



MATHEMATICS



N.S. Yr. 5 P.11

Estimate and approximate numbers.

Equipment

Paper, pencil, ruler, calculator, real pennies, plastic pennies, real 2p pieces, paper clips, CD, lemonade bottle, stop watch.

MathSphere

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Concepts

Children should be familiar with numbers up to 1 000 and be able to estimate simple proportions of 1 000 and multiples of this number, both on a number line and in practical situations. They should be able to deal with simple negative numbers in the same context. They should also be able to say how they arrived at their estimate.

They should be able to say how accurate their estimates are.

Children should also be familiar with the meanings and spellings of these words:

guess, estimate, approximate, roughly, nearly, approximately, too many, too few, enough, not enough, round, nearest.

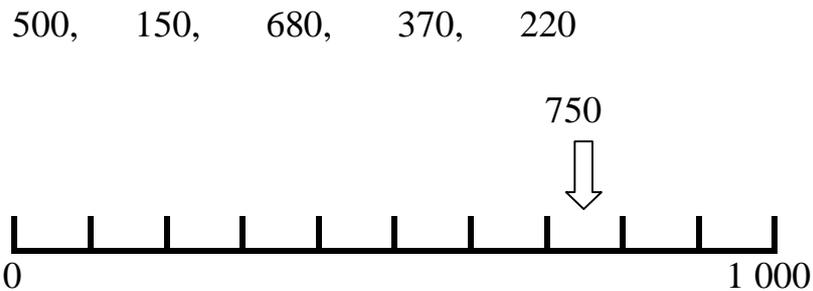
And the symbol for "approximately equal to" (\approx).

Accuracy

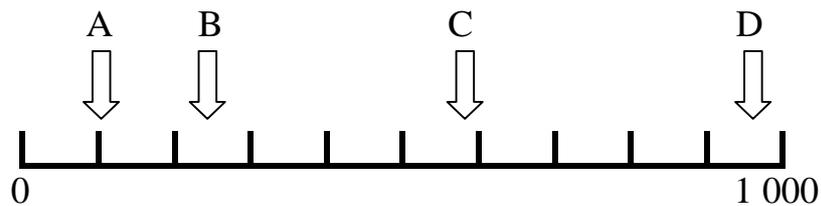
When asked in the following questions how accurate a result is, allow plenty of leeway as this is a very difficult quantity to estimate and a new one for many children. An estimate of an arrow pointing at 340 on a scale to 1 000 may have an error of about 30 either way, depending on the ability of the children. Understanding the ideas involved is more important at this stage than absolute accuracy.

With these questions be prepared to say how you got your answers.

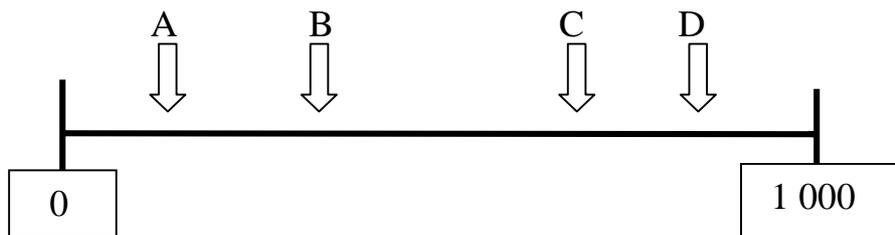
1. This line shows the numbers up to 1 000 divided into hundreds. Draw an arrow to show the following numbers approximately (the first has been done for you).



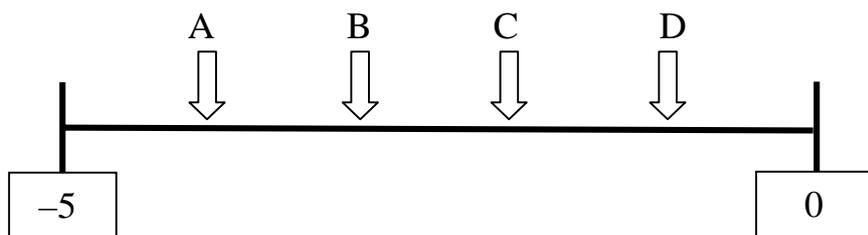
2. Where are the arrows approximately pointing to on this line?



3. Where are the arrows approximately pointing to on this line?



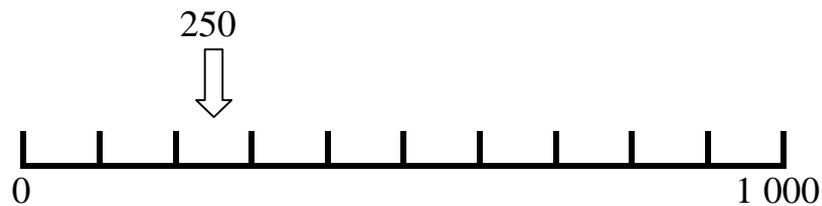
4. Where are the arrows approximately pointing to on this line?



