05 - Ratio and Proportion - Question Pack

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This question pack is part of a series of Numerical Reasoning Test (NRT) preparation resources which you can find at www.numericalreasoningtestsuccess.com.

These resources are organised into a number of different topics. For each topic, there is a set of notes and a question pack (such as this one).

Each set of notes explains a set of skills, with example questions for each one. Within the question pack for the same topic, you can find practice questions (with answers) for each of these skills.

I advise that you work through the sets of notes in order. Within each set of notes, start by reading the explanation of the first skill. Then go to that skill in the question pack and complete the practice questions. Only once you have mastered a skill should you move onto the next one. And only once you have mastered all the skills in a set of notes should you move on to the next set of notes. This approach is called *mastery learning*.

If you find any errors in this document (including mathematical errors, typos or any other mistakes), please let me know at contact@numericalreasoningtestsuccess.com.

Questions

You may use a calculator.

The answers can be found at the end of this document.

Given the ratio of two values, express it in its simplest form.

1) Express the ratio 96:90 in its simplest form.
2) Express the ratio 165:117 in its simplest form.
3) Express the ratio 35:147 in its simplest form.
4) Express the ratio 1.5:6 in its simplest form.
5) Express the ratio 270:204 in its simplest form.

Given the ratio of three or more values, express it in its simplest form.

1) Express the ratio 90:18:108 in its simplest form.

2) Express the ratio 300:560:260:100 in its simplest form.

3) Express the ratio 70:105:350 in its simplest form.

4) Express the ratio 276:308:140 in its simplest form.

5) Express the ratio 72:108:63:135 in its simplest form.

Given information about the quantities of different items, express this as a ratio in its simplest form.

Give all answers in their simplest form.

1) A family has a monthly income of £2538 and monthly outgoings of £2052. What is the family's ratio of income to outgoings?

2) A vending machine contains 195 drinks and 198 snacks. What is the ratio of drinks to snacks in the vending machine?

3) A petting zoo has 30 goats, 12 alpacas and 18 rabbits. What is the ratio of goats to alpacas to rabbits?

4) On Jenny's bookshelf there are 56 magazines and 312 books. What is the ratio of magazines to books on Jenny's bookshelf?

5) A school has 272 students and 32 teachers. What is the ratio of students to teachers at the school?

Given how many times larger or smaller one value is than another, work out the ratio of the two values in its simplest form.

Give all answers in their simplest form.

1) Alex is 3 times younger than Beth. What is the ratio of Alex's age to Beth's age?

2) In Simon's stationery cupboard, there are 7 times as many pens as staplers. What is the ratio of pens to staplers in Simon's stationery cupboard?

3) The distances on a paper map are 500 times less than the actual distances they represent. What is the ratio of the distances on the map to the actual distances?

4) In Mark's house, there are 8 times fewer sofas than chairs. What is the ratio of sofas to chairs in Mark's house?

5) In a village, there are 25 times as many houses as shops. What is the ratio of houses to shops in the village?

In a situation with three or more values, given information about how many times larger or smaller different values are than each other, work out the ratio of all the values in its simplest form.

Give all answers in their simplest form.

1) A company spends half as much on wages as it does on raw materials. The amount the company spends on stationery is three times less than the amount it spends on wages. What is the company's ratio of spending on wages to spending on raw materials to spending on stationery?

2) In Linda's stamp collection, there are five times as many British stamps as French stamps, and there are twice as many French stamps as Dutch stamps. What is the ratio of British to French to Dutch stamps in Linda's collection?

3) Alan's salary is six times Beth's and eight times Charles'. What is the ratio of Alan's salary to Beth's to Charles'?

4) On a lake, there are three times as many geese as swans, four times as many swans as herons, and five times fewer swans than ducks. What is the ratio of geese to swans to herons to ducks on the lake?

5) In a cupboard, there are two and a half times as many coats as hats and three times fewer scarves than coats. What is the ratio of coats to hats to scarves in the cupboard?

Given the ratio of A to B, state the ratio of B to A.

1) In a biscuit tin, the ratio of digestive biscuits to rich tea biscuits is 7:5. What is the ratio of rich tea biscuits to digestive biscuits?

Given the ratio between two or more values, and given one of the values, calculate the other value(s).

1) The ratio of chickens to humans on Earth is 13:4. If there are 7,900,000,000 humans on Earth, how many chickens are there?

2) In a restaurant, the ratio of kitchen staff to bar staff to waiting staff is 3:1:4. If there are 6 kitchen staff, how many bar staff and waiting staff are there?

3) On an estate, the ratio of houses to flats to maisonettes is 4:7:3. If there are 165 maisonettes, how many houses and flats are there?

