-4. For every one person, there are two eyes.

a What is the ratio of people to eyes?

$1:2$

b Complete the table showing number of people and number of eyes:

Number of people	Number of eyes
1	2
2	4
3	6
10	20
4	8
50	100
100	200

-3. For every one chicken, there are two wings.

a What is the ratio of chickens to wings?

$1:2$

b Complete the table showing number of chickens and number of wings:

Number of chickens	Number of wings
1	2
2	4
3	6
8	16
5	10
12	24
7	14

-2.9 Aunt Agatha is mixing a bucket of lime cordial. For every one part of cordial, ten parts of water must be used.

a What is the ratio of cordial to water?
$1:10$

b What is the ratio of water to cordial?
$10:1$

c Complete the table showing amount of cordial and amount of water

Amount of cordial (ml)	Amount of water (ml)
1	10
2	20
3	30
10	100
20	200
50	500
100	1000

-2.8 Aunt Agatha wants to share some muffins between her two nephews. She wants the first nephew to receive twice as many muffins as the second nephew.

a In what ratio must aunt Agatha share the muffins?
$2:1$

b Complete the table showing how many muffins each nephew should receive:

Total number of muffins	Muffins for nephew 1	Muffins for nephew 2
3	2	1
6	4	2
9	6	3
12	8	4
15	10	5
18	12	6
21	14	7

-2. Share each number in the given ratio:

2,1:1	4,1:1	6,1:1	8,1:1
1, 1	2, 2	3, 3	4, 4
3,1:2	6,1:2	9,1:2	12,1:2
1, 2	2, 4	3, 6	4, 8
4,1:3	8,1:3	12,1:3	16,1:3
1, 3	2, 6	3, 9	4, 12
3,2:1	6,2:1	9,2:1	12,2:1
2, 1	4, 2	6, 3	8, 4
4,3:1	8,3:1	12,3:1	16,3:1
3, 1	6, 2	8, 3	12, 4
5,2:3	10,2:3	15,2:3	20,2:3
2, 3	4, 6	6, 9	8, 12
7,5:2	14,5:2	21,5:2	28,1:2
5, 2	10, 4	15, 6	20, 8
8,1:3	16,1:3	24,1:3	32,1:3
2, 6	4, 12	6, 18	8, 24
9,2:1	18,2:1	27,2:1	36,2:1
6, 3	12, 6	18, 9	8, 4

7,3:4	14,3:4	21,3:4	28,3:4
3, 4	6, 8	9, 12	12, 16

-1. Simplify the ratios

2:2	3:3	4:4	5:5
1:1	1:1	1:1	1:1
4:2	6:2	8:2	10:2
2:1	3:1	4:1	5:1
2:4	2:6	2:8	2:10
1:2	1:3	1:4	1:5
6:3	9:3	12:3	15:3
2:1	3:1	4:1	5:1
6:6	12:6	18:6	24:6
1:1	2:1	3:1	4:1
3:6	9:6	15:6	21:6
1:2	3:2	5:2	7:2
2:6	8:6	14:6	20:6
1:3	4:3	7:3	10:3
6:4	10:4	10:6	10:8
3:2	5:2	5:3	5:4
9:6	15:6	15:9	15:12
3:2	5:2	5:3	5:4
60:60	120:60	180:60	240:60
1:1	2:1	3:1	4:1
30:60	90:60	150:60	210:60
1:2	3:2	5:2	7:2
20:60	80:60	140:60	200:60
1:3	4:3	7:3	10:3

1 Complete the table showing the ratio of red counters to blue counters in a magician's bag--the first row has been completed for you!

Red Counters	Blue counters	Ratio in simplest form
1	1	1:1
1	2	1:2
1	3	1:3
1	4	1:4
2	1	2:1
2	2	1:1
2	3	2:3
2	4	1:2
3	1	3:1
3	2	3:2
3	3	1:1
3	4	3:4
4	1	4:1
4	2	2:1
4	3	4:3
4	4	1:1
36	6	6:1
1	6	1:6
1	6	1:6

2 Complete the table showing the ratio of prize bulls to farmers at some popular farming events. Note that the first row has been completed for you!

