Series A

Edge Hill University

Level 2 Numeracy

Standalone Equivalency Test Revision Pack

Contents

PLEASE NOTE: A CALCULATOR **CANNOT** BE USED IN THE NUMERACY EXAM.

Introduction

Edge Hill University

Thank you for choosing Edge Hill University for your equivalency test. As a leading university, we are dedicated to creating opportunity from knowledge – a philosophy that drives our teaching, our academic research, and our commitment to providing you with a great student experience leading to a rewarding career.

The University provides a package of targeted support to applicants and students, aimed at ensuring that individuals with the capacity to benefit from higher education can come to university, stay at university and take advantage of opportunities while they study.

We are continually recognised for our outstanding achievements in student support, graduate employment and innovation, as well as our significant role in transforming lives. Join us, and you will be studying on one of the best campuses in UK higher education, as part of a unique and welcoming academic community.

Standalone Equivalency Exams

This information pack is designed to support your revision in preparation for the exam. It is not designed to emulate the exams in any way.

The Edge Hill Level 2 equivalency tests offer you the opportunity to demonstrate that you satisfy our entry requirements for most of our health-related programmes, excluding Medicine.

Standalone tests allow you to revise at home, before booking to sit your exam on selected dates throughout the year at either Edge Hill University or Holy Cross College in Bury.

Once you have booked and paid for the test, you can revise at your own pace. However, we do ask that you make at least one attempt at the chosen exam within one year of payment. Refunds can be requested either within 1 year of payment, or prior to attempting the exam (whichever of these is the earliest). This applies to standalone exams only.

Please be aware that Edge Hill University Equivalency Exams are designed to meet the Level 2 entry requirements for Edge Hill University only. Other institutions or governing bodies may accept them, however, it is important that you check with your chosen training provider that this equivalent exam will be accepted. If any issues arise please pass your details and the provider's details to edgehilltests@edgehill.ac.uk and we can provide copies of our exam specification.

Why choose Edge Hill University equivalency programmes?

Value for Money

- We provide high quality, professionally written exams which are well supported and professionally administered.
- Exams are professionally assessed, and results are returned promptly, generally within two - four weeks.
- We offer our candidates a range of exam dates advertised in advance, both on campus at Edge Hill University, or at Holy Cross College in Bury, Greater Manchester.
- We also offer a tutor-led revision course to support Numeracy candidates.
- Candidates have two further opportunities to resit their exam if they are unsuccessful in the first instance.
- Our charges cover our costs and are lower than most other providers.

Our expertise

- The Edge Hill Equivalency Tests team have been offering equivalency examinations to help students progress on to degree programmes for over 20 years. We are part of the Access Programmes Team, enabling access to university by offering equivalency tests and revision support. We also deliver Edge Hill's highly successful 'Fastrack' access programme which provides a free entry route for people lacking the necessary qualifications, study skills and confidence to enter higher education directly.
- Our equivalency tests team is made up academic tutors, former teachers and university admissions staff; we know how to best assist applicants through this process.
- Academic professionals write and deliver our equivalency programmes, including professional examiners and trained exam invigilators.
- All examinees are ID checked by staff with compliance training.

Customer Service

- The Equivalency Tests team are available Monday-Friday, 9am-5pm, to support candidates with any queries.
  You can call 01695 657148
  Or email edgehilltests@edgehill.ac.uk.

Security and Accountability

- Banks of exams in each subject are regularly rotated to protect the integrity of the exams.
- Completed exams, marking schemes, profiles of markers and evidence of specific learning difficulties (where relevant) are kept secure for five years before being disposed of in accordance with standard University procedure.

Purpose of study

We have a responsibility to ensure that candidates meet the minimum standard of written English necessary to be successful in their future academic studies. Applicants must demonstrate that they are able to write fluently so that they can communicate their ideas and emotions to others and through their reading and listening, others can communicate with them.

Our equivalency tests can be used to demonstrate a satisfactory level of English language proficiency through the use of appropriate grammar by candidates for whom English is not their first language.

If English is not your first language, please note that in order to meet the assessment criteria for the English and Literacy examinations, you must demonstrate a satisfactory level of English language proficiency through the use of appropriate grammar in your answers. Please read the “Assessment Component 2: Technical Accuracy” skills descriptors for guidance.

Assessment Summary

Level 2 Numeracy Equivalency – Standalone Test

Assessment Topics

You will be tested on the following 8 topics:

1. Properties of Numbers
2. Measure and Conversion
3. Fractions, Decimals and Percentages
4. Charts and Graphs
5. Ratio & Proportion
6. Area, Perimeter, Volume
7. Averages, Probability
8. Algebra

Assessment Format

- Written exam: 1 hour and 30 minutes.
- Marks available will be listed on the front of the exam paper.
- Candidates must achieve at least 50% to pass.
- You must show your working out.

General Administration

Further information about our range of equivalency programmes can be found at www.edgehill.ac.uk/tests

Level 2 Equivalency Tests

Edge Hill University Equivalency Exams are designed to meet the Level 2 requirements for Edge Hill University only. Candidates are advised that other institutions or governing bodies may accept them, however, it is the candidates' responsibility to check that this equivalent exam will be accepted.

Awarding grades and reporting results

These tests are designed and delivered by the Access Programmes Team at Edge Hill University and are not validated through a national examination body.

Candidates who are successful in passing the exam receive a certificate from Edge Hill University. We will post your certificate to your registered address within 10 working days. You must notify us within 15 working days if you haven't received the certificate, otherwise, after this time there will be a charge.

It is the candidate's responsibility to inform Edge Hill Tests of a change of address. Please contact us if you have changed address since registering for your test so that we can send your certificate to the correct location.

Resits and shelf life

Candidates have two further opportunities to resit their exam if they are not successful in the first instance. We have three papers available for each subject and you must not sit the same paper twice or it will void your exam.

Candidates are informed that they must keep their certificate safe; after five years we cannot guarantee that we will be able to retrieve their results and confirm that they sat and passed an equivalency test at Edge Hill University. If candidates lose their certificate or require a replacement, the charge is £5.

Previous learning and prerequisites

The Numeracy equivalency test requires some prior subject knowledge (i.e. it is not suitable for complete beginners). You have the option to top-up to the Level 2 Numeracy tutor-led course: https://store.edgehill.ac.uk/product-catalogue/equivalency-testing/equivalency-testing/level-2-equivalency-testing-topup-payment If you choose this option after sitting a standalone test, your previous attempts will be deducted from the three attempts allocated to you.

Standalone Level 2 tests allow candidates to revise at home at their own pace before choosing a standalone test date. Exam dates are available throughout the year.

Access Arrangements

We make reasonable adjustments to the exam format to meet the requirements of our candidates with additional needs.

We ask candidates who have a disability or a specific learning difficulty to speak to us in advance so that we can discuss their requirements and make the arrangements. In certain circumstances, this may mean arranging a private exam. Candidates are asked to contact the Equivalency Tests Team to provide evidence of a specific learning requirements, such as an educational Psychology Report or Needs Assessment, **at least five working days prior to the exam date**. It is not possible to guarantee being able to meet requests made on the day of the test.

We are unable to approve extra time in exams for candidates on the basis that English is their second language. All candidates must be assessed according to the same marking criteria and following the same regulations, so that grades and certificates have the same validity. Standalone Level 2 tests allow candidates to revise at home at their own pace before choosing a standalone test date. Exam dates are available throughout the year.

Access Programmes Team

Janet Fairclough - Access Programmes Manager
Anne-Marie Kennedy – Pre-Entry Advice and Guidance Officer
Lindsey Tetlow – Senior Admissions Administrator (Access Programmes)
Joanne Williams – Admissions Assistant
Vicki Guttridge – Admissions Assistant

Contact Us

You can visit our website for information about all of our equivalency programmes: www.edgehill.ac.uk

The Equivalency Tests team are available Monday-Friday, 9am-5pm.

If you have any queries about equivalency tests, please get in touch:
T: 01695 657148
E: edgehilltests@edgehill.ac.uk

Your Level 2 Numeracy Equivalency Exam

Exam Preparation

Level 2 Numeracy equivalency standalone test:

Please take time before each exam to read the instructions on the front of the exam paper.

- 1 hour 30 minutes in duration

You much achieve at least 50% to pass the test.

50% and above = Pass

What to bring with you:

You will need to bring **photo ID** to register for the exam.

Acceptable ID includes: passport, driving licence, recognised age ID card, residential permit, student or NUS Card. If you have recently changed your name you must bring additional evidence such as a change of name document or marriage certificate. If you feel your name has not been registered correctly please contact us prior to the exam.

- A blue/black pen and a spare.
- Pencil
- Ruler

Calculators are not permitted.

Receiving Results

Please allow at least 4 weeks for your paper to be marked.

Unless otherwise requested, candidates will initially be informed of results by telephone. If you are successful in passing the exam, confirmation will also be made in writing and posted to your registered address.

On the Day of Your Exam

Please read the following information carefully, as it contains important information about the terms and conditions of Edge Hill University Standalone Equivalency Exams.