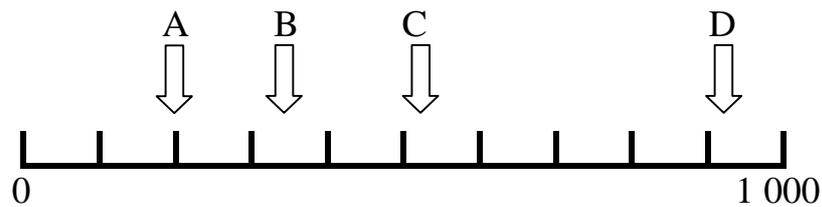
With these questions be prepared to say how you got your answers.

1. This line shows the numbers up to 1 000 divided into thousands.
Draw an arrow to show the following numbers (the first has been done for you).

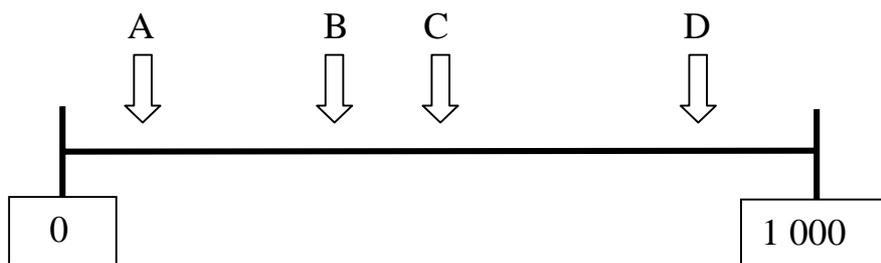
450, 850, 320, 590, 670



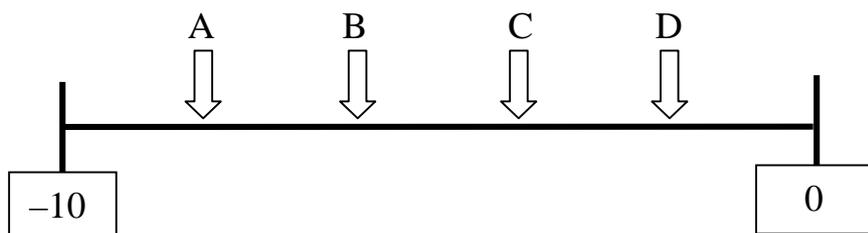
2. Where are the arrows approximately pointing to on this line?



3. Where are the arrows approximately pointing to on this line?



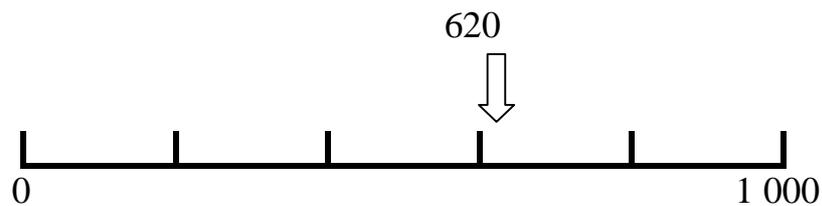
4. Where are the arrows approximately pointing to on this line?



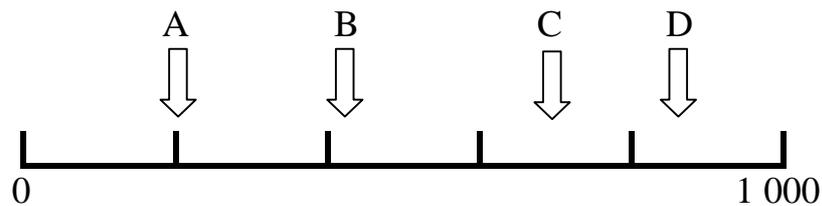
With these questions be prepared to say how you got your answers.

