RATIOS AS LINEAR FUNCTIONS

Task 1

1) The ratio of blue to red counters is 2 : 3. What fraction of the counters are blue?

Total parts =
$$2 + 3 = 5$$

 $\frac{2}{5}$

2) The ratio of red to orange sweets is 3 : 7. What fraction of the sweets are orange?

Total parts =
$$3 + 7 = 10$$

 $\frac{7}{10}$

3) A paint mixes yellow and blue in the ratio 4 : 1. What fraction of the paint is yellow?

Total parts =
$$4 + 1 = 5$$

4 5

4) In a cinema the ratio of adults to children is 1:6. What fraction of the people are adults?

Total parts =
$$1 + 6 = 7$$

 $\frac{1}{7}$

5) The ratio of right-handed to left-handed pupils in a class is 7:2. What percentage of the pupils are left-handed? Give your answer to the nearest percentage.

Total parts =
$$7 + 2 = 9$$

$$\frac{2}{9} = 22\%$$

6) A bag has red, green and yellow counters in the ratio 9: 4:7. What percentage of the counters are green?

Total parts =
$$9 + 4 + 7 = 20$$

$$\frac{4}{20} = 20\%$$

7) At a school, pupils take Spanish, French and German in the ratio 5:9:4. What fraction of the pupils do not study Spanish?

Total parts =
$$5 + 9 + 4 = 18$$

 $\frac{13}{18}$

- 8) A bag contains red and blue counters. $\frac{3}{8}$ of the counters are red. Write the ratio of red to blue counters. 3:5
- A drink is made with 30% syrup, and the rest is sparkling water. Write the ratio of syrup to sparkling water in the drink. Give your answer in simplest form.

30:70 **3:7**

10) The ratio A: B is 2:5. What fraction of the ratio represents A?

Total parts =
$$2 + 5 = 7$$

 $\frac{2}{7}$

- 11) In a sale $\frac{2}{3}$ of the items in a store are marked down. Write the ratio of the items marked down, to the items that are full priced. 2:1
- 12) In a jewellery store, $\frac{4}{11}$ of the jewellery is silver and the rest of the jewellery is gold. Write the ratio of gold jewellery to silver jewellery. 7:4
- 13) At a concert the number of adults to children is in the ratio 5 : 2. The children are all either under 10 or over 10. The ratio of children under 10 to children over 10 is 3 : 4. What fraction of all the people at the concert are children under 10?

Fraction of children:

 $\frac{2}{7}$

Fraction of children under 10:

$$\frac{2}{7} \times \frac{3}{7} = \frac{6}{49}$$

14) On a coach the ratio of teachers to students is 1: 12. All the students study either science or history. The ratio of science students to history students is 5: 7. What fraction of all the people on the coach are history students? Give your answer in simplest form.

Fraction of students:
$$\frac{12}{13}$$

Fraction of history students:
$$\frac{12}{13} \times \frac{7}{12} = \frac{84}{156} = \frac{7}{13}$$

15) In a park the ratio of adults to children is 4:1. The children are all either playing football or playing basketball. The ratio of football players to basketball players is 2:3. What percentage of all the people in the park are basketball players?

Fraction of children:
$$\frac{1}{5}$$

Fraction of children that play basketball:
$$\frac{1}{5} \times \frac{3}{5} = \frac{3}{25} = 12\%$$

16) In a university the ratio of national to international students is 7:3.40% of the international students are studying engineering. What fraction of all the students in the university are international engineering students? Give your answer in simplest form.

$$\frac{3}{10}$$

Fraction of international engineering students:

$$\frac{3}{10} \times \frac{4}{10} = \frac{12}{100} = \frac{3}{25}$$

Task 2

17) Given that a: b = 2: 3 and b: c = 3: 4, write the ratio a: b: c.

$$a : b : c$$

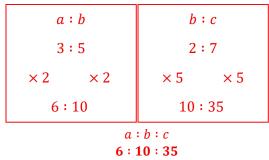
2 : **3** : **4**

18) Given that p: q = 6: 7 and q: r = 5: 9, write the ratio p: q: r.

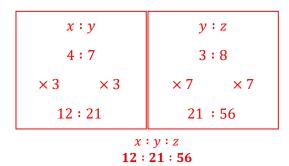
the ratio p. q. i.		
p:q	q:r	
6:7	5 : 9	
×5 ×5	×7 ×7	
30:35	35 : 63	

$$p:q:r$$
 30: **35**: **63**

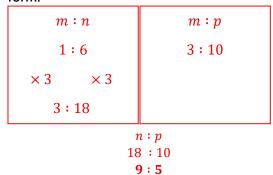
19) Given that a: b = 3:5 and b: c = 2:7, write the ratio a: b: c.



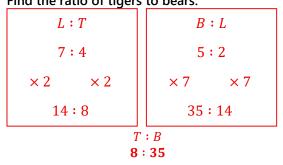
20) Given that x : y = 4 : 7 and y : z = 3 : 8, write the ratio x : y : z.