Arriving for your exam

You have been asked to arrive 30 minutes before the start of the exam for registration. This will allow us time to register everyone. Please wait outside the exam room until registration begins.

If you arrive 0-15 minutes after the start of the exam, you will be able to sit your test but you will not be given any extra time.

If you arrive more than 15 minutes after the start of the exam, you will be refused entry and advised to re-book your test; this will not count as one of your attempts.

Please wait outside the exam room until registration begins.

Registration and Identification Checks

All examination candidates must bring a photo ID document to register for the exam. Acceptable ID includes: passport, driving licence, recognised age ID card, residential permit, student or NUS Card. The ID must contain a visible name and a photograph with a clear resemblance to the candidate sitting the examination. If you have recently changed your name you must bring additional evidence such as a change of name document or marriage certificate. If you feel your name has not been registered correctly please contact us prior to the exam.

The Invigilator in the examination venue will check each candidate's ID in advance of the exam. If an invigilator has any doubts over the validity of a candidate's ID, or if the candidate has not brought their ID or any other form of photographic identification with them to the examination, the candidate will still be allowed to sit the examination, however, they will be required to take a photograph of themselves on the day of the exam and email it to edgehilltests@edgehill.ac.uk along with a photograph of a valid ID document.

Edge Hill University acknowledges that some examination candidates will choose to wear religious dress, for example: turbans and hijabs/veils. It may be necessary, for the purposes of identification before an examination, to ask a student to remove any garment that obscures their identity. In the case of a female student who is asked to remove a veil in order for the Invigilator to confirm their identity, an appropriate female member of staff will accompany the student to a private area where they can remove their veil to enable identification to take place. This may also apply to face masks if it is difficult to match the photo ID document to the exam candidate.

Invigilators

The role of the invigilators is to supervise your exam, to make sure your exams take place according to the rules and that the rules are applied fairly. You must follow any instructions given by an invigilator. It is your responsibility to listen to and follow these instructions.

If anything unexpected happens to you during an exam, such as feeling unwell, you should notify the invigilator immediately.

Additional Needs

We are happy to make reasonable adjustments to the exam format to meet the requirements of our candidates with additional needs.

All venues are accessible. However, if you have a disability or a specific learning difficulty, we do recommend that you speak to us in advance so that we can discuss your requirements and to allow us time to make the arrangements. In certain circumstances, this may mean you need to sit the exam on an alternative date.

Please contact the Equivalency Tests Team to let us know and provide evidence **at least five working days prior to the exam date**. It is not possible to guarantee being able to meet requests made on the day of the test.

Please contact edgehilltests@edgehill.ac.uk with evidence of your specific learning requirements such as an educational Psychology Report or Needs Assessment, or call 01695 657148 if you wish to discuss anything.

Your conduct

Improper conduct and actions that cause a disturbance during an exam are considered malpractice. They are unfair for other candidates and penalties often include losing marks or having your exam entry cancelled.

Examples of malpractice by candidates include:

- Pretending to be someone else or getting someone else to attempt to sit an exam for you.
- Disruptive behaviour in the exam room.
- Using rude, abusive, offensive or discriminatory language or images in your answer booklet.
- Copying from another candidate.
- Using any material or aids that would give you an unfair advantage in the exam.

Rules

It is important that you follow the test rules, to make sure that everyone has a fair and equal chance of doing their best work:

- When you enter the exam room you are under **exam conditions**; you must be silent, you must not communicate with anyone else in the room or disturb other candidates.
- **All personal belongings** and any revision materials should be stored under your chair or table and out of your / your fellow candidates' line of vision.
- Mobile phones and web enabled devices must be switched OFF, put inside the **clear plastic bag** provided and placed on top of your desk for the duration of the exam. Phones cannot be used as calculators or timing devices.
- Any pencil cases should be clear plastic if they are on top of your desk.
- **Water** can be brought into the exam room in clear bottles.
- If you require any assistance during the exam, please raise your hand and wait for the invigilator to approach you.
- **You cannot eat food**, unless you have notified us of a medical condition.
- If you need to visit the bathroom during the exam, you cannot take any exam materials including stationery with you. Additional time is not allowed for such breaks (unless specified under an additional needs report).
- Calculators are not permitted.

Question papers and answer booklets

It is important to read the instructions on the front of your exam paper. Make sure you follow them carefully and note the duration of your exam.

If you need extra paper, you should raise your hand and ask the invigilator.

You must complete your details legibly on the front of the question paper or answer booklet. If using extra paper, remember to write your name and the exam date on each sheet and put these inside your answer booklet.

Work through your question paper until you see the statement, 'END OF PAPER'. There will be nothing else you need to answer after this.

Writing your answers

You must use a pen with black or blue ink and it is important that you write legibly. Examiners will do their best to read your work but they might not be able to award marks if your writing is difficult to read.

Remember to cross out any rough work or unwanted answers if you make more than one attempt at a question.

Leaving the exam room

You can leave the exam if you finish early but please be considerate of other candidates who may still be working. Please be aware that talking outside of the exam room can be very distracting.

All exam papers and answer booklets must be handed in at the end of the exam. You could lose all marks for the paper concerned if you do not give your answer booklet to the invigilator before leaving the exam room, or when requested.

Examination Tips

1. ***Do*** **read any instructions given on the paper.**
   It is essential that you follow these implicitly.

2. ***Do*** **show your working out.**
   Some questions are worth multiple marks, which will include your answer and the steps you took to reach your answer.

3. ***Do*** **look at the number of marks awarded to each question if this is shown.**
   It will help you to decide how much time to spend on the question and how long your answer should be. It is inadvisable to spend 10 minutes working on an answer that will give you only 1 mark and it would be foolish to give a short answer without any working out if the examiner indicates that it is worth 8 marks.

4. ***Do*** **make every effort to answer all of the questions.**
   If you are struggling with a question, move on. Allow yourself time at the end of the exam to revisit any questions that you found difficult.

Edge Hill University, Ormskirk

BUILDING LOCATIONS

	Number	Grid
BioSciences	15	D3
Business School	16	E4
Catalyst	22	G4
Creative Edge	23	H4
Durning Centre	21	G2
Faculty of Education (Lakeside)	10	B4
Faculty of Education (Piazza)	11	D4
Faculty of Education (Professional Learning)	17	E3
Faculty of Health and Social Care	9	C5
GeoSciences	12	D4
Health and Wellbeing Centre, Milton House	13	C1
Hargrave	27	A6
Laurels	20	F2
Law and Psychology	7	E4
Lodge	25	F6
Magnolia	28	G6
Medical School	8	D4
Old Gym	18	E3
Performing Arts	6	E6
Main Reception	1	F5
Security and Customer Information Centre	26	F6
Sport and Physical Activity Building (Wilson Centre)	19	F4
Student Administration	4	E5
The Hub	2	F5
Students' Union	3	F4
Tech Hub	14	D2
The Arts Centre	5	E6
The Sports Centre	24	K4

Department	Building	Number	Grid
Academic Registry	Student Administration	4	E5
Academic Quality and Development Unit	Main Building (Clough)	1	F5
Accommodation Office (Student Services)	Catalyst	22	G4
Admissions	Student Administration	4	E5
Arts Centre	The Arts Centre	5	E6
Biology, Department of	BioSciences	15	D3
Business School	Business School Building	16	E4
Capital Projects	Durning Centre	21	G2
Careers Centre	Catalyst	22	G4
Chaplaincy Service	Students' Union	3	F4
Computer Science, Department of	Tech Hub	14	D2
Confucius Institute	The Lodge	25	F6
Corporate Communications	Main Building	1	F5
Course Enquiries	Student Administration	4	E5
Deliveries	Durning Centre	21	G2
Directorate	Main Building	1	F5
Education, Faculty of	Faculty of Education (Lakeside)	10	B4
Education: Early Years Children, Education and Communities	Faculty of Education (Lakeside)	10	B4
Education: Professional learning	Faculty of Education (Professional Learning)	17	E3
Education: Secondary, Further Education Education programmes	Faculty of Education (Piazza)	11	D4
English, History and Creative Writing	Main Building (Clough)	G	G6
Facilities Management	Durning Centre	21	G2
Faith and Reflection Room	Magnolia	28	G6
Finance Office	Main Building (Lady Margaret)	J	E5
Geography, Department of	GeoSciences	12	D4
Hale Hall	Main Building (Hub)	1	F4
Health and Social Care, Faculty of	Faculty of Health and Social Care	9	C5
Health and Wellbeing Centre	Milton House	13	C1
Human Resources	Main Building (Lady Margaret)	J	G6
International Office	Main Building (Stanley)	H	G5
IT Services	Durning Centre	21	G2
Language Centre	Law and Psychology	7	E4
Law and Criminology, Department of	Law and Psychology	7	E4
Library	Catalyst	22	G4
Media, Department of	Creative Edge	23	H4
Medical School	Medical School	8	D4