Event	Prize bulls	Farmers	Ratio in simplest form
Border Union Show	100	100	1:1
Royal Lancashire Show	100	200	1 : 2
Royal Cheshire County Show	100	300	1 : 3
Southern Agricultural Show	100	400	1 : 4
Cockermouth Show	200	100	2:1
Carnwath Show	200	200	1:1
Turriff Show	100	300	1:3
Tockwith Show	300	400	3:4
Herefordshire Country Fair	200	300	2:3
Cheshire Game & Angling Fair	400	600	2:3
Fermanagh County Show	300	300	1:1
North Devon Show	600	400	3:2
Cartmel Show	4000	2500	8:5
Black Isle Show	4000	2000	2:1
Burwarton Show	4000	7000	4:7
Honiton Show	4000	400	10:1
Dumfries Show	3000	1000	3 : 1
Taunton Flower Show	1000	200	5 : 1
Hinderwell Show	3333	6666	1 : 2

3 Complete the table showing the ratio of red socks to blue socks to green socks in a clown's bedroom. The first row has already been completed!

Red socks	Blue socks	Green socks	Ratio in simplest form
1	1	1	1:1:1
1	2	1	1:2:1
1	3	1	1:3:1
2	4	2	1:2:1
2	1	1	2:1:1
2	2	2	1:1:1
2	3	4	2:3:4
2	4	6	1:2:3
3	1	2	3:1:2
3	2	1	3:2:1
3	3	3	1:1:1
3	4	1	3:4:1
4	1	1	4:1:1
4	2	2	2:1:1
4	3	1	4:3:1
4	4	4	1:1:1
36	6	3	6:1:1
1	6	1	1:6:1
1	6	1	1:6:1

4 Complete the table with ratios in their simplest form. The table shows ratios of the numbers of cakes of each flavour entered at a recent baking competition. This problem may appear daunting so it must be approached with courage.

Carrot (C)	Banana (B)	Lemon (L)	C:B:L	C:B	C:L	B:L
1	1	1	1:1:1	1:1	1:1	1:1
1	2	2	1:2:2	1:2	1:2	1:1
1	3	1	1:3:1	1:3	1:1	3:1
2	4	2	1:2:1	1:2	1:1	2:1
2	1	1	2:1:1	2:1	2:1	1:1
2	2	2	1:1:1	1:1	1:1	1:1
2	3	4	2:3:4	2:3	1:2	3:4
2	4	6	1:2:3	1:2	1:3	2:3
2	2	4	1:1:2	1:1	1:2	1:2
3	2	2	3:2:2	3:2	3:2	1:1
2	3	2	2:3:2	2:3	1:1	3:2
3	4	3	3:4:3	3:4	1:1	4:3
4	1	2	4:1:2	4:1	2:1	1:2
4	2	2	2:1:1	2:1	2:1	1:1
4	4	4	1:1	1:1	1:1	1:1
4	6	33	4:6:33	2:3	4:33	2:11
10	6	1	10:6:1	5:3	10:1	6:1
1	68	100	1:68:100		1:100	17:25
36	6	216	6:1:36	6:1	1:6	1:36

4.01. On a farm, for every cow there are 2 pigs. Work out the number of pigs corresponding to each number of cows:

1 cow	2 cows	3 cows	4 cows
2 pigs	4 pigs	6 pigs	8 pigs
10 cows	100 cows	1000 cows	10,000 cows
20 pigs	200 pigs	2000 pigs	20,000 pigs

4.02. Cows and pigs are the only animals on the farm. Complete the table:

Number of cows	Number of pigs	Total number of animals
1	2	3
2	4	6
3	6	9
4	8	12
5	10	15
6	12	18
7	14	21
8	16	24
9	18	27
20	40	60
22	44	66
1	2	3
2	4	6
3	6	9
4	8	12

4.1 Another farm has chickens and sheep in the ratio 1:3. This means that for every chicken, there are 3 sheep. Work out the number of sheep corresponding to each number of chickens:

1 chicken	2 chickens	3 chickens	4 chickens
3 sheep	6 sheep	9 sheep	12 sheep
10 chickens	100 chickens	1000 chickens	10,000 chickens
30 sheep	300 sheep	3000 sheep	30,000 sheep

4.2. Sheep and chickens are the only animals on the farm. Complete the table:

Number of chickens	Number of sheep	Total number of animals
1	3	4
2	6	8
3	9	12
4	12	16
5	16	20
6	12	16
5	15	20
7	21	28
6	18	24
20	60	80
15	45	60
1	3	4
2	6	8
5	15	20
3	9	12

