

Reasoning and Problem Solving

Step 2: Equivalent Lengths – m and cm

National Curriculum Objectives:

Mathematics Year 3:(3M1a) [Compare lengths \(m/cm/mm\)](#)

Mathematics Year 3:(3M2a) [Measure lengths \(m/cm/mm\)](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Explain whether a given length is correct by converting from m to cm and vice versa. Lengths in multiples of 5cm.

Expected Explain whether a given length is correct by converting from m to cm and vice versa. Lengths in multiples of 1cm. Includes use of one half.

Greater Depth Explain whether a given length is correct by converting from m to cm and vice versa. Lengths in multiples of 1cm, including the use of 0 as a place holder. Includes use of one quarter and three quarters.

Questions 2, 5 and 8 (Reasoning)

Developing Compare two lengths by converting from m to cm and vice versa. Lengths in multiples of 5cm.

Expected Compare three lengths by converting from m to cm and vice versa. Lengths in multiples of 1cm. Includes use of one half.

Greater Depth Compare three lengths by converting from m to cm and vice versa. Lengths in multiples of 1cm, including the use of 0 as a place holder. Includes use of one half and three quarters.

Questions 3, 6 and 9 (Problem Solving)

Developing Using digit cards, find two possible ways to complete a given statement. Lengths in multiples of 5cm.

Expected Using digit cards, find three possible ways to complete a given statement. Lengths in multiples of 1cm.

Greater Depth Using digit cards, find three possible ways to complete a given statement. Lengths in multiples of 1cm, including the use of 0 as a place holder. Includes use of one quarter, one half and three quarters.

More [Year 3 Length and Perimeter](#) resources.

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Equivalent Lengths – m and cm

Equivalent Lengths – m and cm

1a. Joe's table is 1m and 60cm long. Is her tablecloth long enough to cover it?



Joe

My tablecloth is 145cm long.

Convince me.



R

1b. Maisie's garage is 495 cm long. Will her car fit in?



Maisie

My car is 4m and 50cm long.

Convince me.



R

2a. True or false? The crocodile's body is longer than the tiger's.

Not drawn to scale



3m and 85cm



420cm

Explain your answer.



R

2b. True or false? The elephant's body is shorter than the hyena's.

Not drawn to scale



160cm



4m and 70cm

Explain your answer.



R

3a. Tulisa has used three digit cards to make two pairs of equivalent lengths.



I have used three odd digits.

$$\square \text{ m } \square \text{ 5 cm } = \square \square \square \text{ cm}$$

$$\square \text{ m } \square \square \text{ cm } = \square \square \square \text{ 5 cm}$$

What could the digit cards' values be?



PS

3b. Gerald has used three digit cards to make two pairs of equivalent lengths.



I have used three even digits.

$$\square \text{ m } \square \square \text{ cm } = \square \square \square \text{ 0 cm}$$

$$\square \text{ m } \square \square \text{ 0 cm } = \square \square \square \text{ cm}$$

What could the digit cards' values be?



PS

Equivalent Lengths – m and cm

Equivalent Lengths – m and cm

4a. Tom's hallway is 3m and 42cm long. Does he have enough carpet to cover it?



My piece of carpet is $3\frac{1}{2}$ m long.

Convince me.



R

4b. Milly's window is 576cm long. Are her curtains long enough?



My curtains are $5\frac{1}{2}$ m long.

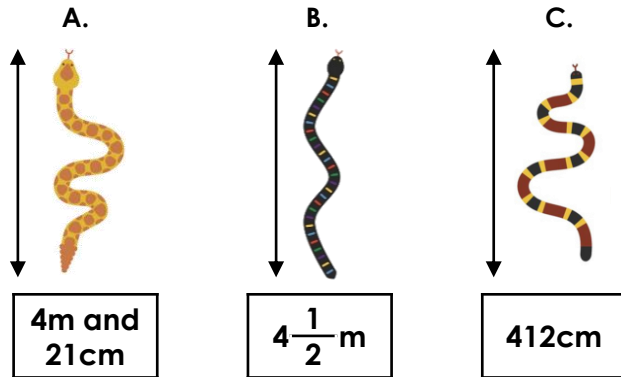
Convince me.