Department	Building	Number	Grid
Performing Arts, Department of	The Arts Centre	5	E6
Performing Arts, Department of	Performance Studio	6a	E4
Psychology, Department of	Law and Psychology	7	E4
Reception	Main Building	1	F5
Research Office	Business School	16	E4
Security	Security and Customer Information Centre	26	F6
Social Sciences, Department of	Creative Edge	23	H4
Sport and Physical Activity, Department of	Sport and Physical Activity	19	F3
Strategic Planning and Policy Unit	Student Administration	4	E5
Student Experience	Student Administration	4	E5
Student Financial Support	Catalyst	22	G4
Student Recruitment	Student Administration	4	E5
Student Services	Catalyst	22	G4
Students' Union Bar	The Street	3	F4
Students' Union Office	The Hub	2	F4
Sports Centre	Sports Centre	24	K4
Teaching and Learning Development Unit	The Lodge	25	F6
Vice-Chancellor's Office	Main Building	1	F5
Food, Drink and Shopping			
Café Rewind	Faculty of Health and Social Care	9	C5
53.3° North	Catalyst	22	G4
Starbucks (We Proudly Brew)	Student Hub	2	E4
Grab and Go Snack Bar	Student Hub	2	F4
McColl's (Shop)	Student Hub	2	F4
Students' Union Bar	Students' Union	3	F4
Students' Union Shop	Students' Union	3	F4
Subway	Students' Union	3	F4
The Red Bar	The Arts Centre	5	E6
Waters Edge	Faculty of Education (Lakeside)	10	C4
Cashpoints (ATM)	The Hub	2	E4
	Security and Customer Information Centre	26	F6

Download the **Edge Hill Uni Virtual Tour App** to explore the campus yourself:

GET IT ON Google Play

Download on the App Store

HALLS OF RESIDENCE

A	Graduates Court	A4, A5, B5
B	Founders West	C6 - D6
C	Founders East	E6
D	Chancellors Court	H3 - J3
E	Chancellors South	I4
F	Forest Court	G6
G	Clough	G5
H	Stanley	G5
I	John Dalton	E5
J	Lady Margaret	E5
K	Eleanor Rathbone	E3
L	Lady Openshaw	E3
M	Katherine Fletcher	F3
N	EM Butterworth	F3
O	Margaret Bain	F3
P	Palatine Court	G6
Q	Woodland Court	G5 - H5
R	Hollies (Guest Accommodation)	C6

Edge Hill University

Holy Cross College in Bury, Greater Manchester

For exam candidates who live closer to Manchester, we hold some of our exams at Holy Cross College on selected Tuesday evenings from 5:30pm.

PLEASE NOTE: There is NO onsite parking. A lot of streets in the areas surrounding Holy Cross are residential parking or two-hour parking only. Please carefully check signs when parking and allow time to travel from your parking space to the college. You must sign in at Main Reception on arrival and the invigilator will collect you and lead you to the exam room.

1. Properties of Numbers

4 operations, rounding, negatives, HCF and LCM

Basic Numeracy

The system that we use today is based on the number 10. The numbers below 10 are called digits.

An integer is a whole number (not a fractional number) that can be positive, negative or zero. Examples of **integers** are: -5, 1, 5, 8, 97, and 3,043. Examples of numbers that are not **integers** are: -1.43, 1 3/4, 3.14, 0.09, and 5,643.1.

Positive integers are the numbers starting from 0 and going in a positive direction. For example 0, 1, 2, 3, 4, 5, etc

Negative integers are the numbers below 0 (or positive zero) they move in a negative direction. Examples of these are -1, -2, -3, -4

Real life examples of negative numbers are temperature, e.g. -1 º Celsius and bank balances (overdraft: - £100)

An Even number is a number that can be divided by 2, e.g. 2, 4, 6 or -2, -4, -6

An Odd number is a number that cannot be divided by 2, e.g. 1, 3, 5, or -1, -3, -5

To **square** a number is to Multiply it by itself, to square 6 (written as 6^2) = 6 x 6 = 36

To **cube** a number, written as 4^3 = 4 x 4 x 4 = 64

A **square root** (written as √) of a number is another number which when squared will equal the first number.
√49 = 7. Note that √49 could also be -7 (-7 x -7 = +49)

Four Rules of Number

The four rules of number that we are going to look at are:

Addition **- the answer is called the sum**

Subtraction **- the answer is called the difference**

Multiplication **- the answer is called the product**

Division **- the answer is called the quotient**

Addition

When we add numbers we must make sure that we keep the numbers in the correct column: example 13567 + 46789

We start our sum from the right side 

1	3	5	6	7
4	6	7	8	9
1 we now add these three numbers together and get 6	1 - we now add these three numbers together and get 10 again put the 0 down and carry the 1	1 - we now add these three numbers together and get 13 again put the 3 down and carry the 1	1 - we now add these three numbers together and get 15 again put the 5 down and carry the 1	We add 9 + 7 and get 16, we put the 6 in this column and carry the 1 over
6	0	3	5	6

Hence 13567+ 46789 = 60356

This is especially important when adding with decimal places lets add 5.34 and 6.25

5	.	3	4
6	.	2	5
We add these together and 11	This our decimal point column	we now add these three numbers together and get 5	we now add these three numbers together and get 9
11	.	5	9

Hence 5.34 + 6.25 = 11.59

If we get decimals of uneven numbers either side of the point place a 0 there.

We will add 116.32 to 10.1

			Point Column		
1	1	6	.	3	2
0 (added to keep numbers in line)	1	0	.	1	0 (added to keep numbers inline)
1 and 0 = 1	1 and 1 = 2	6 and 0 = 6	.	3 and 1 = 4	2 and 0 = 2
1	2	6	.	4	2

Hence 116.32 + 10.1 = 126.42

Addition: Exercise 1

Find the sum for each of the questions:

1. 0.9 + 11

2. 2.34 + 32.6

3. 3.45 + 78.2

4. 113.89 + 11.45

5. 16.7 + 000000000.5

Subtraction

This works the same as addition only we are finding the difference between the numbers. We still have to keep the numbers in line. We shall now subtract the numbers that we added together in the first examples.
We will subtract 13567 from 46789.

4	6	7	8	9
1	3	5	6	7
4 take away 1 gives us 3	6 take away 3 gives us 3	7 take away 5 give us 2	8 take away 6 gives us 2	9 take away 7 gives us 2
3	3	2	2	2

Hence 46789 - 13567 = 33222

We shall now subtract 5.34 and 6.25

6 – we will borrow 1 from here, so this number is now 5	.	We put the 1 next to the 2 so it becomes 12	5
6 is now 5	.	1 2	5
5	.	3	4
Our 6 is now a 5 because we borrowed one from it. We now take away 5 from 5 which leaves us with 0	This our decimal point column	We can't take 3 away from 2 so we must borrow one from the next column. 12 take away 3 is 9	5 take away 4 leaves us with 1
0	.	9	1

Hence 6.25 – 5.34 = 0.91

If we get decimals of uneven numbers either side of the point place a 0 there.

We will subtract 10.1 from 116.32

			Point Column		
1	1	6	.	3	2
0 (added to keep numbers in line)	1	0	.	1	0 (added to keep numbers inline)
1 take away 0 is 1	1 take away 1 is 0	6 take away 0 is 6	.	3 take away 1 is 2	2 take away 0 is 2
1	0	6	.	2	2

Hence 116.32 - 10.1 = 106.22

Subtraction: Exercise 2

Subtract the following:

1. 11 - 0.9

2. 32.6 - 2.34

3. 78.2 – 3.45

4. 113.89 - 11.45

5. 16.7 - 0.5

Multiplication

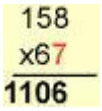
(adapted from BBC Bitesize)

Traditional method

This is where we multiply by the units and the tens separately, then add the two rows together.

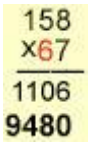
To calculate 158 × 67:

First, multiply by 7 (units):

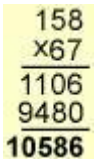


Then add a zero on the right-hand side of the next row. This is because we want to multiply by 60 (6 tens), which is the same as multiplying by 10 and by 6.

Now multiply by 6:



Now add your two rows together and write your answer.



So the answer is **10586.**

Multiplying Decimals

To multiply decimals, you need to follow this process:
Multiply the decimal by 10 or 100 to get rid of the decimal, multiply as before, divide by the same amount as you multiplied (to put the decimal back in).

