



Ratio, Proportion and Rates of Change

Age 11+ Level ★ Worksheet 1

1. Minutes in Between

How many minutes are there between 11:41 and 14:02?

2. Roman Distances

In ancient Rome they used the following units of length:

5 pedes = 1 passus,

125 passus = 1 stadium.

The atrium (courtyard) of Marcus' home was a square with each side 50 pedes long.

How many times did Marcus have to walk round his atrium to complete his daily exercise of 8 stadia?

Can you write your answer in Roman numerals?

3. Flying Down Under

Fred flew to Melbourne, Australia. The flying time to Melbourne, which is 11 hours ahead of Britain, was 21 hours. Fred's flight left London at 11.30am on Tuesday. What time was it in Melbourne when Fred's flight arrived?

4. Thunder and Lightning

Sound travels at about 330 metres per second; light travels so fast that it arrives almost instantaneously. If you time the gap between a flash of lightning and its clap of thunder as 6 seconds, roughly how far away is the storm?

5. Family Fortune

Three brothers and a sister shared a sum of money equally among themselves. If the brothers alone had shared the money, then they would have increased the amount they each received by £20. What was the original sum of money?

6. Flapjack

A recipe for eight flapjacks needs 2oz butter, 3oz sugar and 4oz rolled oats.

How many flapjacks can I make if I have 14oz butter, 15oz sugar and 16oz rolled oats?

These problems are adapted from UKMT (ukmt.org.uk) and SEAMC (seamc.asia) problems.



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Age 11+ Level ★ Worksheet 2

1. Turbo Tortoise

Harriet Hare and Turbo Tortoise want to cross the finish line together on their 12 mile woodland race. Turbo sets off at 8:15 am and trots at a constant speed of 4 mph. Given that Harriet runs at a constant speed of 8 mph, at what time should she set off?

2. A Classy Ratio

There are six more girls than boys in Miss Spelling's class of 24 pupils. What is the ratio of girls to boys in the class?

3. Printer Ink

A small ink cartridge has enough ink to print 600 pages. Three small ink cartridges can print as many pages as two medium cartridges.

Three medium cartridges can print as many pages as two large cartridges.

How many pages can be printed using a large cartridge?

4. Dean's Mountain

Dean runs up a mountain road at 8 km per hour. It takes him one hour to get to the top.

He runs down the same mountain at 12 km per hour. How long does it take him to run down the mountain?

5. Speed over a Bridge

A train that is 100 metres long is travelling at a constant speed. It takes 30 seconds to clear a bridge which is 400 metres long.

What speed is the train travelling at, in kilometres per hour?

6. Athletics Club

An athletics club has two types of member: junior and adult. The junior members are either boys or girls. There are 16 more adult members than there are junior members.

The ratio of girls to boys to adults is 3 : 4 : 9.

In total, how many members does the club have?

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Age 11+ Level ★ Worksheet 3

1. Race Time

Frank and Gabriel competed in a 200m race. Gabriel finished in half a minute and Frank finished in one hundredth of an hour. Who won the race and by how many seconds?

2. Three of a Kind

The time shown on a digital clock is 5:55.
How many minutes will pass before the clock next shows a time for which all the digits are the same?

3. 24 Hour Conundrum

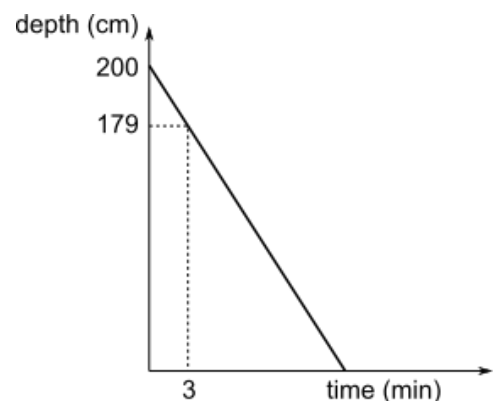
It is 225 minutes until midnight. What time is it on a 24-hour digital clock?

4. Draining a Pool

Water is draining from a pool.

The graph shows the depth of the water, in centimetres, against time, in minutes.

At what time will the depth of the water be 144 cm?



5. Eating Beans

The Bean family are very particular about beans. At every meal all Beans eat some beans. Pa Bean always eats more beans than Ma Bean but never eats more than half the beans. Ma Bean always eats the same number of beans as both children together and the two children always eat the same number of beans as each other.

At their last meal they ate 23 beans altogether. How many beans did Pa Bean eat?

6. Brothers and Sisters

A boy has the same number of sisters as brothers.

Each of his sisters has only half as many sisters as brothers.

How many brothers and sisters are in the family altogether?

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