my stride length
equals 1449 steps

$$\begin{array}{r} 1449 \\ 69 \overline{)1000} \end{array}$$

The number of steps more is the
biggest answer take away the smallest
which equals 60 steps

$$\begin{array}{r} 1449 \\ -1389 \\ \hline 0060 \end{array}$$

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

A 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? 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.

$$\begin{array}{r} 2375 \\ 2 \overline{)4750} \end{array}$$

A 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.

$$\begin{array}{r} \text{Bridge road} \\ 1950 \\ 1450 \\ \hline 500 \end{array}$$

$$\begin{array}{r} \text{Bridge} \\ 1950 \\ 1950 \\ \hline 200 \end{array}$$

$$\begin{array}{r} \text{Church Ave} \\ 3750 \\ 2600 \\ \hline 1150 \end{array}$$

STEPS !

$$\begin{array}{r} \text{Bridge road} - 500 \text{ steps} \\ \text{Bridge} - 200 \text{ steps} \\ \text{Church Ave} - 1150 \text{ steps} \end{array} \left. \begin{array}{l} \text{Add} \\ \text{them} \\ \text{up} \end{array} \right\} \begin{array}{r} 500 \\ 200 \\ 1150 \\ \hline 1850 \end{array}$$

$$\begin{array}{r} 1850 \\ \times 6 \\ \hline 1110 \text{ metres} \end{array}$$

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