Example: 24 x 0.4
0.4 x 10 so our calculation is 24 x 4 = 96
Divide by 10 so our final answer is 9.6

Multiplication: Exercise 3

1:	**2:**	**3:**	**4:**	**5:**
11	23	57	54	74
x 21	x 9	x 19	x 10	x 93

6:	**7:**	**8:**	**9:**	**10:**
14	0.37	0.17	7.4	7.2
x 0.81	x 56	x 13	x 4	x 6.7

Division

If you have small numbers division is quite easy.
Example 12 ÷ 4 = 3 (how many 4s go into 12)

However, if we have larger numbers it can get quite complicated: 435 ÷ 25

We display the sum as follows:

```
25 | 4 3 5
```

We would start by saying 25 goes into 4 how many times? It won't go! We therefore place a zero above the 4 and carry the 4 over to the 3:

```
    0
25 | 4 43 5
```

We now say how many 25's will go into 43? The answer is 1. We place a 1 above the 43. Hence:

```
    0 1
25 | 4 43 5
```

However, we have some left over. 43 – 25 = 18. We must carry 18 over to the next number:

```
    0 1
25 | 4 43 185
```

We now say how many 25's go into 185? The answer is 7 but with 10 left over:

```
    0 1 7
25 | 4 43 185
```

When we place the 7 above the 185 we have reached the end of our number we therefore must place a decimal point here:

```
    0 1 7.
25 | 4 43 185
```

We still have 10 left over so we need to carry on the sum. We will place a zero next to the 185:

```
    0 1 7.
25 | 4 43 185 0
```

We now need to carry the 10 over:

```
      0  1   7 .
25  | 4 43 185 100
```

We can now say ‘how many 25’s go into 100?’ The answer is 4 with no remainders. We have reached the end of our sum.

```
      0  1   7 . 4
25  | 4 43 185 100
```

Our final answer is 17.4

The diagram below explains how to answer this sum:

	0	1	7	4
25	4	4 – carried over 3	18 – carried over 5	10 – carried over 0
	25 won’t go into 4 So we place a 0 above the 4 position	We must carry the 4 over. So 3 becomes 43. 25 into 43 will go once. So we place a 1 above the 3 position. However this leaves 18. We must carry the 18 over.	This figure now becomes 185. 25 into 185 will go 7 times but there is 10 left over. We can stop here or carry the 10 over. For this example I have carried the 10 over	As with all sums where there is no number we place a 0. As we have 10 carried over this number is now 100. 25 goes into 100 four times. We place the 4 above the 0 position

As there are no remainders we can stop here.

Our answer so far is 0174. As we added a 0 onto the end of our sum it changes our initial number of 435 to 4350, therefore we need to move our decimal point to show this. Our answer is 017.4
Alternatively we could have stopped after the 7 and our answer would have been 17 remainder 10.

Division: Exercise 4

1: $12\overline{)672}$

2: $12\overline{)996}$

3: $20\overline{)1200}$

4: $17\overline{)1445}$

5: $18\overline{)990}$

6: $11\overline{)770}$

7: $14\overline{)1386}$

8: $20\overline{)1640}$

Order of Operations

BIDMAS gives the order in which each operation should be carried out. It is also known as BODMAS.

B	Brackets	(if there are brackets, work out the value of the expression inside the brackets first)
I	Indices	(indices include square roots, cube roots and powers)
D	Divide	(if there are no brackets, do divide and multiply, before add and subtract)
M	Multiply	
A	Add	
S	Subtraction	

Indices refers to powers (e.g. $3^2 = 3 \times 3 = 9$) and square roots (e.g. $\sqrt{16} = 4$)

Example

$10 \times 2^2 - 5$ work out 2^2 first
$= 10 \times 4 - 5$ multiply 10×4
$= 40 - 5$ then subtract
$= 35$

Example 2

$(12 - 2 \times 5)^3$
$= (12 - 10)^3$
$= (2)^3$
$= 8$

BIDMAS: Exercise 5

1:	2:	3:
$20 – 3 \times 5$	$11 + 8 \div 2$	$8 – (3 \times 2) \div 6$
4:	5:	6:
$3 + 2^2$	$(4^2 - 10) + 4$	$5 \times (8 – 3) - 20$

Factors, Multiples and Primes

A factor is a number that divides exactly into a given number and leaves no leftovers or remainders. For example, 12 has the following factors, 1, 2, 3, 4, 6, 12

Multiple. The multiples of a number are just the times table.
Example: multiples of 7 are 7, 14, 21, 28

In the example above we discussed the factors of 12. A multiple would be the result, in others words the common multiple of 2, 3, 4, and 6 would be 12. So, 12 is the multiple and the other numbers are the factors. 20 is a multiple of 2, 4, 5, 10 as all these numbers can multiplied to make 20.

Example: Find the lowest common multiple of 3 and 5

List the multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

List the multiples of 5: 5, 10, 15, 20, 25, 30.

15 and 30 appear in both lists so are common multiples. 15 is the smaller number so it is the Lowest Common multiple

Example 2: Find the Highest Common Factor of 24 and 16

Factors of 24: 1, 2 ,3, 4, 6, 8, 12, 24

Factors of 16: 1, 2, 4, 8, 16

1, 2, 4, 8 appear in both lists so are common factors. 8 is the biggest number so it is the Highest Common Factor

Prime number is a number that has only two factors – itself and one. For example, 2 can only be divided by itself or 1. Other prime numbers 3, 5, 7, 11,

Factors and Multiples: Exercise 6

1: List all the factors of 20

2: List the first 10 multiples of 5

3: Find the Lowest Common Multiple of 4 and 6

4: Find the Highest common Factor of 20 and 18

Rounding

Rounding means making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use. Example: 73 rounded to the nearest ten is 70, because 73 is closer to 70 than to 80. But 76 goes up to 80.

The general rule is:
If the number you are **rounding** is followed by 5, 6, 7, 8, or 9, round the number up. Example: 38 rounded to the nearest ten is 40. If the number you are **rounding** is followed by 0, 1, 2, 3, or 4, round the number down. Example: 23 rounded to the nearest 10 is 20.

Example
2.76 to 1 decimal place = 2.8
4.525 to 1 decimal place = 4.5

Rounding to significant figures

The 1st significant figure of any number is the first digit that is not a zero
234 to 1 sf = 200 (2 is the first significant figure)
0.057 to 1 sf = 0.6 (5 is the first non-zero number and we round it up because the next number is 7

The 2nd, 3rd, 4th significant figures follow on immediately after the1st, regardless of being zeros or not

54.3 to 2 sf = 54
4670 to 2 sf = 4700
0.04467 to 2 sf = 0.045

Estimating

If you are asked to estimate a calculation you do not work it out. You round each value to 1 significant figure and then do the calculation

Example

(32.1 + 679.3) ÷ 9.8 Round each value
(30 + 70) ÷ 10
= (100) ÷ 10
= 10

Rounding: Exercise 7

1: Round the following to the nearest 10

a. 467 b. 5433 c. 89 d. 87003

2: Round the following to 1 decimal place

a. 36.37 b. 6.88 c. 0.89 d. 0.499

3. Round the following to 1 significant figure

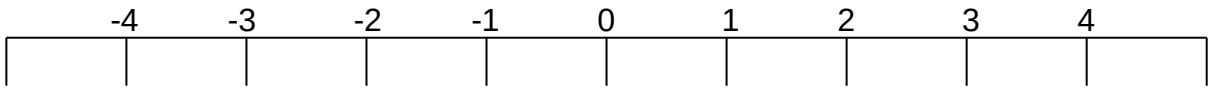
a. 670 b. 27 c. 0.77 d. 23.09

4. Estimate

a. 35.3 + 92 b. (34 + 73) ÷ 5

Negatives

To add and subtract negative numbers, use a number line.



Starting at zero, count to the left for negative numbers and to the right for positive numbers

Examples
-1 - 3
Start at -1. Count 3 places to the left= - 4

3 - 5
Start at 3. Count 5 places to the left. = - 2

-4 + 7
Start at -4. count 7 places to the right = 3

Negatives: Exercise 8

1: 4 – 6 2: 3 - 6 3: -2 + 6 4: -7 - 2 5: -4 + 3

2. MEASURE AND CONVERSION

- length, money, appropriate units, convert between units, including imperial

UNITS OF LENGTH

Length is how long something is.
Some common units for length are millimetres(mm), centimetres (cm), metres(m) and kilometres (km). These units are related:
1cm = 10 mm
1m = 100 cm
1km = 1000 m

To go from mm to cm, divide by 10
To go from cm to mm, multiply by 10

To go from cm to m, divide by 100
To go from m to cm, multiply by 100

To go from m to km, divide by 1000
To go from km to m, multiply by 1000

Examples

1. What is 2.7km in m?
   You are going from km to m, so multiply by 1000
   2.7 x 1000 = 2700m
2. What is 1570 cm in m?
   You are going from cm to m, so divide by 100
   1570 ÷ 100 = 15.7 m

UNITS OF WEIGHT

Weight is how heavy something is. Grams(g) and Kilograms(kg) are common units for weight.
1 kg = 1000g
To go from g to kg, divide by 1000
To go from kg to g, multiply by 1000

Example
How many grams are there in 0.7kg?
You're going from kg to g, so multiply by 1000
0.7 x 1000 = 700 g

UNITS OF CAPACITY

Capacity is how much something will hold. Common units are millilitres(ml), centilitres (cl) and litres (l)

1 cl = 10 ml
1litre = 100 cl

To go from ml to cl, divide by 10 To go from cl to ml, multiply by 10
To go from l to cl, divide by 100 To go from l to cl, multiply by 100