4) The ratio of cars to lorries to vans to bicycles that go over a bridge on average per day is 28:2:5:10. If 455 vans go over the bridge on average per day, how many cars go over the bridge on average per day?

5) The ratio of carrots to leeks to potatoes in a stew is 4:1:2. If there are 6 potatoes in the stew, how many carrots are there?

Given the ratio between two or more values, and given one of the values, calculate the total of all of the values.

1) Last year, the ratio of a company's sales in the North West to the North East to the South East to the South West was 15:17:14:10. If the value of the sales in the North East was £3,602,592, what was the total value of all the sales across all four regions?

2) In a skatepark, everybody is either skateboarding, rollerblading or BMXing. The ratio of skateboarders to rollerbladers to BMXers is 7:3:5. If there are 35 skateboarders, how many people are in the skatepark?

3) In a school, students can choose to study French, German or Mandarin. The ratio of the numbers of students studying French to German to Mandarin is 15:11:4. If 297 students are studying German, how many students are there in total?

4) A group of friends all decided to play *Pokémon Red* (they each played a separate game on a separate device). Near the beginning of the game, each player had to choose a starter Pokémon: Charmander, Bulbasaur or Squirtle. The ratio of players who chose Charmander to Bulbasaur to Squirtle was 7:1:3. If 14 of the friends chose Charmander, how many friends were there in total?

5) The ratio of salaried employees to freelancers who work for a company is 4:7. If 224 freelancers work for the company, how many people work for the company in total (assuming that everyone who works for the company is either a salaried employee or freelancer)?

Given the ratio between two or more values, and given the total of all of the values, calculate any given value.

1) A computer shop sells three types of computer: desktop, notebook and ultrabook. Last year, the ratio of desktops to notebooks to ultrabooks sold by the shop was 12:65:34. If the shop sold 888 computers last year, how many of them were notebooks?

2) A woodland contains four types of trees: oak, ash, birch and lime, in a ratio of 8:15:6:7. If there are 324 trees in the woodland, how many of them are oak trees?

3) A DJ has only funk, soul and disco records, in a ratio of 14:15:20. If she has 294 records in total, how many of them are disco records?

4) A group of schoolchildren going on a field trip were given a choice of salt and vinegar, cheese and onion, or ready salted crisps in their packed lunch. The ratio of children who chose salt and vinegar to cheese and onion to ready salted was 7:5:2. If there were 70 children on the trip, how many chose ready salted crisps?

5) At a baby group, the ratio of adults to children is 4:3. If there are 21 people there in total, how many of them are adults?

Given the ratio between two or more items, calculate the fraction that a given item is of the total.

1) The ratio of standing tickets to seated tickets available for a concert is 5:3. What fraction of the tickets are seated tickets?

2) A swimming pool has three types of lanes: fast lanes, medium lanes and slow lanes, in a ratio of 3:5:2. What fraction of the lanes are medium lanes?

3) On a train, the ratio of first class to standard class passengers is 3:17. What fraction of the passengers are travelling standard class?

4) A band is made up of drummers, guitarists, bass guitarists, keyboardists and singers in a ratio of 2:3:1:2:4 (each person has only one role). What fraction of the band members are singers?

5) Last year, an art dealer sold three types of art: paintings, prints and sculptures in a ratio of 6:13:3. What fraction of the pieces of art sold by the dealer were paintings?

In a situation where there are two values, given the fraction or percentage that one value is of the total, find the ratio between the two values, expressed in its simplest form.

1) 65% of the passengers on a flight paid extra for baggage. What is the ratio of passengers who paid extra for baggage to passengers who didn't?

2) $\frac{14}{29}$ of a driving instructor's students pass their driving test on their first attempt. What is the ratio of the driving instructor's students who pass on their first attempt to those who do not?

3) 95% of tea drinkers have milk in their tea. What is the ratio of tea drinkers who have milk in their tea to tea drinkers who do not?

4) 62.5% of the houses in a town are at risk of flooding. What is the ratio of houses that are at risk of flooding to houses that are not at risk of flooding in the town?

5) $\frac{28}{37}$ of the members of a book club are aged 30 or over. What is the ratio of book club members aged 30 or over to book club members aged under 30?

Given the fraction or percentage that one value is of another, find the ratio between the two values.

Give all answers in their simplest form.

1) Ash's salary is 76% of Jordan's. What is the ratio of Ash's salary to Jordan's?

2) A plant shop sells $\frac{1}{2}$ as many outdoor plants as houseplants. What is the ratio of outdoor plants to houseplants sold by the shop?