R

5a. True or false? Snake B is the longest.

Not drawn to scale



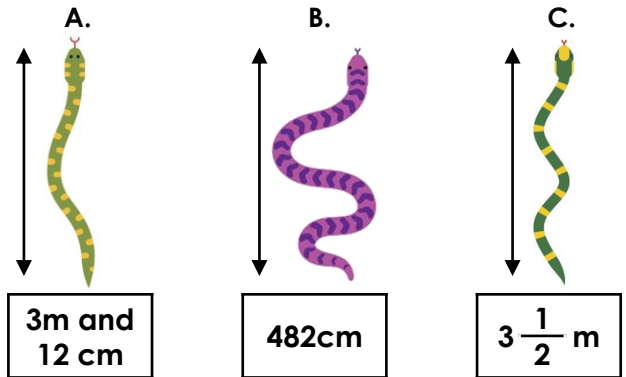
Explain your answer.



R

5b. True or false? Snake C is the shortest.

Not drawn to scale



Explain your answer.



R

6a. Felipe has used three digit cards to make three pairs of equivalent lengths.



When the digits are added together, the digit sum is 14.

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

What could the digit cards' values be?



PS

6b. Sheridan has used three digit cards to make three pairs of equivalent lengths.



When the digits are added together, the digit sum is 11.

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

$$\square \text{ m } \square \square \text{ cm} = \square \square \square \text{ cm}$$

What could the digit cards' values be?



PS

Equivalent Lengths – m and cm

Equivalent Lengths – m and cm

7a. Freddy's caravan is 4m and 4cm long. Will it fit on his drive?



Freddy

My drive is $4\frac{3}{4}$ m long.

Convince me.



R

7b. Grace runs 9m 14cm to the nearest bus stop. Is her statement correct?



Grace

The bus stop is $9\frac{1}{4}$ m away from my house.

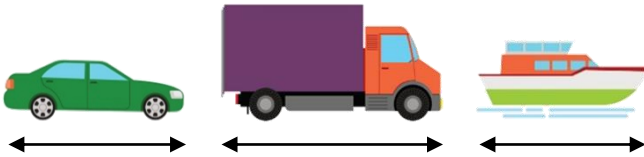
Convince me.



R

8a. True or false? The lorry is $2\frac{1}{4}$ m longer than the car.

Not drawn to scale



6m and 5cm

$8\frac{1}{2}$ m

905cm

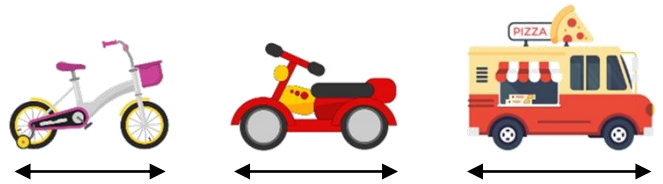
Explain your answer.



R

8b. True or false? The motorbike is 15cm longer than the bicycle.

Not drawn to scale



$1\frac{3}{4}$ m

190cm

7m and 1cm

Explain your answer.



R

9a. Stanley has used digit cards to make two pairs of equivalent lengths.



I used two even digit cards.

$$\begin{array}{ccc} \square & \square & \square \\ \hline \square & \square & \square \end{array} \text{ cm} = \begin{array}{c} \square \\ \hline \square \\ \hline 2 \end{array} \text{ m}$$

$$\begin{array}{c} \square \\ \hline \square \\ \hline 2 \end{array} \text{ m} = \begin{array}{ccc} \square & \square & \square \\ \hline \square & \square & \square \end{array} \text{ cm}$$

Which digit cards could he have used?



