KEY VOCABULARY

Fraction: Part of a whole eg. $\frac{3}{4}$ ← Numerator: How many parts we have. ← Denominator: How many equal parts the whole has been divided into.

Unit Fraction: Always has a numerator of 1 eg $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{17}$

Improper Fraction: Numerator is bigger than the denominator

eg $\frac{4}{3}$ $\frac{7}{5}$ $\frac{10}{3}$ $\frac{9}{2}$

Mixed Numbers: Has a whole number and a fraction part

eg $3\frac{1}{4}$ $7\frac{2}{3}$ $10\frac{14}{15}$

Equivalent Fractions: Fractions that use different numbers but have the same value. eg.

$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{30}{60} = \frac{17}{34} = \frac{85}{170} = \frac{5}{10}$

Simplest form: To get a fraction into its simplest form, divide the top and the bottom by any common factors. eg.

$\frac{90}{120} \overset{\div 10}{=} \frac{9}{12} \overset{\div 3}{=} \frac{3}{4}$ ← Simplest form

$\div 10$ and $\div 3$ are common factors

No common factors left

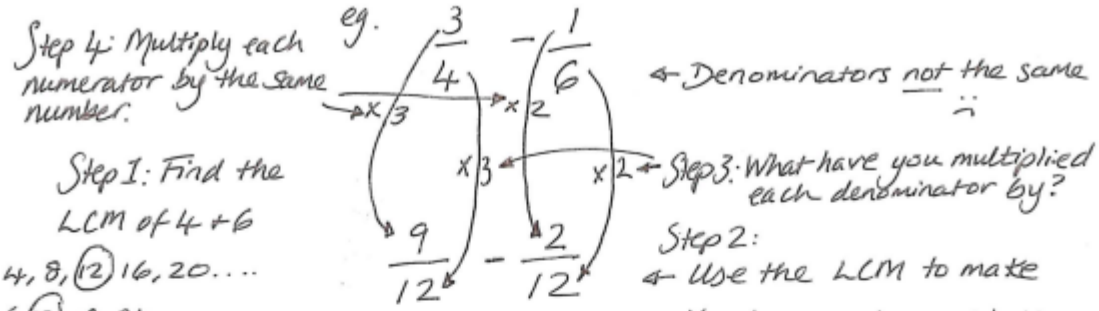
or

$\frac{90}{120} \overset{\div 30}{=} \frac{3}{4}$

$\div 30$

KEY SKILLS

Adding and Subtracting Fractions: Must have the same denominator



You can try a few:

Think of as 7/7

① $\frac{1}{9} + \frac{2}{3}$ ② $\frac{7}{10} - \frac{2}{5}$ ③ $\frac{5}{12} + \frac{1}{8}$ ④ $1 - \frac{2}{7}$

ANSWERS: ① $\frac{7}{9}$ ② $\frac{3}{10}$ ③ $\frac{13}{24}$

Finding a fraction of a quantity: Divide the quantity by the denominator and then multiply by the numerator.

eg $\frac{2}{3}$ of £45 → 45 ÷ 3 = 15 → 15 × 2 = £30

You can try a few

① $\frac{3}{4}$ of 24

② $\frac{7}{8}$ of 40

③ $\frac{2}{5}$ of 25

ANSWERS: ① 18 ② 35 ③ 10

Place value table: ← Gives the value of each digit in a number

Billions			Millions			Thousands											
B	HM	TM	M	HTh	TTh	Th	H	T	U	.	t	h	th	tth	hth	m
											$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10000}$	$\frac{1}{100000}$	$\frac{1}{1000000}$
									0	.	6	5				

↓

$\frac{65}{100}$

Converting decimals into fractions:

eg. $0.65 = \frac{65}{100} \overset{\div 5}{=} \frac{13}{20}$ ← Leave your final answer in its simplest form

You can try a few:

① 0.26

② 0.8

③ 0.02

④ 0.35

Converting fractions into decimals: Find an equivalent fraction with a denominator of 100.

Bonus skill

eg. $\frac{2}{5} \overset{\times 2}{=} \frac{4}{10} \overset{\times 10}{=} \frac{40}{100} = 0.40 = 0.4$ also 40%

$\frac{11}{25} \overset{\times 4}{=} \frac{44}{100} = 0.44$ and 44%

You can try a few:

① $\frac{3}{5}$

② $\frac{9}{20}$

③ $\frac{19}{50}$

① 0.6 ② 0.45 ③ 0.38 ④ $\frac{7}{20}$ ⑤ $\frac{4}{5}$ ⑥ $\frac{13}{50}$

Converting percentages into fractions: Start as a fraction over 100.

eg. $71\% = \frac{71}{100}$ and $32\% = \frac{32}{100} = \frac{16}{50} = \frac{8}{25}$ ← Leave as simplest form.

