11+ & KS2 Maths

A Common Type Of Question Uses Divide And Multiply For Scaling

In basic arithmetic there are four different operations $+ - \times \div$. There is a type of question which turns up in various forms, all basically the same, which involve division and multiplication. I call this scaling.

It makes sense to learn to recognise this type of problem and how to solve it as there are often several questions of this type in an 11+ or KS2 maths tests. Part of the art of succeeding at tests and exams is to be able to answer as many questions as you can as quickly as possible, in order to

a) secure as many marks as possible as early as possible

> *A key point in answering questions in exams and tests is to answer the easy question first. You do not (usually) have to answer the questions in the order they are set.*

b) leave more time for harder questions

So if you know there is a type of question which may crop up more than once in various different forms it makes sense to learn how to recognise and solve these problems quickly.

Here is a simple example

> *If 2 ice creams cost £2.40 how much would 3 cost?*
>
> To solve this you have to first find out how much 1 ice cream costs
>
> Divide the £2.40 (the price of 2 ice creams) by 2
>
> So 1 ice cream costs £1.20
>
> Then multiply by £1.20 by 3 to get £3.60 for the price of 3 ice creams.

I usually start like this, doing the divide first and then the multiplication to stress why these steps are done, i.e. to find the price of one and once you know this you can multiply to find the price of any number.

If you really want to stress the steps it's as well to say these questions

- only involve $\div$ and $\times$
- never $+$ or $-$

Later you can explain for sums involving only times and division they can be worked out in any order, so each of the following all have the same value

$$\frac{£2.40 \times 3}{2} = \frac{(£2.40 \times 3)}{2} = \left(\frac{£2.40}{2}\right) \times 3 = £2.40 \times \left(\frac{3}{2}\right)$$

> The sums in brackets are worked out first.

and it make sense to choose the one that's easiest to work out. Here there's not much in it but if the numbers we had to multiply and divide by where larger, for example

If 22 ice creams cost £2.40 how much would 33 cost?

It makes sense to see the problem as

$$\frac{£2.40 \times 33}{22} = £2.40 \times \left(\frac{33}{22}\right) = £2.40 \times \left(\frac{3}{2}\right)$$

And then it's probably easiest to switch to

$$\left(\frac{£2.40}{2}\right) \times 3$$

In KS2 the numbers are usually easy, in 11+ the numbers can involve 3 decimal places.

There is a variation of this type of problem where you start with the price of 1, for example

Butter costs 1.56 a kilo how much would 1.6 kg cost?

There are 900 words in each chapter of a book. In 12 chapters how many words are there?

Sometimes children get confused as they don't have to do the divide.

In 11+ maths exam often starts with questions that just tell you to calculate something for example

Calculate 1.2×1.43

Later on the questions are usually asked in words which mean whoever is taking the test has to translate the words into a series of arithmetic calculations.

Here are some of different ways this type of scaling problem can come up, occasionally there are variations with also include $+$ and $-$.

Question 1

$\frac{1}{7}$ of a number is 9.

What is $\frac{1}{3}$?

Question 2

It takes 360g of sugar to make 3 cakes.

How much is needed for 5 cakes?

Question 3

On a map 2cm corresponds to 1km.

What distance on the map coresponds to 17km?

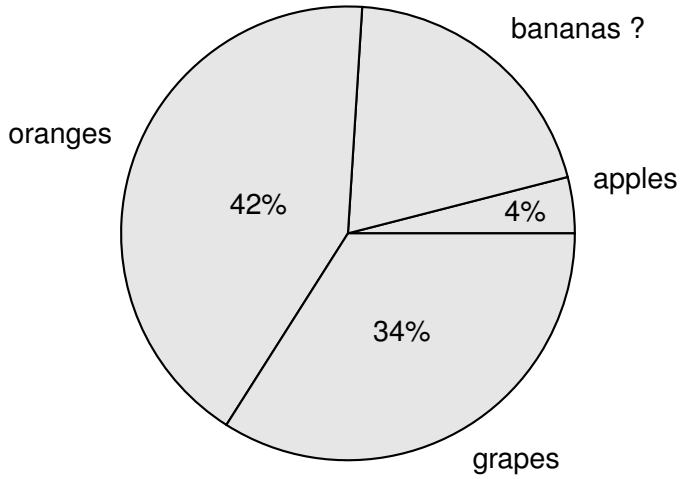
Question 4

A jar of sweets was made up like this

	Wrapped	Not Wrapped
Toffee	10	16
Chocolate	7	17

What percentage of sweets are wrapped?

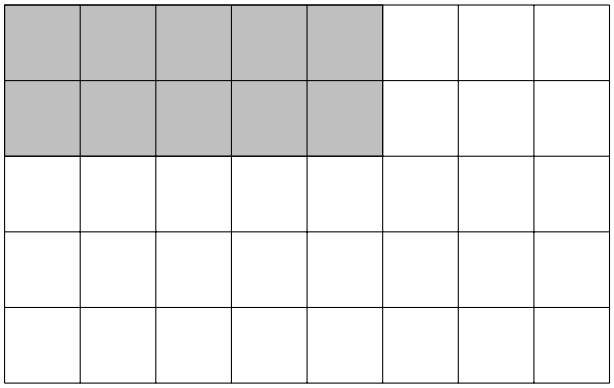
Question 5



The pie chart gives the percentages of different types of fruit in pupils lunch boxes at a school.