21) Given that m: n = 1: 6 and m: p = 3: 10, write the ratio n: p. Give your answer in simplest form.



22) The ratio of lions to tigers is 7 : 4.
The ratio of bears to lions is 5 : 2.
Find the ratio of tigers to bears.



23) Amir, Ben and Corey share £212. The ratio of Amir's share to Ben's share is 5 : 3. The ratio of Ben's share to Corey's share is 4 : 7. How much does Corey receive?

 A:B B:C

 5:3 4:7

 $\times 4$ $\times 3$ $\times 3$

 20:12 12:21

A: B: C20: 12: 21 20 + 12 + 21 = 53 £212 ÷ 53 = £4

Corey receives: $£4 \times 21 = £84$

24) Given that m: p = 2:9 and n: p = 5:6, write the ratio m: n: p.

the ratio iii . p.			
m:p		n:p	
2	: 9	5	: 6
× 2	× 2	× 3	× 3
4	: 18	15	: 18

m:n:p **4**: **15**: **18**

25) A survey is taken about vehicles in a car park. The results are expressed in the following ratios, as the numbers of:

Cars: Motorbikes = 5:3 Cars: Vans = 10:1

If there were 187 vehicles recorded, how many vans were recorded?

C : M	C:V
5:3	10:1
× 2 × 2	
10:6	
$C: M: V$ $10: 6: 1$ $10 + 6 + 1 = 17$ $187 \div 17 = 11$	

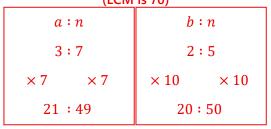
10:6:1 $\times 11 \qquad \times 11$

110:66:11

11 vans were recorded.

- Task 3
 - 26) In a fruit basket, there are apples, bananas and oranges. The ratio of apples to fruit that are not apples is 3:7. The ratio of bananas to fruit that are not bananas is 2:5. Work out the ratio of apples: bananas: oranges.

Make the total parts of the ratio the same (LCM is 70)



Number of oranges: 70 - 21 - 20 = 29

a:b:o **21**: **20**: **29**

27) A customer feedback survey was given. Each review was positive, neutral or negative. The ratio of positive reviews to not positive reviews was 3: 2. The ratio of negative reviews to not negative reviews was 2: 7. Given there were fewer than 100 surveys given, work out the highest number of respondents that gave a negative review.

Make the total parts of the ratio the same

(LCIVI IS 45)		
P:O	N:O	
3:2	2:7	
×9 ×9	×5 ×5	
27:18	10:35	

Number of neutral reviews:

$$45 - 27 - 10 = 8$$

P: NU: N 27:8:10 54:16:20 (90 parts) 20 respondents 28) The points A, B, C and D lie in order on a straight line, where

AB : BD = 4 : 7 and AC : CD = 5 : 3.

Work out the ratio AB: BC: CD.

Make the total parts of the ratio the same (LCM is 88)

(2611 13 00)		
AB:BD	AC : CD	
4:7	5:3	
×8 ×8	× 11 × 11	
32:56	55 : 33	

$$88 - AB - CD$$

 $88 - 32 - 33 = 23$

AB : BC : CD32:23:33

29) The points A, B, C and D lie in order on a straight line, where

AB : BD = 2 : 9 and AC : CD = 7 : 8.

Work out the ratio AB: BC: CD.

Make the total parts of the ratio the same

(LCM is 165)

AB	: <i>BD</i>	AC	: <i>CD</i>
2	: 9	7	: 8
× 15	× 15	× 11	× 11
30:	135	77	: 88

Length of BC:

$$165 - AB - CD$$

$$165 - 30 - 88 = 47$$

AB : BC : CD30:47:88

Task 4

30) Given that,

A: B = 7: 2 and C: D = 3: 8,

A + B = C + D

Work out the ratio A:B:C:D.

Make total parts of the ratio the same

(LCM is 99)

(20:0:15:55)	
A:B	C:D
7:2	3:8
× 11 × 11	×9 ×9
77 : 22	27 : 72

A:B:C:D77:22:27:72

31) A charity collects a bag of coins. The ratio of the number of 50p coins to the number of 20p coins is 3:2. The ratio of the number of 20p coins to the number of 10p coins is 5:4. If the total value of all the coins is £103.00, work out how many 50p coins there are.

Make the parts of the 20p coins the same:

50p : 20p	20p : 10p	
3:2	5 : 4	
×5 ×5	×2 ×2	
15:10	10:8	

50p : 20p : 10p15:10:8

Work out the values of the ratio:

$$50p coins \rightarrow 15 parts \rightarrow 15 \times 50p = 750p$$

20p coins
$$\rightarrow$$
 10 parts \rightarrow 10 \times 20p = 200p

10p coins
$$\rightarrow$$
 8 parts \rightarrow 8 \times 10p = 80p

7.50:2:0.8

Share £103 in the ratio:

$$7.5 + 2 + 0.8 = 10.3$$

 $103 \div 10.3 = 10$

Number of 50p coins:

 $15 \times 10 = 150$

There are 150, 50p coins.