You can try a few:

① 17% ② 64%

answers ① $\frac{13}{100}$ ② $\frac{16}{25}$

Converting percentages to decimals: Divide by 100 ie two places down

eg $14\% = 14 \div 100 = 0.14$ and. $30\% = 30 \div 100 = 0.3$

You can try a few:

① 23% ② 70%

answers ① 0.23 ② 0.7

Converting decimals to percentages: Multiply by 100 ie two places up.

eg. $0.38 = 0.38 \times 100 = 38\%$ and $0.05 = 0.05 \times 100 = 5\%$

and $1.52 = 1.52 \times 100 = 152\%$ and $0.9 = 0.9 \times 100 = 90\%$

You can try a few:

① 0.47 ② 0.08

③ 2.08 ④ 0.1

answers ① 47% ② 8% ③ 208% ④ 10%

Using a multiplier ← decimal equivalent of the percentage. to work out percentages of amounts:

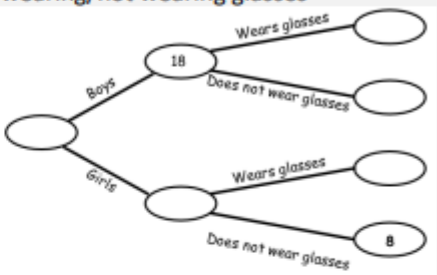
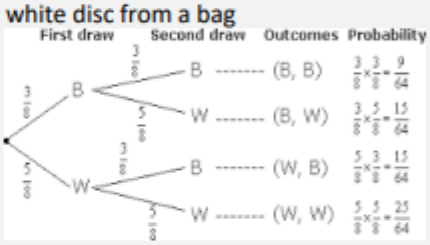
eg To find 85% of 140 → $0.85 \times 140 = 119$ ← On your calculator!

You can try a few:

① 46% of 750 ② 3% of 8400

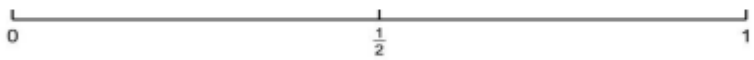
answers: ① 345 ② 252

Topic/Skill	Definition/Tips	Example
1. Probability 2.Probability scale	The **likelihood/chance** of something happening. A scale expressed as a number **between 0 (impossible) and 1 (certain)**. (0% - 100%) Can be expressed as a fraction, decimal, percentage or in words (likely, unlikely, even chance etc.).	
3. Event and outcome	Event is an activity Outcome is the actual result of that activity.	Throw a 2 on a dice is event 1, 2, 3, 4, 5 and 6 are outcomes
4. Fair / bias	Fair is **not giving priority** to one happening Bias is **favouring** one happening.	A biased dice would come up more often with certain numbers than others.
5. Equally likely	Equally likely outcomes have the **same** probability of happening.	
6. Mutually Exclusive	Events are mutually exclusive if they **cannot happen at the same time**. Outcomes are **exhaustive** if they **cover the entire range of possible outcomes.** Probabilities of an exhaustive set of **mutually exclusive** events **adds up to 1**. The **probability of something not happening** is **1 minus the probability that it does happen**.	Examples of mutually exclusive events: - Turning left and right - Heads and Tails on a coin Example of non mutually exclusive events: - King and Hearts from a deck of cards, because you can pick the King of Heart
7. Probability Notation	**P(A)** refers to the **probability that outcome of the event is A**.	P(Red Queen) refers to the probability of picking a Red Queen from a pack of cards.
8. Theoretical Probability	$\frac{Number\ of\ Favourable\ Outcomes}{Total\ Number\ of\ Possible\ Outcomes}$	Probability of rolling a 4 on a fair 6-sided dice is P(4) = $\frac{1}{6}$.
9. Trials	**Repeatedly** doing the same thing. The probability is **more accurate** if there are many repetitions.	Flipping a coin 50 times; more accurate if flipped 500 times
10.Experimental probability ≡ Relative Frequency	$\frac{Number\ of\ Successful\ Trials}{Total\ Number\ of\ Trials}$	A coin is flipped 50 times and lands on Tails 29 times. The relative frequency of getting Tails = $\frac{29}{50}$.
11. Expected Outcomes	To find the number of expected outcomes, **multiply** the **probability** by the **number of trials**.	The probability that a football team wins is 0.2 How many games would you expect them to win out of 40? $0.2 \times 40 = 8\ games$
12. Sample	A **sample** is a small selection of items from a population.	A sample could be selecting 10 students from a year group at school.
12. Sample Size	The larger a sample size, the closer those probabilities will be to the true probability	A sample size of 100 gives a more reliable result than a sample size of 10