1. This line shows the numbers up to 1 000 divided into units of two thousand. Draw an arrow to show the following numbers approximately:

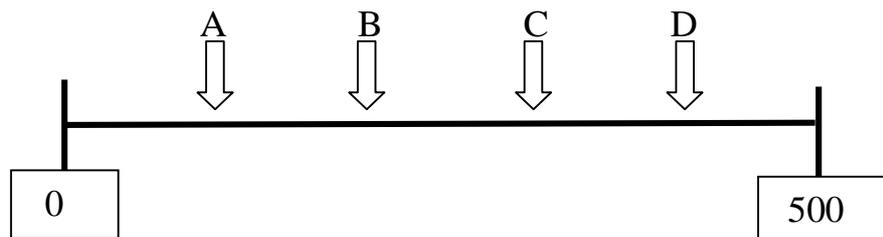
500, 250, 180, 440, 960



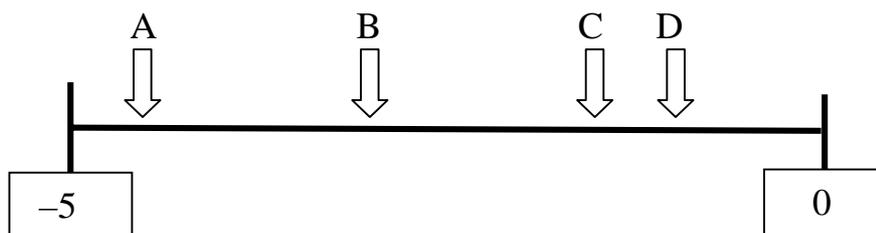
2. Where are the arrows approximately pointing to on this line?



3. Where are the arrows approximately pointing to on this line?



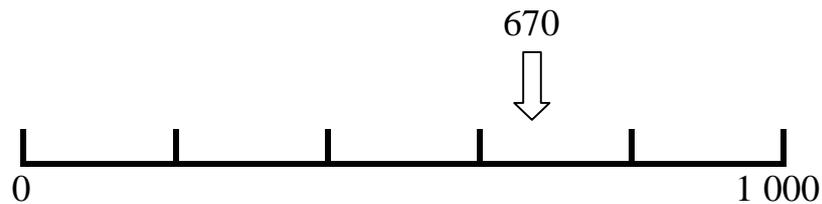
4. Where are the arrows approximately pointing to on this line?



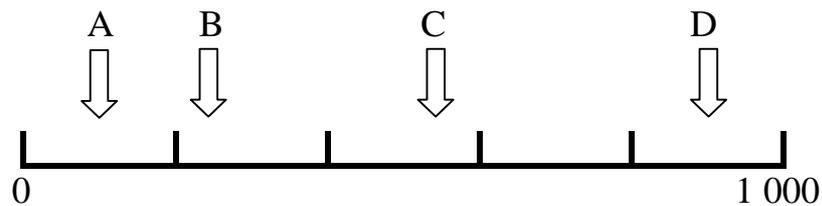
With these questions be prepared to say how you got your answers.

1. This line shows the numbers up to 1 000 divided into units of two thousand. Draw an arrow to show the following numbers approximately:

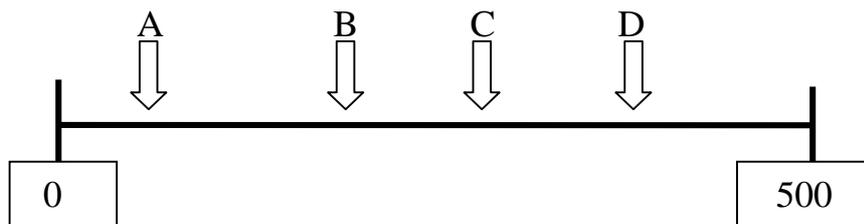
300, 350, 250, 830, 990



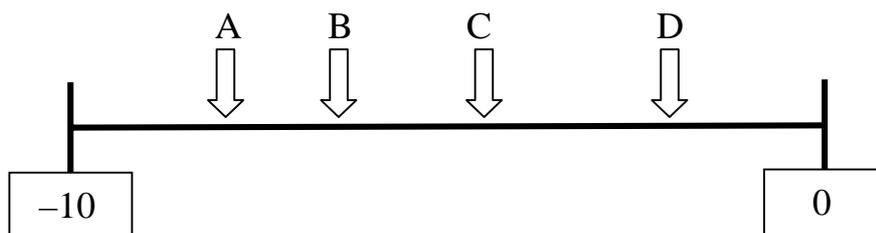
2. Where are the arrows approximately pointing to on this line?



3. Where are the arrows approximately pointing to on this line?



4. Where are the arrows approximately pointing to on this line?



1. Using a stop watch, find out how fast you can count up to 100.

Use this information to estimate how long it would take to count to 1 000.

How long would it take to count to 10 000 at the same rate? Could you actually do this in the time you have calculated?

2. How could you estimate the number of two penny coins that will make a metre long line?

Try it to see how many you would need.

How many would you need for a line 10m long?

How many would you need for a line 100m long?

3. What is the diameter of a CD?

How many CDs would you need to make a metre?

How many would you need to make 10m?

How many would you need to make 100m?

