

Ratio, Proportion and Rates of Change

Age 11+ Level ★ Worksheet 1 - Solutions

1. Minutes in Between

141 minutes

rich.maths.org/6196/solution

2. Roman Distances

Marcus had to walk round his atrium 25 times
(XXV in Roman numerals)

rich.maths.org/6236/solution

3. Flying Down Under

It was 7.30pm in Melbourne

rich.maths.org/5693/solution

4. Thunder and Lightning

6 x 330 metres is roughly 2000 metres

rich.maths.org/6248/solution

5. Family Fortune

The original sum was £240

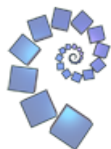
rich.maths.org/5013/solution

6. Flapjack

I can make 32 flapjacks

rich.maths.org/6202/solution

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



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Age 11+ Level ★ Worksheet 2 – Solutions

1. Turbo Tortoise

Harriet should she set off 90 minutes after Turbo, that is at 9.45am

nrich.maths.org/5694/solution

2. A Classy Ratio

The ratio of girls to boys is $15:9 = 5:3$

nrich.maths.org/11685/solution

3. Printer Ink

1350 pages

nrich.maths.org/11680/solution

4. Dean's Mountain

40 minutes to run down the mountain

nrich.maths.org/11630/solution

5. Speed over a Bridge

60 kilometres per hour

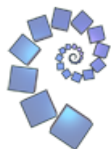
nrich.maths.org/12777/solution

6. Athletics Club

128 members

nrich.maths.org/11700/solution

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Age 11+ Level ★ Worksheet 3 - Solutions

1. Race Time

Gabriel won by 6 seconds

nrich.maths.org/6766/solution

2. Three of a Kind

In 316 minutes (5 hrs 16 min) all the digits will be the same (11:11)

nrich.maths.org/2533/solution

3. 24 Hour Conundrum

It is 20:15

nrich.maths.org/12572/solution

4. Draining a Pool

8 minutes

nrich.maths.org/13388/solution

5. Eating Beans

Pa Bean ate 11 beans

nrich.maths.org/5020/solution

6. Brothers and Sisters

There are 4 brothers and 3 sisters in the family

nrich.maths.org/12771/solution

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



Ratio, Proportion and Rates of Change

Age 11+ Level ★★ Worksheet 1 - Solutions

1. Don't Be Late

5 hours

rich.maths.org/6795/solution

2. Decimal Clock

2:50

rich.maths.org/3103/solution

3. Sharing Sweets

12 tails

rich.maths.org/11718/solution

4. Leg It

a) 20 metres

b) 25 metres

rich.maths.org/12889/solution

5. How Many Swimmers?

29 members

rich.maths.org/11725/solution

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Age 11+ Level ★★ Worksheet 2 – Solutions

1. Musical Maths

A year

nrich.maths.org/13136/solution

2. Ratio Swap

32 adults

nrich.maths.org/13137/solution

3. Out of Sync

$\frac{2}{3}$ of the day

nrich.maths.org/2512/solution

4. Fruit Basket Ratio

24 oranges.

nrich.maths.org/12573/solution

5. Stair Climb

Spike first

Boris second

Percival last

nrich.maths.org/4879/solution

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Age 11+ Level ★★ Worksheet 3 - Solutions

1. Tyre Wear

24000 km

rich.maths.org/6220/solution

2. Millennium Leap

242 leap years

rich.maths.org/2445/solution

3. Off the Cuff

Ratio of long-sleeve to short-sleeve shirts is 1:2

rich.maths.org/2450/solution

4. A Leg to Stand On

32 chairs

rich.maths.org/2458/solution

5. The Elephant Diet

$\frac{1}{3}$ kg of carrots

rich.maths.org/13693/solution

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Age 14+ Level ★★ Worksheet 1 - Solutions

1. Antifreeze

1 more litre of antifreeze is needed

rich.maths.org/5012/solution

2. Platinum Puzzle

C: a house

rich.maths.org/5682/solution

3. Hillwalking

Andrew walks 8 km

rich.maths.org/11661/solution

4. Travelator

Andrew is 300 m ahead of Bill

rich.maths.org/11710/solution

5. Travelling by Train

Stephen arrives in Durham at 09:38

rich.maths.org/11637/solution

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Age 14+ Level ★★ Worksheet 2 - Solutions

1. Crude Calculation

Petrol increased by 56.25%

rich.maths.org/12536/solution

2. Pond Runners

It takes James 288 seconds to complete one lap

rich.maths.org/12626/solution

3. Walking in the Mountains

They arrived at 2pm

rich.maths.org/6761/solution

4. Shepherd's Flock

The ratio of goats to sheep is $100:155 = 20:31$

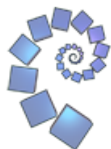
rich.maths.org/6790/solution

5. Overtake

Tim travelled at 66 mph

rich.maths.org/7167/solution

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Age 14+ Level ★★ Worksheet 3 - Solutions

1. Bike Shop

Average speed is 4.8 miles per hour

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2. Very Long Line

It would need to be 5000 metres = 5 km long

nrich.maths.org/11672/solution

3. Inches and Barleycorns

1 inch is the same length as 3 barleycorns

nrich.maths.org/12943/solution

4. Ratio Riddle

The ratio of $b : c = 9 : 8$

nrich.maths.org/4740/solution

5. Tyneside Average Speed

The van's average speed is $34\frac{2}{7}$ mph

nrich.maths.org/4744/solution

6. Dolly Dolphin

Her average speed is 7.5 m/s

nrich.maths.org/13160/solution

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Age 14+ Level ★★★ Worksheet 1 - Solutions

1. Televisual Technology

The ratio of widescreen width : traditional width is $\sqrt{3}:2$ or $\sqrt{12}:4$

nrich.maths.org/2453/solution

2. Late for Work

She should drive at 24 miles per hour

nrich.maths.org/12455/solution

3. Walk up the Escalator

It would take her 36 seconds to travel up the escalator

nrich.maths.org/12556/solution

4. Day Out

His average speed was 35 km/h.

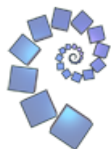
nrich.maths.org/12627/solution

5. Boys and Girls

In September there were 1300 students in the school

nrich.maths.org/12843/solution

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Age 14+ Level ★★★ Worksheet 2 – Solutions

1. Laps

The hare will first pass the tortoise on the hare's 13th lap

rich.maths.org/12870/solution

2. Petrol Stop

Roberto drove 1 hour and 10 minutes after his petrol stop

rich.maths.org/12934/solution

3. Candles

The ratio of the length of the longer candle to the shorter candle was 11:14

rich.maths.org/13225/solution

4. Flower Show

It will take six gardeners 9 hours

rich.maths.org/4739/solution

5. Marathon Mission

Her time decreased by 20%

rich.maths.org/2537/solution

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Age 14+ Level ★★★ Worksheet 3 - Solutions

1. Traffic Jam

Her average speed was reduced by 20%

nrich.maths.org/11679/solution

2. 100m Sprint

Carol was 37m behind

nrich.maths.org/12571/solution

3. Backwards Laps

It takes Sophie 40 seconds to complete each lap

nrich.maths.org/12890/solution

4. Fraction of Percentages

W is $\frac{3}{16}$ of Z

nrich.maths.org/13155/solution

5. Two Trains

The journey from Amityville to Brookville took 15 hours

The journey from Brookville to Amityville took 10 hours

nrich.maths.org/13776/solution

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