If there are 11 lunch boxes with apples how many lunch boxes have bananas?

Question 6



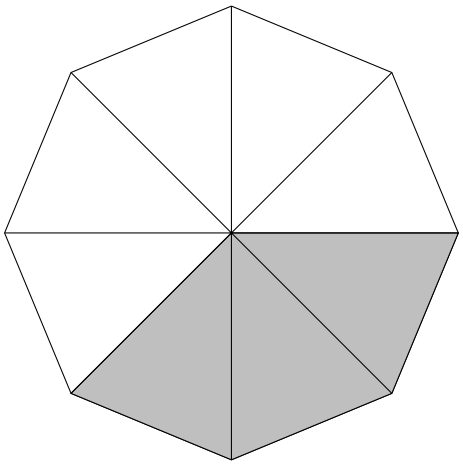
What fraction of the rectangle is shaded?

Question 7

$4x + 7 = 47$

$x =$?

Question 8



The shaded area of the octogon is $25mm^2$

What is the total area of the octogon?

Question 9

There are 201 pupils at a school fete.

$\frac{2}{3}$ of them buy a coconut.

How many pupils bought a coconut?

Question 10

Which of the following lines go through the point $(15, 5)$

A) $y = 3x$

B) $y = x$

C) $y = \frac{x}{5}$

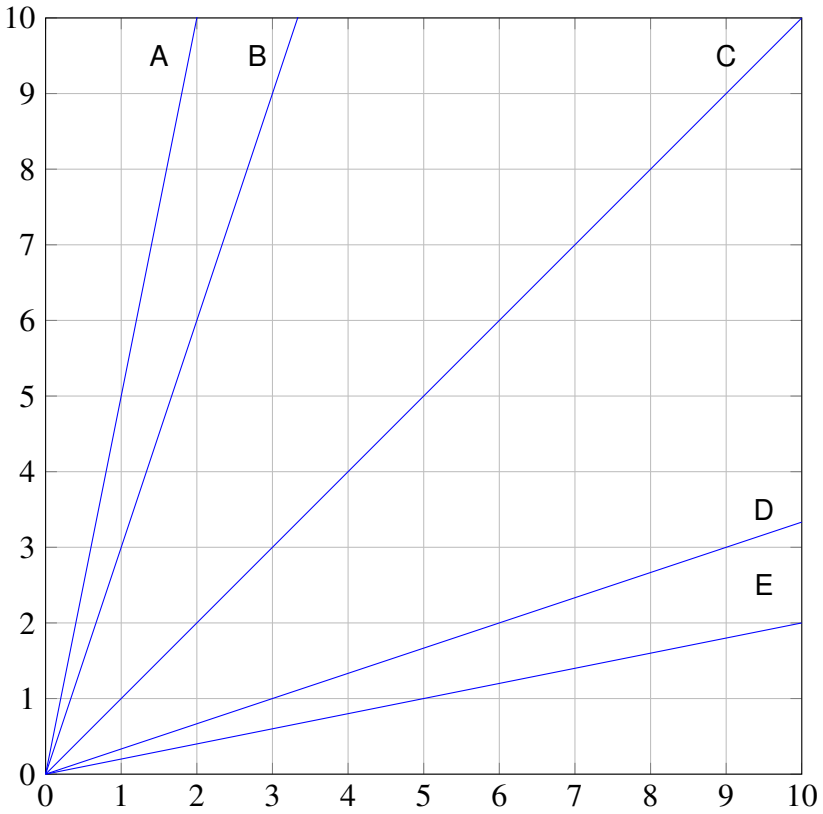
D) $y = 5x$

E) $y = \frac{x}{3}$

Question 11

3 kilograms of cheese cost £3.13 how much do 12 kilograms cost?

Question 12

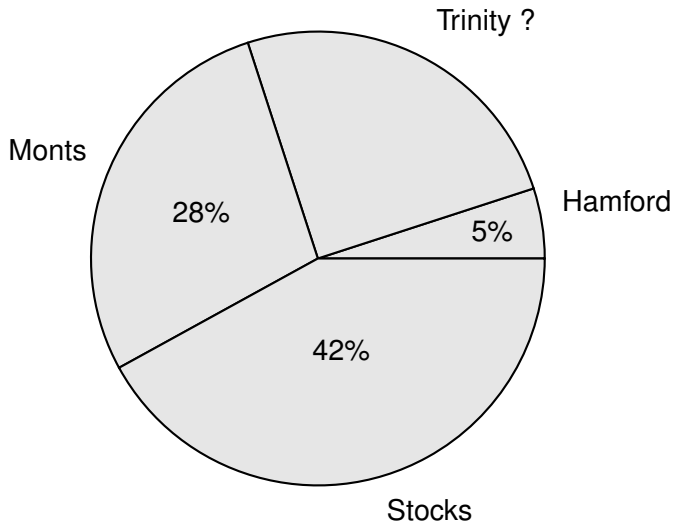


Which line goes through the point $(27, 9)$?

Question 13

Butter costs £1.47 a kilogram how much does 1.92 kilograms cost.

Question 14



The pie chart gives the percentages of prizes won at sports day by the four different teams in a school.

If there are Mamford won 3 prizes how many did Trinity win?

How many degrees does the piece of the pie chart that represents Trinty have?