4.3 Another farm has antelope and hyenas in the ratio 2:3. Work out the number of hyenas corresponding to each number of antelope:

2 antelope	4 antelope	6 antelope	8 antelope
3 hyenas	6 hyenas	9 hyenas	12 hyenas
10 antelope	100 antelope	1000 antelope	10,000 antelope
15 hyenas	150 hyenas	1500 hyenas	15,000 hyenas

4.4. Antelope and hyenas are the only animals on the farm. Complete the table:

Number of antelope	Number of hyenas	Total number of animals
2	3	5
4	6	10
6	9	15
8	12	20
10	15	25
8	12	20
10	15	25
14	21	35
12	18	30
20	30	50
30	45	75
2	3	5
4	6	10
8	12	20
12	18	30

4.5 Complete the table showing how to share treats between a cat and a dog. The first row has already been completed!

Total number of treats	Ratio	Number of treats received by cat	Number of treats received by dog
2	1:1	1	1
3	2:1	2	1
3	1:2	1	2
4	1:1	2	2
4	1:3	1	3
4	3:1	3	1
5	$3:2$	3	2
5	$2:3$	2	3
5	$1:4$	1	4
5	$4:1$	4	1
6	1:1	3	3
7	4:3	4	3
7	5:2	5	2
8	7:1	7	1
8	5:3	5	3
8	3:1	6	2
8	1:3	2	6
8	1:1	4	4
12	1:2	4	8



4.55 Complete the table showing how to split profit between a manager and an employee:

Profit ($)	Ratio manager: employee	Payout received by manager ($)	Payout received by employee ($)
20,000	1:1	10,000	10,000
30,000	2:1	20,000	10,000
30,000	1:2	10,000	20,000
40,000	1:1	20,000	20,000
40,000	1:3	10,000	30,000
40,000	3:1	30,000	10,000
50,000	3:2	30,000	20,000
50,000	2:3	20,000	30,000
50,000	1:4	10,000	40,000
50,000	4:1	40,000	10,000
60,000	1:1	30,000	30,000
110,000	10:1	100,000	10,000
120,000	5:1	100,000	20,000
300,000	1:2	100,000	200,000
500,000	3:2	300,000	200,000
1,000,000	3:2	600,000	400,000
1,100,000	10:1	1,000,000	100,000
1,200,000	5:1	1,000,000	200,000
10,100,000	100:1	10,000,000	100,000

4.575. Complete the table showing the number of red and green counters in a bag:

Total number of counters	Ratio of red counters to green counters	Number of red counters	Number of green counters
100	1:1	50	50
2	1:1	1	1
3	2:1	2	1
5	2:3	2	3
10	2:3	4	6
50	2:3	20	30
100	2:3	40	60
5	1:4	1	4
10	1:4	2	8
50	1:4	10	40
100	1:4	20	80
6	2:1	4	2
9	2:1	6	3
12	2:1	8	4
15	2:1	10	5
18	2:1	12	6
180	2:1	120	60
7	3:4	3	4
14	3:4	6	8

4.5875. Complete the table showing the number of blue and yellow counters in a bag:

Total number of counters	Ratio of blue counters to yellow counters	Number of blue counters	Number of yellow counters
10	1:1	5	5
21	3:4	9	12
28	3:4	12	16
35	3:4	15	20
8	3:5	3	5
16	3:5	6	10
24	3:5	9	15
32	3:5	12	20
9	4:5	4	5
90	4:5	40	50
900	4:5	400	500
18	4:5	8	10
27	4:5	12	15
11	6:5	6	5
22	6:5	12	10
33	6:5	18	15
55	6:5	30	25
77	6:5	42	35
143	6:5	78	65

4.6 A farmer has 300 bales of hay and 2 fields of sheep. The first field has twice as many sheep as the second field. How many bales should be delivered to each field?

200 to first field and 100 to second field

4.65 A baker bakes 600 loaves of bread. They must be divided between 2 villages. The first village has twice as many inhabitants as the second. How many loaves should be delivered to each village?

400 to first village and 200 to second village

4.675 A warehouse must divide 12 pallets into 2 equal piles. How many pallets should go on each pile?

6

4.7 A different warehouse must divide 12 different pallets into 2 piles, but at this warehouse the first pile must have twice as many pallets on it as the second pile. How many pallets must each pile have at this warehouse?