3) Liverpool's population is 89.8% of Manchester's. What is the ratio of Liverpool's population to Manchester's population?

4) Albert's door number is $\frac{5}{6}$ of Jean-Paul's door number. What is the ratio of Albert's door number to Jean-Paul's?

5) In a library, the number of fiction books is 144% of the number of non-fiction books. What is the ratio of fiction books to non-fiction books in the library?

Given the ratio between two numbers, express it in the form X:1, where X is a value to be found.

Round all of your answers to 3 sf.

1) Express the ratio 13:14 in the form X:1.

2) Express the ratio 12:5 in the form X:1.

3) Express the ratio 72:35 in the form X:1.

4) Express the ratio 6:17 in the form X:1.

5) Express the ratio 4:103 in the form X:1.

Given a list of ratios, place them in ascending or descending order.

1) Place the following ratios in ascending order: 48:61, 3:10, 12:17, 1:6, 88:257.

Given the ratio between two or more values and the difference between two of the values, calculate all of the values.

1) Four numbers, A, B, C and D, have a ratio of 41:25:30:66. The difference between B and D is 328. What are the numbers A, B, C and D?

2) A toolkit contains hammers, screwdrivers and wall plugs in a ratio of 1:2:25. If there are 3 more screwdrivers than hammers, how many of each item are there?

3) Last year, a small business' ratio of revenue (income) to expenses (outgoings) was 8:3. If the business had a profit (revenue minus expenses) of £17,060 last year, how much were its revenue and expenses?

4) A hospital has inpatients and outpatients, in a ratio of 4:13. If the hospital has 5715 more outpatients than inpatients, how many of each type of patient does it have?

5) In a park, the ratio of trees to benches to bins is 32:7:4. If there are 24 more benches than bins, then how many trees, benches and bins are there?

Answers

Given the ratio of two values, express it in its simplest form.

1. 16:15

2. 55:39

3. 5:21

4. 1:4

5. 45:34

Given the ratio of three or more values, express it in its simplest form.

1. 5:1:6

2. 15:28:13:5
3. 2:3:10
4. 69:77:35
5. 8:12:7:15

Given information about the quantities of different items, express this as a ratio in its simplest form.

1. 47:38
2. 65:66
3. 5:2:3
4. 7:39
5. 17:2

Given how many times larger or smaller one value is than another, work out the ratio of the two values in its simplest form.

1. 1:3
2. 7:1
3. 1:500
4. 1:8
5. 25:1

In a situation with three or more values, given information about how many times larger or smaller different values are than each other, work out the ratio of all the values in its simplest form.

1. 3:6:1
2. 10:2:1
3. 4:24:3
4. 12:4:1:20
5. 15:6:5

Given the ratio of A to B, state the ratio of B to A.

1. 5:7

Given the ratio between two or more values, and given one of the values, calculate the other value(s).

1. 25,675,000,000
2. 2 bar staff, 8 waiting staff.
3. 220 houses, 385 flats.
4. 2548
5. 12

Given the ratio between two or more values, and given one of the values, calculate the total of all of the values.

1. £11,867,361.88
2. 75
3. 810
4. 22
5. 352

Given the ratio between two or more values, and given the total of all of the values, calculate any given value.

1. 520
2. 72
3. 120
4. 10
5. 12

Given the ratio between two or more items, calculate the fraction that a given item is of the total.

1. $\frac{3}{8}$
2. $\frac{1}{2}$
3. $\frac{17}{20}$
4. $\frac{1}{3}$

5. $\frac{3}{11}$

In a situation where there are two values, given the fraction or percentage that one value is of the total, find the ratio between the two values, expressed in its simplest form.

1. 13:7
2. 14:15
3. 19:1
4. 5:3
5. 28:9

Given the fraction or percentage that one value is of another, find the ratio between the two values.

1. 19:25
2. 1:2
3. 449:500
4. 5:6
5. 36:25

Given the ratio between two numbers, express it in the form X:1, where X is a value to be found.

1. 0.929:1
2. 2.40:1
3. 2.06:1
4. 0.353:1
5. 0.0388:1

Given a list of ratios, place them in ascending or descending order.

1. 1:6 (0.167:1), 3:10 (0.3:1), 88:257 (0.342:1), 12:17 (0.706:1), 48:61 (0.787:1)

Given the ratio between two or more values and the difference between two of the values, calculate all of the values.

1. A = 328, B = 200, C = 240, D = 528

2. 3 Hammers, 6 Screwdrivers, 75 Wall plugs
3. Revenue = £27,296, Expenses = £10,236
4. 2540 Inpatients, 8255 Outpatients
5. 256 Trees, 56 Benches, 32 Bins