Example
1 How many centilitres are in 0.34l?
Change from l to cl, by multiplying by 100.
0.34 x 100 = 34cl

2 A can of coke holds 330ml. What is this in cl
Change from ml to cl, by dividing by 10
330 ÷ 10 = 33cl.

Units of Measure: Exercise 9

1: convert the following to cm
a. 15mm b. 2m c. 0.5m

2.Convert the following to g
a. 2 kg b. 10kg c. 0.3kg

3. Convert the following into cl
a. 20ml b. 2 litres c. 0.5 litres

CONVERTING BETWEEN IMPERIAL and METRIC UNITS

You may be asked to convert between old and new measurements. You will normally be given the conversion rate
Example
1 km approximately = 0.6 miles
How far in miles is 10 km?
1 km = 0.6 miles
10 km = 10 x 0.6 = 6 miles

Example 2
1 kg = 2.2 lbs (pounds). How many lbs are in 4 kg
1kg = 2.2 lbs
2 kg = 4 x 2.2 = 8.8 lbs

3. FRACTIONS DECIMALS PERCENTAGES

-4 operations with fractions, decimals, percentages, percentage increase and decrease, converting between fractions, decimals and percentages

Fractions

A fraction is a part of a whole

If you were to cut a cake into pieces you will have fractions:

$^{1}/_{2}$	$^{1}/_{4}$	$^{3}/_{8}$
(One-Half)	**(One-Quarter)**	**(Three-Eighths)**

Numerator / Denominator

We call the top number the **Numerator**, it is the number of parts you have.
We call the bottom number the **Denominator**, it is the number of parts the whole is divided into.

$$\frac{\textbf{Numerator}}{\textbf{Denominator}}$$

Equivalent Fractions

Some fractions may look different, but are really the same, for example:

$^{4}/_{8}$	=	$^{2}/_{4}$	=	$^{1}/_{2}$
(Four-Eighths)		Two-Quarters)		(One-Half)

It is usually best to show an answer using the simplest fraction ($^{1}/_{2}$ in this case). That is called ***Simplifying***, or ***Reducing*** the Fraction

Examples

3/9. Both numbers can be divided by 3 so 3/9 can be simplified to

$$\frac{3 \div 3}{9 \div 3} = \frac{1}{3}$$

8/12. Both numbers can be divided by 4 so 8/12 = 2/3

16/18. Divide both numbers by 2, so 16/18 = 8/9

Adding Fractions

You can add fractions easily if the bottom number (the *denominator*) is the same:

$^{1}/_{4}$ (One-Quarter)	+	$^{1}/_{4}$ (One-Quarter)	=	$^{2}/_{4}$ (Two-Quarters)	=	$^{1}/_{2}$ (One-Half)

Another example:

$$^{5}/_{8} + {}^{1}/_{8} = {}^{6}/_{8} = {}^{3}/_{4}$$

Adding Fractions with Different Denominators

But what if the **denominators** are not the same? As in this example:

$$^{3}/_{8} + {}^{1}/_{4} = ?$$

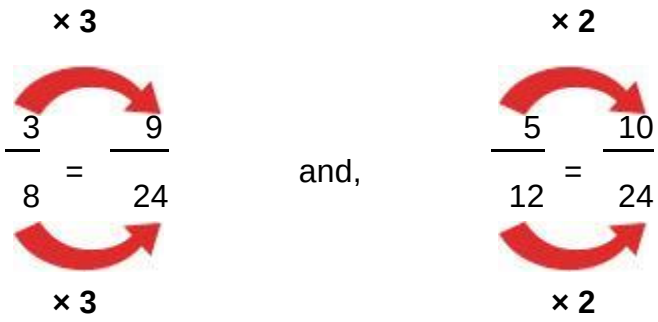
You must *somehow* make the denominators the same. In this case it is easy, because we know that $^{1}/_{4}$ is the same as $^{2}/_{8}$:

$$^{3}/_{8} + {}^{2}/_{8} = {}^{5}/_{8}$$

Fractions with Different Denominators

Sometimes you have two (or more) fractions with different denominators - you may want to add or subtract them - but you need to make the denominators the same before you can do that:

Example: What is $^{3}/_{8} + {}^{5}/_{12}$? Let's try to make the denominators the same ... if you multiply 8 × 3 you get 24, and if you multiply 12 × 2 you also get 24. So, let's try that (*important: what you do to the bottom of the fraction, you must also do to the top*):



Now we can do the addition: $^{9}/_{24} + {}^{10}/_{24} = {}^{19}/_{24}$.

How to Make the Denominators the Same

Example: What is $^{1}/_{6} + {}^{7}/_{15}$?

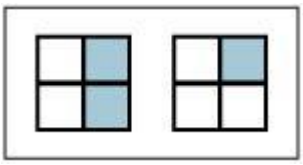
The Least Common Multiple of 6 and 15 is **30** (because 5x6 is 30 and 15x2 is 30. You need to find a number that will both numbers can divide into). So, let's do some multiplying to make each denominator equal to 30:

$$\frac{1}{6} \overset{\times 5}{=} \frac{5}{30} \quad \text{and,} \quad \frac{7}{15} \overset{\times 2}{=} \frac{14}{30}$$

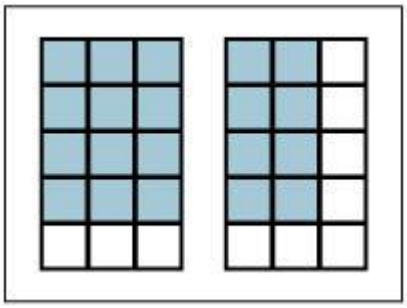
Now we can easily do the addition: $^{5}/_{30} + {}^{14}/_{30} = {}^{19}/_{30}$.

Multiplying and dividing fractions

Multiplying fractions



$$\frac{1}{2} \text{ of } \frac{1}{2} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$



$$\frac{2}{3} \text{ of } \frac{4}{5} = \frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

> When we multiply fractions, we multiply the numerators and multiply the denominators, then simplify where necessary.

Example - multiplying

Calculate $\frac{3}{4} \times \frac{2}{5}$

Solution:

$$\frac{3}{4} \times \frac{2}{5} = \frac{3 \times 2}{4 \times 5}$$

$$= \frac{6}{20}$$

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

Dividing fractions

> When we divide fractions, we turn the second fraction upside down, then multiply.

Example - dividing

Calculate $\frac{3}{4} \div \frac{4}{5}$

Solution:

$$\frac{3}{4} \div \frac{4}{5} = \frac{3}{4} \times \frac{5}{4}$$

$$= \frac{15}{16}$$

Fractions: Exercise 10

1. $\frac{1}{4} + \frac{1}{4}$	**2.** $\frac{1}{8} + \frac{3}{8}$	**3.** $\frac{1}{6} + \frac{2}{6}$
4. $\frac{1}{10} + \frac{1}{2}$	**5.** $\frac{3}{4} + \frac{3}{16}$	**6.** $\frac{1}{10} + \frac{3}{5}$
7. $\frac{1}{4} - \frac{1}{6}$	**8.** $\frac{3}{5} - \frac{3}{8}$	**9.** $\frac{3}{4} - \frac{3}{5}$
10. $\frac{1}{2} \times \frac{1}{2}$	**11.** $\frac{1}{4} \times \frac{1}{2}$	**12.** $\frac{2}{3} \times \frac{4}{9}$
13. $\frac{3}{5} \div \frac{1}{2}$	**14.** $\frac{4}{9} \div \frac{1}{9}$	**15.** $\frac{2}{5} \div \frac{1}{10}$

Finding the Fraction of an Amount

To find a fraction of an amount, the rule is divide by the bottom and multiply by the top.

So, to calculate 1/3 of 27
27÷ 3 = 9. Then 9 x 1 = 9

2/5 of 25
25 ÷ 5 =5. Then 5 x 2 = 10

Fractions: Exercise 10b

1.	1/3 of 15	2: 1/5 of 40	3: ¼ of 24
4	2/3 of 27	5: 2/5 of 50	6: 3/7 of 21

Decimals

Decimals are numbers with a decimal point in them, e.g. 0.5, 1.3

How to put decimals in order of size
Example: Put these decimals in order of size: 1.22, 0.24, 0.06, 0.3

Start with the smallest

1. put the numbers into a column, lining up the decimal points
2. make all the numbers the same length by filling in extra zeros at the ends
3. look at the numbers before the decimal point. Arrange the numbers from smallest to largest
4. Are any of the numbers are the same, move onto the numbers after the decimal point. Arrange the numbers from smallest to largest

Step 1	Step 2	Step 3	Step 4
1.22	1.22	0.24	0.06
0.24	0.24	0.06	0.24
0.06	0.06	0.30	0.30
0.3	0.30	1.22	1.22

Percentages

The word percent means out of 100. When you say 50% you are actually saying 50/100.