4. Count how many bricks there are in one row of a wall.

Estimate how many rows there are in the wall.

Estimate how many bricks there are in the wall.

5. How many slices of bread are there in a loaf?

How many slices does your class or family eat in a week?

How many slices would they eat in a year?

6. How many pencils would you need to weigh 100g ?

How many pencils would you need to weigh 1 Kg ?

1. Using a stop watch, find out how long it takes you to run 100 steps on the spot.

Use this information to estimate how long it would take to run 1 000 steps on the spot.

How long would it take to run 10 000 steps at the same rate? Could you actually do this in the time you have calculated?

2. How could you estimate the number of paper clips that will make a metre long line?

Place some end to end to see how many you would need.

How many would you need for a line 10m long?

How many would you need for a line 100m long?

3. What is the diameter of a bottle of lemonade?

How many bottles would you need to make a metre?

How many would you need to make 10m?

How many would you need to make 100m?

4. Count how many tiles there are in one row of a roof.

Estimate how many rows there are in the roof.

Estimate how many tiles there are in the roof.

5. How many books are there on one shelf in your library?

How many books would there be on a bookstand with several shelves?

How many books would there be altogether in your library?

6. How many sheets of A4 paper would you need to weigh 1 Kg ?

1. How many sheets of paper make a pile 1cm thick?

How many would make a pile 10cm thick?

How many would make a pile 1m thick?

How many would you need to reach the ceiling ?

2. Roughly how many **real** penny coins weigh 100g ?

How many would weigh 1 Kg?

How many would weigh 1 tonne? (Remember 1 tonne = 1 000 Kg)

3. A medieval archer could fire an arrow from a longbow every two seconds. How many could he fire in one minute?

How many could he fire in one hour if he does not need a rest?

4. See how long it takes you to write a piece of work with 100 letters (about 20 words).

How long would it take to write 10 000 letters (about 2 000 words) at the same rate?

5. A company makes 250 felt pens in one minute.

How many could it make in one hour?

How many could it make in an eight hour day?

How many could it make in one year if it is open 300 days in each year?

6. How long does it take you to say your two times table?

How long does it take you to say your nine times table?

How much faster is one than the other?

1. How many sheets of card make a pile 1cm thick?

How many would make a pile 10cm thick?

How many would make a pile 1m thick?

How many would you need to reach as high as a house ?

2. Roughly how many **plastic** penny coins weigh 100g ?

How many would weigh 1 Kg?

How many would weigh 1 tonne?

3. A passenger gets onto a plane every three seconds. How many get on in one minute?

How many could get on in 20 minutes?

4. Find your pulse and count the number of beats in one minute.

How many times does your heart beat in one hour?

How many times does it beat in 24 hours?

5. A company makes 480 badges in one minute.

How many could it make in one hour?

How many could it make in a nine hour day?

How many could it make in one year if it is open 280 days in each year?

6. How long does it take you to clean your teeth?

How long is this per tooth?

Answers

Page 3

2. A 100 B 240 C 580 D 960
 3. A 140 B 340 C 680 D 840
 4. A -4 B -3 C -2 D -1

Page 4

2. A 200 B 340 C 520 D 920
 3. A 100 B 360 C 500 D 840
 4. A -8 B -6 C -4 D -2

Page 5

2. A 200 B 420 C 700 D 860
 3. A 100 B 200 C 310 D 410
 4. A -4.5 B -3 C -1.5 D -1

Page 6

2. A 100 B 240 C 540 D 900
 3. A 60 B 190 C 280 D 380
 4. A -8 B -6.5 C -4.5 D -2

Page 7

Allow some leeway in these answers (your wall will be quite different to ours!)

1. Depends on child. 2. Approx. 40, 400, 4 000
 3. 12 cm approx. 8.3, 83, 830 4. Say 40, say 35, say 1 400
 5. Depends on loaf/family 6. Say 25, say 250.

Page 8

1. Depends on child. 2. Say 33, depending on size, 330, 3 300
 3. Say 9cm, 11, 110, 1 100 4. Say 50, say 30, say 1 500
 5. Depends on shelf/library etc. 6. Approx. 200 @ 80 gsm.

Page 9

1. Approx. 80, 800, 8 000, 20 000 2. Approx. 30, 300, 300 000
 3. 30, 1 800 4. Depends on child.
 5. 15 000, 120 000, 36 000 000. 6. Depends on child.

Page 10

1. Depends on card. 2. Say 100 depending on manufacturer,
 1 000, 1 000 000.
 3. 20, 400 4. Approx. 80, 4 800, 115 200
 (say 115 000)
 5. 28 800, 259 200, 72 576 000 6. Depends on child.