8, 4

4.8 Yet another warehouse has yet another pallet-stacking policy. At this warehouse, 12 pallets must again be divided into 2 piles, but the first pile must have 3 times as many pallets on it as the second. How many pallets must go on each stack at this warehouse?

9, 3

4.9 Ian decides that he is bored of stacking pallets by hand and decides to apply for a job as a forklift driver. On the training course he learns that he must load lorries with white and brown loaves in the ratio 2:1. One lorry can carry 30,000 loaves at a time. How many white loaves and how many brown loaves must Ian load onto each lorry?

20,000 white and 10,000 brown

4.95 While loading bread, Ian notices that all of it is going to only 2 customers: “Bread Products” and “Bread Solutions”. He also notices that for every 2 lorries from Bread Products he loads 5 lorries from Bread Solutions. If Ian loads 70 lorries in a day, how many lorries does he load for each customer?

Bread Products: 20 Bread Solutions: 50

4.96 Bread Solutions goes out of business due to a high-profile corruption scandal and its lorries are split between two new companies, “Bread Basket” and “Bread Line”, in the ratio 2:3. If Ian still loads 70 lorries in a day, how many must he load for each of these new customers?

Bread Basket: 20 Bread Line: 30

5 Share each number in the given ratio:

12,1:1:1	15,1:1:1	18,1:1:1
4, 4, 4	5, 5, 5	6, 6, 6
12,1:1:2	16,1:1:2	20,1:1:2
3, 3, 6	4, 4, 8	5, 5, 10
15,1:2:2	20,1:2:2	25,1:2:2
3, 6, 6	4, 8, 8	5, 10, 10
12,1:2:3	18,1:2:3	24,1:2:3
2, 4, 6	3, 6, 9	4, 8, 12
14,2:2:3	21,2:2:3	28,2:2:3
4, 4, 6	6, 6, 9	8, 8, 12
120,1:1:1	150,1:1:1	180,1:1:1
40, 40, 40	50, 50, 50	60, 60, 60
120,1:1:2	160,1:1:2	200,1:1:2
30, 30, 60	40, 40, 80	50, 50, 100
150,1:2:2	200,1:2:2	250,1:2:2
30, 60, 60	40, 80, 80	50, 100, 100
120,1:2:3	180,1:2:3	240,1:2:3
20, 40, 60	30, 60, 90	40, 80, 120
140,2:2:3	210,2:2:3	280,2:2:3
40, 40, 60	60, 60, 90	80, 80, 120

6 A trio of bank robbers split their illicit gains in the ratio 3:2:1. Complete the table showing each robber's share:

Bank	Amount	Suspect A	Suspect B	Suspect C
HSBC	£600	£300	£200	£100
Barclays	£1200	£600	£400	£200
Co-op Bank	£60	£30	£20	£10
Post Office	£24	£12	£8	£4
Halifax	£450	£225	£150	£75
TSB	£900	£450	£300	£150
Lloyds	£300	£150	£100	£50
Santander	£1800	£900	£600	£300

7 After a police investigation, Suspects A, B and C are sentenced. The judge decides that a total of 18 years in prison must be divided between the suspects in proportion to each suspect's share of the loot. How long will each suspect spend in prison?

Suspect A: 9 years Suspect B: 6 years Suspect C: 3 years

8 A monarch distributes pennies to 3 beggars in a different ratio every day of the week. The number of pennies distributed also changes each day. Complete the table showing the number of pennies received by each beggar:

Day	Total number of pennies	Ratio	Beggar 1	Beggar 2	Beggar 3
Monday	13	3:5:7	3	5	7
Tuesday	240	3:1:4	90	30	120
Wednesday	1200	2:3:7	200	300	700
Thursday	300	3:3:4	90	90	120
Friday	500	3:5:12	75	125	300
Saturday	1000	3:5:12	150	250	600
Sunday	2000	8:5:7	800	500	700