PS

9b. Gabriella has used digit cards to make two pairs of equivalent lengths.



I used five odd cards.

$$\begin{array}{ccc} \square & \square & \square \\ \hline \square & \square & \square \end{array} \text{ cm} = \begin{array}{c} \square \\ \hline \square \\ \hline 4 \end{array} \text{ m}$$

$$\begin{array}{c} \square \\ \hline \square \\ \hline 4 \end{array} \text{ m} = \begin{array}{ccc} \square & \square & \square \\ \hline \square & \square & \square \end{array} \text{ cm}$$

Which digit cards could she have used?



PS

Reasoning and Problem Solving Equivalent Lengths – m and cm

Developing

1a. No it is not long enough to cover the table because 1m and 60cm is equivalent to 160cm so the tablecloth is 15cm shorter than the table.

2a. True. The crocodile's body is 420cm which is equal to 4m and 20cm. 4m and 20cm is longer than 3m and 85cm.

3a. Various answers, for example: Tulisa could have used digit cards with the values 5, 7 and 9. 9m and 75cm = 975cm; 7m and 95cm = 795cm

Expected

4a. Yes he does because his hallway is 3m and 42cm long, which is equivalent to 342cm. His piece of carpet is $3\frac{1}{2}$ m long which is equivalent to 350cm so the carpet is 8cm longer.

5a. True because Snake B is $4\frac{1}{2}$ m long which is equivalent to 450cm. 450cm is longer than both 421cm (Snake A) and 412cm (Snake C).

6a. Various answers, for example: Felipe could have used digit cards with the values 1, 6 and 7. 7m and 16cm = 716cm; 6m and 71cm = 671cm and 7m and 61cm = 761cm

Greater Depth

7a. Freddy's drive is $4\frac{3}{4}$ m long which is equivalent to 475cm. Freddy's caravan is 4m and 4cm long which is equivalent to 404cm. 404cm is shorter than 475cm so Freddy's caravan will fit on his drive.

8a. False because the car's length is 6m and 5cm which is equivalent to 605cm and $2\frac{1}{4}$ m is equivalent to 225cm. 605cm + 225cm equals 830cm which is not equivalent to $8\frac{1}{2}$ m.

9a. Various answers, for example: 550cm = $5\frac{1}{2}$ m; $7\frac{1}{2}$ m = 750cm

Reasoning and Problem Solving Equivalent Lengths – m and cm

Developing

1b. Yes, the car will fit in the garage because 4m and 50cm is equivalent to 450cm which is 45cm less than 495cm.

2b. False. The elephant's body is 4m and 70cm which is equivalent to 470cm which is longer than the hyena's body which has a length of 160cm.

3b. Various answers, for example: Gerald could have used digit cards with the values 0, 4 and 8. 4m and 80cm = 480cm; 8m and 40cm = 840cm

Expected

4b. No they are not because the window is 576cm long which is equivalent to 5m and 76cm. The curtains are $5\frac{1}{2}$ m long which is equivalent to 550cm so the curtains are shorter than the window.

5b. False because Snake C is $3\frac{1}{2}$ m long which is equivalent to 350cm. 350cm is greater than 3m and 12cm so Snake A is the shortest.

6b. Various answers, for example: Sheridan could have used digit cards with the values 2, 4 and 5. 2m and 45cm = 245cm; 4m and 52cm = 452cm and 5m and 42cm = 542cm

Greater Depth

7b. No because $9\frac{1}{4}$ m is equivalent to 925cm so Grace must have run 9m and 25cm to get to the nearest bus stop. 9m and 25cm is longer than 9m and 14cm.

8b. True because the motorbike's length is 190cm and the bicycle's length is $1\frac{3}{4}$ m which is equivalent to 175cm. 190cm is 15cm longer than 175cm.

9b. Various answers, for example: 625cm = $6\frac{1}{4}$ m; $8\frac{3}{4}$ m = 875cm.