13. Sample space	A diagram showing the **set of all possible outcomes** of an experiment, in a table	The outcomes from two mutually exclusive events are added + 1 2 3 4 5 6 1 2 3 4 5 6 7 2 3 4 5 6 7 8 3 4 5 6 7 8 9 4 5 6 7 8 9 10 5 6 7 8 9 10 11 6 7 8 9 10 11 12
14. Frequency Tree	A diagram showing how information is categorised into various categories, and all possible outcomes The **lines** connected the numbers are called **branches**. The **numbers** at the ends of branches tells us how often something happened (**frequency**).	Frequencies of boys/girls in sample wearing/not wearing glasses 
15. Probability tree diagram	A branched tree diagram showing **all outcomes** and **all probabilities**. The probabilities **along the branches** are **multiplied**, while the probabilities going **down** are **added** (give a total of 1)	Probabilities of picking a black disc or a white disc from a bag 

Try these …

1. There are **three 5p** coins and **three 10p** coins in a bag. Amelita takes at random a coin from the bag.



On the probability scale:

a) Mark with the letter X the probability that Amelita takes a 5p coin.

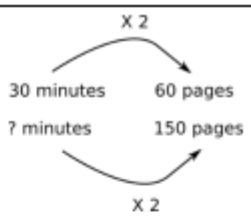
b) Mark with the letter Y the probability that Amelita takes a coin with a value of less than 5p.

2. There are 5 **red** counters, 3 **yellow** counters and 1 **blue** counter in a bag. Harry takes at random a counter from the bag. Find the probability that the counter is

a) red ..... **b)** not blue ..... **c)** red or blue ..... **d)** pink. .....

3. The probability that a spinner lands on blue is 0.4. Find the probability that it does not land on blue.

4. During the past 30 days Josh has missed his school bus on 4 of those days. Estimate the probability that Josh will miss his school bus tomorrow.

Topic/Skill	Definition/Tips	Example
1. Ratio	Ratio compares the size of **one part** to **another part**. Written using the ':' symbol.	3 : 1 
2. Proportion	Proportion compares the size of **one part** to the size of the **whole**. Usually written as a fraction.	In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$
3. Simplifying Ratios	**Divide** all parts of the ratio by a **common factor**.	5 : 10 = 1 : 2 (divide both by 5) 14 : 21 = 2 : 3 (divide both by 7)
4. Connection between ratio and percentages	**Add** both parts of the ratio to get **denominator**. Then multiply by 100 to get the **percentage**.	3 : 2 3/5 x100 =60% 2/5x100=40%
5. Sharing in a Ratio	**1. Add** the total parts of the ratio. **2. Divide** the amount to be shared by this value to find the value of one part. **3. Multiply** this value by each part of the ratio. Use only if you **know the total**.	Share £60 in the ratio 3 : 2 3 + 2 + = 5 60 ÷ 5 = 12 3 x 12 = 36, 2 x 12 = 24 £36 : £24
6. Proportional Reasoning	Comparing two things using **multiplicative reasoning** and applying this to a new situation. Identify one multiplicative link and use this to find missing quantities.	
7. Unitary Method	Finding the **value of a single unit** and then finding the necessary value by **multiplying** the single unit value.	3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes. 3 cakes = 450g So 1 cake = 150g (÷ by 3) So 5 cakes = 750 g (x by 5)
8. Ratio already shared	Find what **one part** of the ratio is worth using the **unitary method**.	Money was shared in the ratio 3:2:5 between Ann, Bob and Cat. Given that Bob had £16, found out the total amount of money shared. £16 = 2 parts So £8 = 1 part 3 + 2 + 5 = 10 parts, so 8 x 10 = £80
9. Best Buys	Find the **unit cost** by **dividing** the **price by the quantity**. The **lowest** number is the best value.	8 cakes for £1.28 → 16p each (÷by 8) 13 cakes for £2.05 → 15.8p each (÷by 13) Pack of 13 cakes is best value.

Try these....

1. The total cost of 6 identical pens is £3

   a) Work out the cost of 1 of these pens. b) Work out the cost of 5 of these pens.

2. Bill makes toy trains and cars. For every train he makes 3 cars.

   On Monday, he made 7 trains.

   a) How many cars did he make?

   On Tuesday, he made 27 cars.

   b) How many trains did he make?

3. Write each of these ratios in its simplest form.

   a) 4 : 12

   b) 24 : 32

4. Carlton takes 10 shots in practice for a basketball game. He scores on 6 of these shots.

   What proportion of his shots does he score?

   Give your answer as a percentage.

5. There are 27 children in Mrs Rahkit's class. 12 of the children are boys.

   Write the ratio number of boys : number of girls.

   Give your answer in its simplest form.

6. Ahmad makes compost by mixing 0.5 kg of sand with 2 kg of peat.

   a) Write the ratio of sand to peat. Give your answer in its simplest form.

   b) What percentage of the compost is sand?

7. Ginny makes orange drink by mixing 2 parts squash with 7 parts water. She has 400 ml of squash.

   How much orange drink can she make?

8. £240 is split into the ratio 5 : 3. What are the two amounts?