% is a short way of writing “per cent”
20% means twenty per cent. This is the same as 20 out of 100
20% = $\frac{20}{100}$

To find 10% - divide by 10
To find 1% - divide by 100
To find 50% - divide by 2
To find 25% - divide by 4

So, to find 10% of 50 = 50 ÷ 10 = 5
To find 50% of 80 = 80 ÷ 2 = 40
To find 1% of 200 = 200 ÷ 100 = 2

We can use these 4 rules to calculate any percentages
To find 20%, find 10% and times by 2

Example: Calculate 20% of 90.
10 % = 90 ÷ 10 = 9
20% = 2 x 9 = 18

Example: A watch is reduced by 40% in price in a sale. The old price was £120. Find the new price

Find 40% of £120.
10% of 120 = 120 ÷ 10 = 12
40 % = 4 x 12 = £48,

Take the reduction away from the original price
120 – 48 = £72

Example: add VAT of 20% onto a cost of £300.
You need to find 20% and add it on

10% of 300 = 30
20% = 2x 30 = £60

300 + 60 = £360

You may be asked to find one quantity as a percentage of another value.
To do this, you need to write the 2 values as a fraction and then simplify

Example: find 20m as a percentage of 80m
Write as 20/80
Simplify to 2/8 = ¼ = 25%

Percentages: Exercise 11

1. Find 40m as a percentage of 50m.

2. What is 40% as a fraction:

3. What is 35% as a decimal:

4. Find 30p as a percentage of £6.

5. A computer costs £800 before VAT. If VAT is 20%, how much VAT will you have to pay?

6. A shopkeeper buys a radio for £30 and wishes to sell it for a profit of 40%. How much should he sell it for?

7. Jackie earns £13 000 a year. She is to get a wage increase of 4%. How much will her increase be?

8. Geeta makes a cake for £2 and sells it for £2.50. What is her percentage profit?

9. Alan buys a CD for £16 and sells it for £12. What's his percentage loss?

10. Si buys a TV for £100 and sells it for £80. What's his percentage loss?

CONVERTING BETWEEN FRACTIONS, DECIMALS AND PERCENTAGES

To write a percentage as a fraction we write it over a hundred, and then simplify it if we can.
46% = 46/100 dividing both numbers by 2 gives us 23/50

We can write percentages as decimals by dividing by 100
So, 46% = 46/100 = 46 ÷ 100 = 0.46

To write a fraction as a percentage, we find the equivalent fraction with a denominator of 100

$\frac{17}{20} \times 5 = \frac{85}{100} = 85\%$

To write a decimal as a percentage, you multiply it by 100

0.8 = 0.8 x 100% = 80%

CONVERTING FDP: Exercise 12

1. Convert the following into percentages
   a. 0.4 b. 0.25 c. ½ d. 1/5

2. Convert the following into decimals
   a. 30% b. 12% c. 1/10 d. 2/5

3. Convert the following into fractions – simplify where possible
   a. 25% b. 83% c. 0.2 d. 0.18

4. CHARTS AND GRAPHS

Read and interpret: Pictograms, bar charts, scatter diagrams, line graphs, pie charts, Venn diagrams

Graphs – (adapted from BBC Bitesize)

Line graphs

A line graph is another way to give a visual representation of the relationship of data that has been collected.

It is made up of a vertical and horizontal axis and a series of points that are connected by a line.

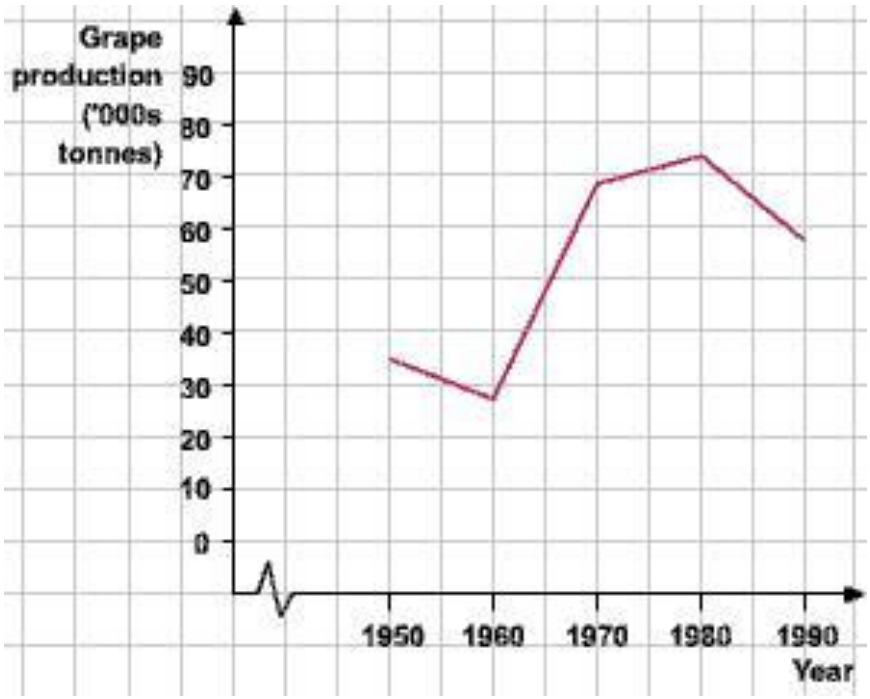
Each point on the line matches up with a corresponding vertical axis and horizontal axis value on the graph.

In some cases, you are giving a value from the horizontal axis and you need to find its corresponding value from the vertical axis. You find the point on the line that matches the given value from the horizontal axis and then match it up with its corresponding vertical axis value to find the value you are looking for. You would do the same type of process if you were given a vertical axis value and needed to find a horizontal axis value.

Example

Year	1950	1960	1970	1980	1990
Grapes ('000 tonnes)	36	28	69	74	58

This table shows a country's grape production (in thousands ['000s] of tonnes) for the years 1950, 1960, 1970, 1980 and 1990. Represent the data in the form of a line graph.



We have no information for the years in between 1950, 1960, 1970, 1980 and 1990, so we join the points with straight lines.

The squiggle on the horizontal axis is there to indicate that there is no data before 1950

Frequency on graphs is generally displayed on the vertical axis. In this case Grape production.

Graphs: Exercise 13a

Make a line graph for each set of Rainforest data below. Label both the x (horizontal) and y (vertical) axis properly. Give each graph a title.

Rainfall (mL)	Time (hr)
2	1
1	2
3	3
5	4
6	*5*
2	6
13	7
1	8
2	9
4	10

Temperature (F')	Time (hr)
64	1
66	2
71	3
73	4
74	5
78	6
82	7
79	8
71	9
68	10

Graphs: Exercise 13b

Make a line graph for each set of data below. Label both the x (horizontal) and y (vertical) axis properly. Give each graph a title.

Height (cm)	Vertical Jump (cm)
59	12
60	17
61	16
62	24
65	21
65	35
67	27
68	36
71	31
74	11

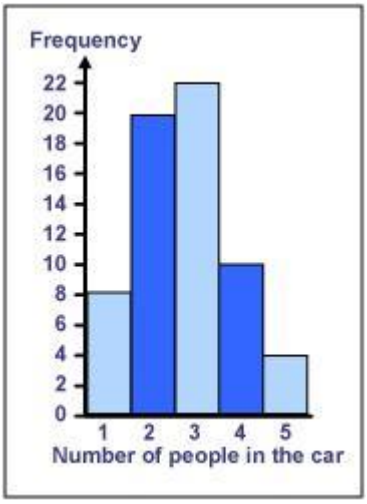
Temperature (F')	Time (hr)
16	2
17	5
18	1
18	6
21	12
24	4
25	0
28	14
29	8
33	4

Bar Charts

In a bar chart, the height of the bar represents the frequency of the data. So, we label the vertical axis 'Frequency'. The labelling of the horizontal axis depends on what is being represented by the bar chart!

Example

Barry conducts a survey to find the number of people in each of the cars arriving at his school gate between 8.30am and 9.00am. His results are shown in the bar chart below:



a) How many cars contained 1 person?

8 cars contained 1 person

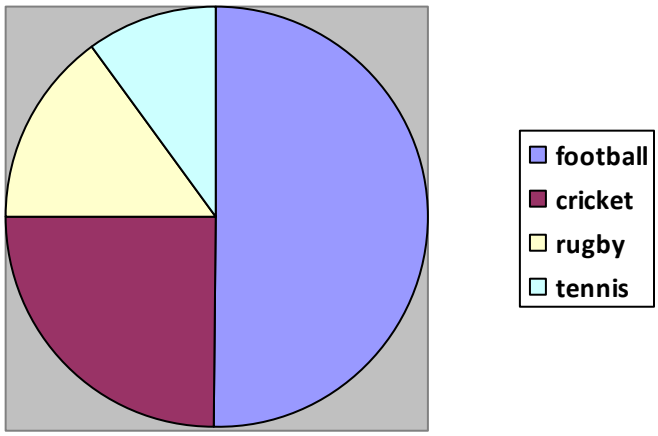
b) How many cars contained more than 3 people?

14 cars contained more than 3 people (10 + 4 = 14)

c) Explain why there are only a small number of cars containing 1 person.