9 Work out the value of B:

$A+B=2, A=1$

1

$A+B=3, A=1$

2

$A+B=4, A=1$

3

$A+B=2, A=2$

0

$A+B=3, A=2$

1

$A+B=4, A=2$

2

$A+B=12, A=1$

11

$A+B=13, A=1$

12

$A+B=14, A=1$

13

$A+B=12, A=2$

10

$A+B=13, A=2$

11

$A+B=14, A=2$

12

$A+B=12, A=11$

1

$A+B=13, A=11$

2

$A+B=14, A=11$

3

$A+B=12, A=12$

0

$A+B=13, A=12$

1

$A+B=14, A=12$

2

$B-A=1, A=1$

2

$B-A=2, A=1$

3

$B-A=3, A=1$

4

$B-A=1, A=2$

3

$B-A=2, A=2$

4

$B-A=3, A=3$

5

$A-B=1, A=1$

0

$A-B=2, A=1$

1

$A-B=3, A=1$

2

$A-B=1, A=2$

1

$A-B=2, A=3$

2

$A-B=3, A=4$

3

$A-B=2, A=2$

0

$A-B=3, A=3$

1

$A-B=4, A=4$

2

$A-B=0, A=2$

2

$A-B=0, A=3$

3

$A-B=0, A=4$

4

10 Complete the table--for the last 4 rows, you can choose the ratio $A:B$!

$A:B$	$A:A+B$	$A:A-B$
$2:1$	2:3	2:1
$3:1$	3:4	3:2
$4:1$	4:5	4:3
$5:1$	5:6	5:4
$3:2$	3:5	3:1
$5:2$	5:7	5:3
$7:2$	7:9	7:5
$4:3$	4:7	4:1
$5:3$	5:8	5:2
$7:3$	7:10	7:4
$5:4$	5:9	5:1
$7:4$	7:11	7:3
$6:5$	6:11	6:1
$7:5$	7:12	7:2
$7:6$	7:13	7:1

11 Complete the table:

A	B	$A+B$	$A-B$	$A:B$	$A:A+B$	$A:A-B$
1	1	2	0	$1:1$	$1:2$	$1:0$
2	1	3	1	$2:1$	$2:3$	$2:1$
3	1	4	2	$3:1$	$3:4$	$3:2$
6	2	8	4	$3:1$	$3:4$	$3:2$
3	2	5	1	3:2	$3:5$	$3:1$
4	1	5	3	4:1	4:5	4:3
4	2	6	2	2:1	2:3	2:1
4	3	7	1	4:3	4:7	4:1
5	1	6	4	$5:1$	5:6	5:4
5	2	7	3	$5:2$	5:7	5:3
5	3	8	2	$5:3$	5:8	5:2
5	4	9	1	$5:4$	5:9	5:1
5	5	10	0	$1:1$	1:2	1:0
1	1	2	0	1:1	$1:2$	1:0
1	2	3	-1	1:2	$1:3$	1:-1
2	1	3	1	2:1	2:3	$2:1$
3	2	5	1	3:2	3:5	$3:1$
4	3	7	1	4:3	4:7	$4:1$
5	4	9	1	5:4	5:9	$5:1$

12 Work out the value of B:

$A:B=1:1, A=1$

1

$A:B=1:1, A=2$

2

$A:B=1:1, A=3$

3

$A:B=1:2, A=1$

2

$A:B=1:2, A=2$

4

$A:B=1:2, A=3$

6

$A:B=1:1, A+B=2$

1

$A:B=1:1, A+B=4$

2

$A:B=1:1, A+B=6$

3

$A:B=1:2, A+B=3$

2

$A:B=1:2, A+B=6$

4

$A:B=1:2, A+B=9$

6

$A:B=1:3, A+B=4$

3

$A:B=1:3, A+B=8$

6

$A:B=1:3, A+B=12$

9

$A:B=1:2, B-A=1$

2

$A:B=1:2, B-A=2$

4

$A:B=1:2, B-A=3$

6

$A:B=1:3, B-A=2$

3

$A:B=1:3, B-A=4$

6

$A:B=1:3, B-A=6$

9

$A:B=2:3, B-A=1$

3

$A:B=2:3, B-A=2$

6

$A:B=2:3, B-A=3$

9

13 A state school has a student-to-teacher ratio of $15:1$. A private school has a student-to-teacher ratio of $10:1$.Work out how many more teachers the private school has compared to the state school if both have 900 students.

30

14 A motorbike fuel tank must be filled with 1 part oil to 10 parts petrol. If the total capacity of the tank is 11 litres, how much of each ingredient must be used to fill it?

1 litre oil
10 litres petrol

15 A second motorbike must be filled with 1 part oil to 100 parts petrol. If both bikes are filled with 10 litres of petrol, how much less oil does the second bike need?

0.9 litres