Most cars would be driven by parents bringing their children to school, only a few would contain just a teacher or a sixth former

Pie Charts

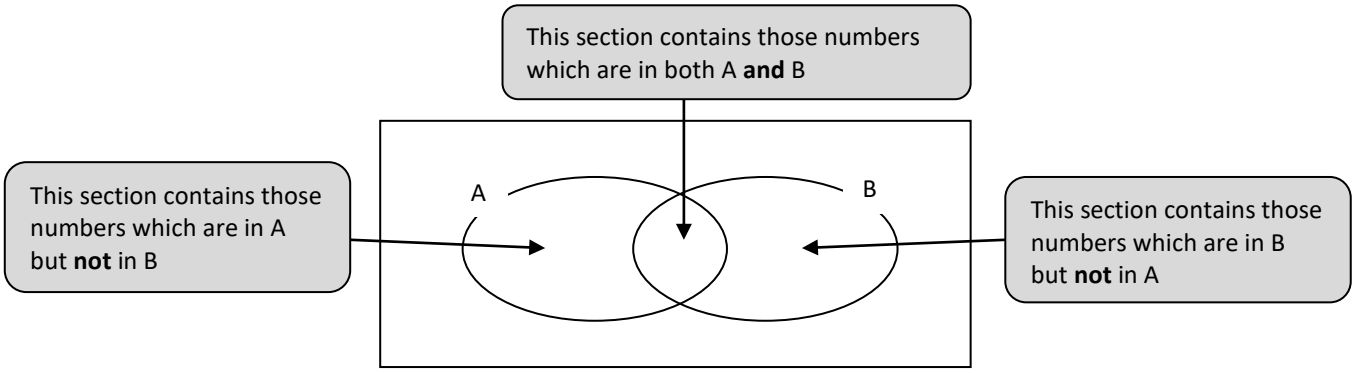


Pie charts are circular diagrams where each sector represents a proportion of the total.
The above diagram shows people's favourite sport.
The chart shows us that 50% of the people like football and 25% (or a quarter) like cricket. The chart gives us proportions but doesn't give us actual quantities.

Venn diagrams

In this section we introduce the ideas of Venn diagrams and probability. A *Venn diagram* is a way of representing information visually.

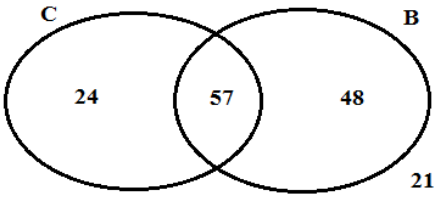
Consider two events A and B,



EXAMPLE 1

The Venn diagram shows information of 150 patients in a local surgery.

They were asked if they took any medication for cholesterol (C) or blood pressure (B).



(a) How many patients took both of the medications?
(b) How many patients took only one medication but not both?
(c) What does 21 represent on the Venn diagram?

.....

(a) 57 ← Look at the number in the overlap of the circles

(b) 24 + 48 = 72 ← 24 = C only as it is in circle C but not also in circle B
48 = B only as it is in circle B but not also in circle C

(c) 21 represents the number of patients who took no medication. ← 21 is not in any of the circles

NOTE: If you add all the numbers you get the total number of patients.
24 + 57 + 48 + 21 = 150

EXAMPLE 2

In a group of 30 friends, 15 play netball, 18 play badminton, 7 play netball and badminton.

(a) Represent this information on a Venn diagram.

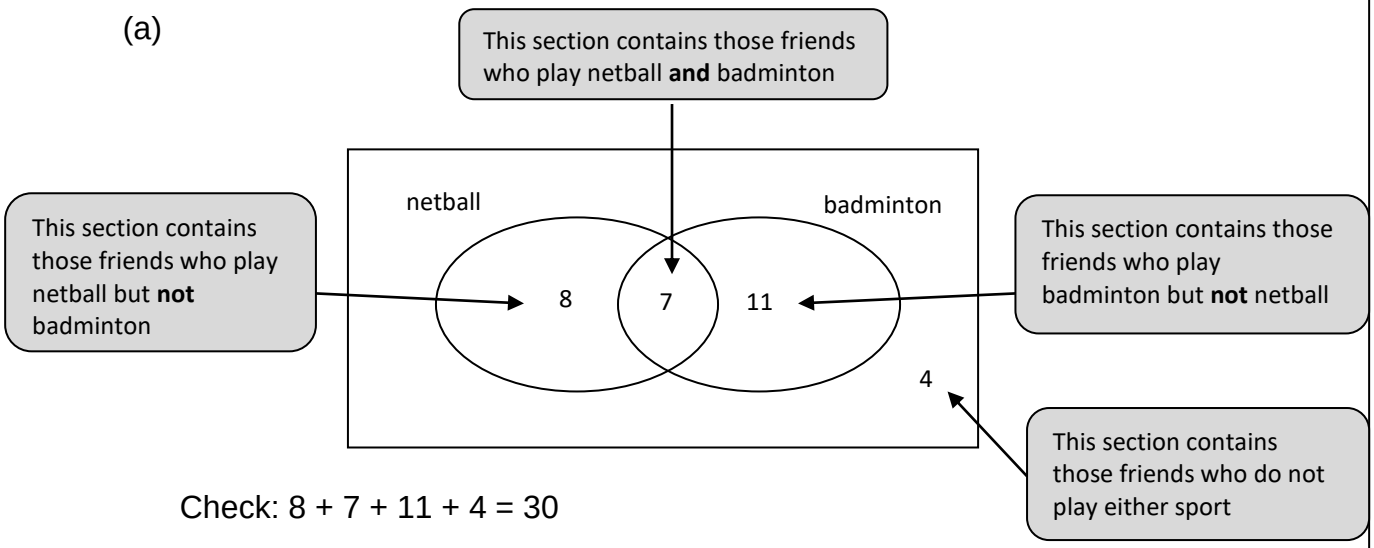
(b) Work out the probability that a friend plays netball only.

(c) Work out the probability that a friend plays badminton only.

(d) Work out the probability that a friend plays netball or badminton but not both.

(e) Work out the probability that a friend does not play netball or badminton.

(a)



Check: 8 + 7 + 11 + 4 = 30

NOTE: Always start from the overlap and then work your way outwards to complete the Venn diagram. Always label your circles.

(b) netball only = 15 − 7 = 8 ← 15 play netball but 7 play both

probability netball only = $\frac{8}{30}$ ← 8 play netball only out of 30 friends

(c) badminton only = 18 – 7 = 11 ← 18 play netball but 7 play both

probability netball only = $\frac{11}{30}$ ← Write your answer as a fraction

(d) netball only or badminton only = 8 + 11 = 19 ← Do not include 7 as 7 play both

probability netball only or badminton only = $\frac{19}{30}$

(e) not netball or badminton = 30 – (8 + 11 + 7) = 4 ← 4 is not in any of the circles

probability not netball or badminton = $\frac{4}{30}$

Reading Graphs

Graphs: Exercise 10

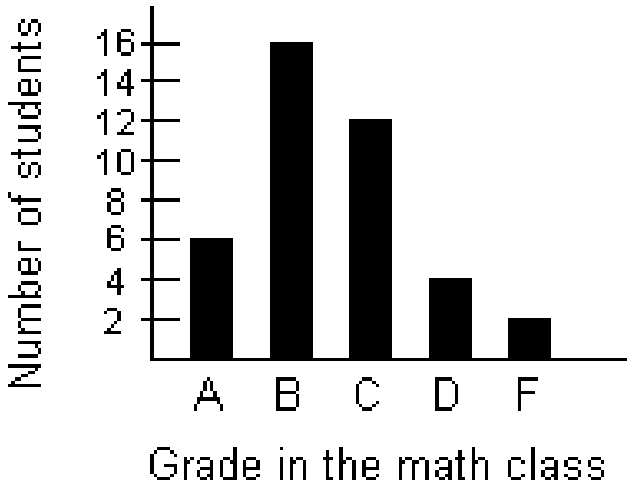
The bar graph below shows the number of students in a maths class that received the grades shown. Use this graph to answer questions 1a - 1d.

1. Find the number of students who received an A.

2. Find the number of students who received an F.

3. Find the number of students who passed the course (D or higher).

4. Which grade did the most students receive?



Graphs: Exercise 13d

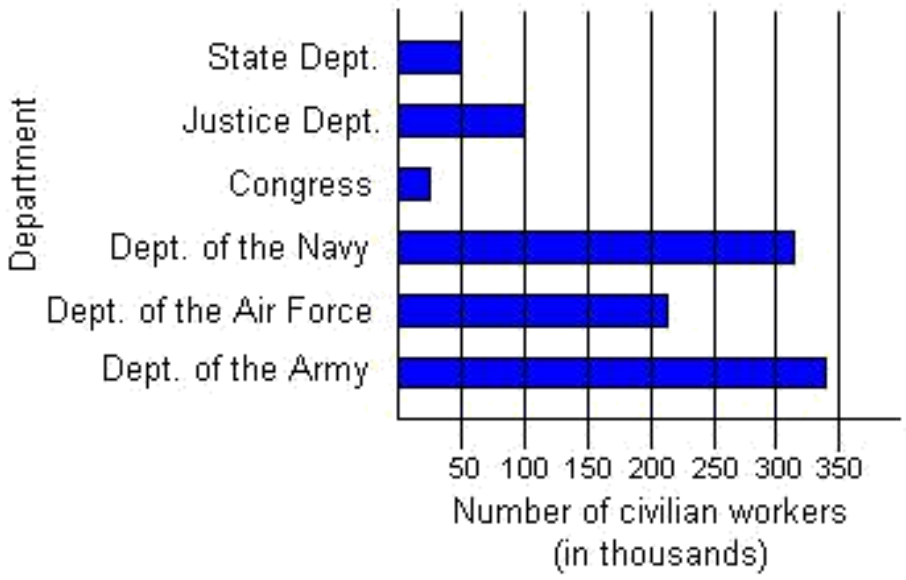
The bar graph below shows the number of civilians holding various federal government jobs. Use the graph to answer questions 2a - 2d.

2a. Approximately how many civilians work for Congress?

2b. Approximately how many civilians work for the State Department?

2c. Approximately how many civilians work for the armed forces (Navy, Air Force, and Army)?

2d. Which federal government job listed has the most civilian workers?

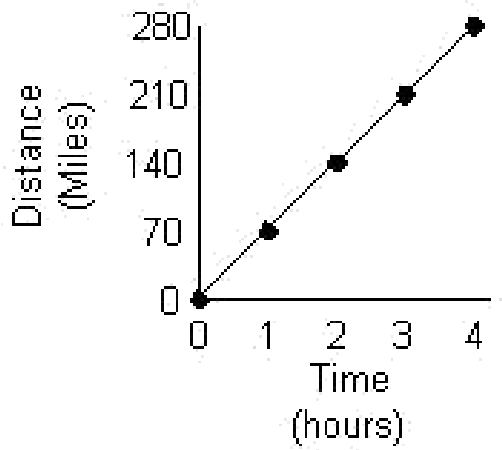


Graphs: Exercise 13e

The line graph below shows the distance travelled of a vacationer going 70 mph down I-40 from 0 to 4 hours. Use the graph to answer questions 3a - 3b.

3a. How far has the vacationer travelled at 3 hours?

3b. How long does it take the vacationer to travel 140 miles?



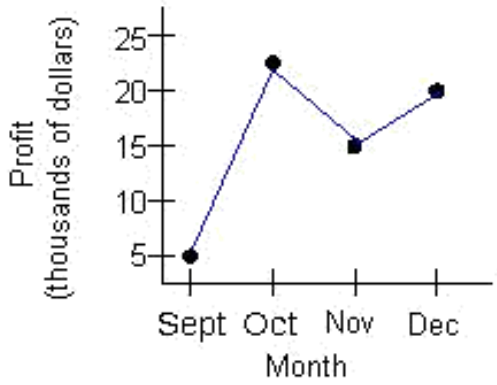
Graphs: Exercise 13f

The line graph below shows the profit a local candy company made over the months of September through December of last year. Use the graph to answer questions 4a - 4c.

4a. Approximately how much was the profit in the month of October?

4b. Which month had the lowest profit?

4c. What is the difference between the profits of November and December?



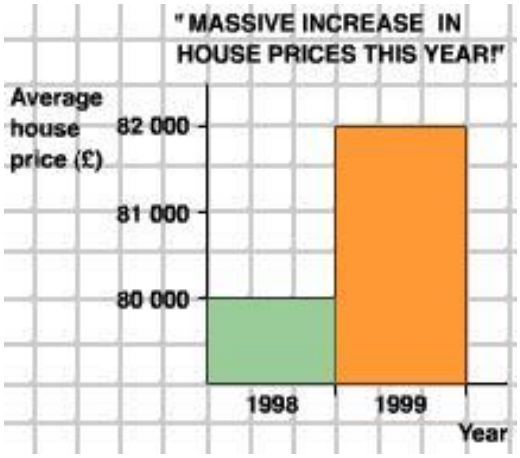
Misleading graphs (adapted from BBC Bitesize)

It is a well-known fact that statistics can be misleading. They are often used to prove a point and can easily be twisted in favour of that point.

Here are some examples of misleading graphs. Can you see what is wrong with each of them? Make a list of their faults, and then check your answers.

Question 1

What is wrong with this bar chart? How should the information be represented?



The Answer

From this graph, it looks as though house prices have trebled in one year! It is misleading because the vertical axis does not start at 0. Look at the 'improved' version of the same graph. This gives a much more accurate picture of what has happened.

Question 2

What is wrong with the information represented in this graph?

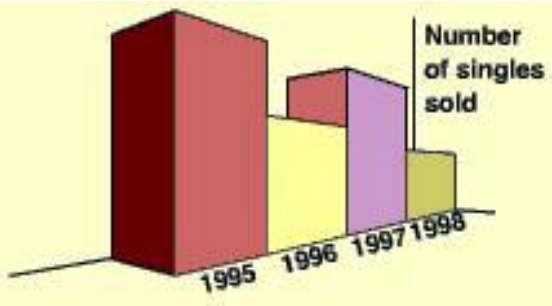
The Answer

Although the vertical scale starts at 0, it does not go up in even steps. This distorts the graph, and makes it look as though the biggest jump is between 1 and 2, rather than 3 and 4.

Also, there are no labels on the axes, so we have no idea what this graph represents!

Question 3

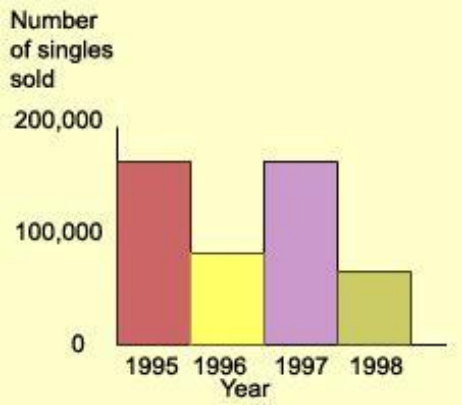
What is wrong with this 3D bar chart?



The Answer

This 3D bar chart might look very attractive, but it is also very misleading. There is no scale on the vertical axis and, because of the perspective, it looks as though sales for 1995 were far greater than those for any other year. In fact, they were identical to those for 1997.

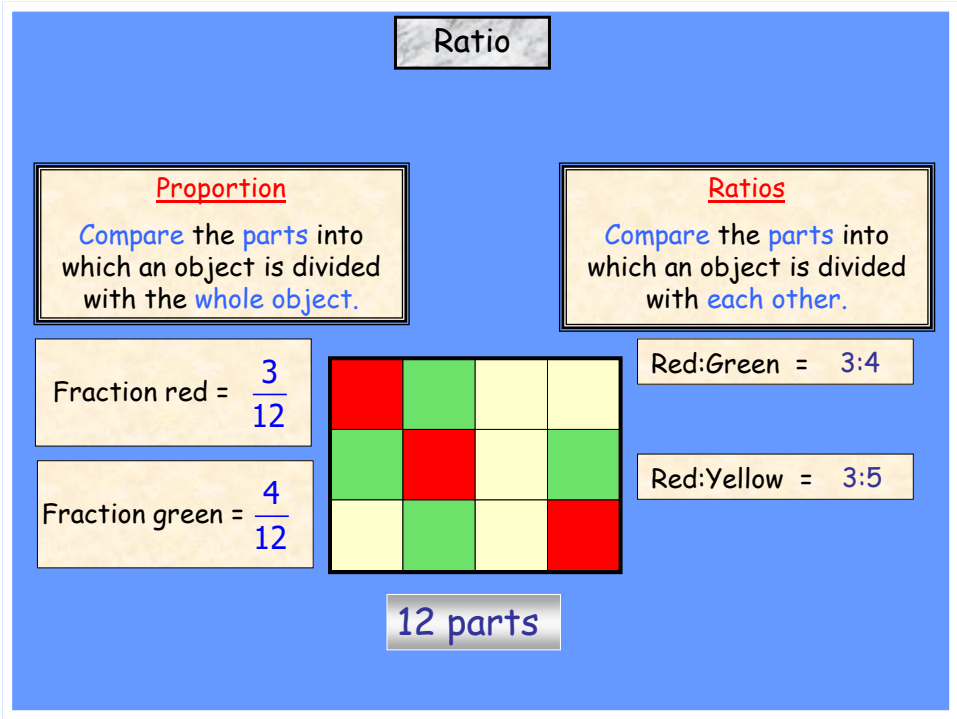
It would be much better to draw a 2D-bar chart like this, with the appropriate labelling on each axis:



5. RATIO & PROPORTION

Divide quantity in given ratio, ratio problems where total not given, proportion of amounts, scale, best buy, recipes

Ratios are a way of showing how many things of one type there are compared with another.
Proportions are a way of showing how much of one part there is compared with the whole thing.

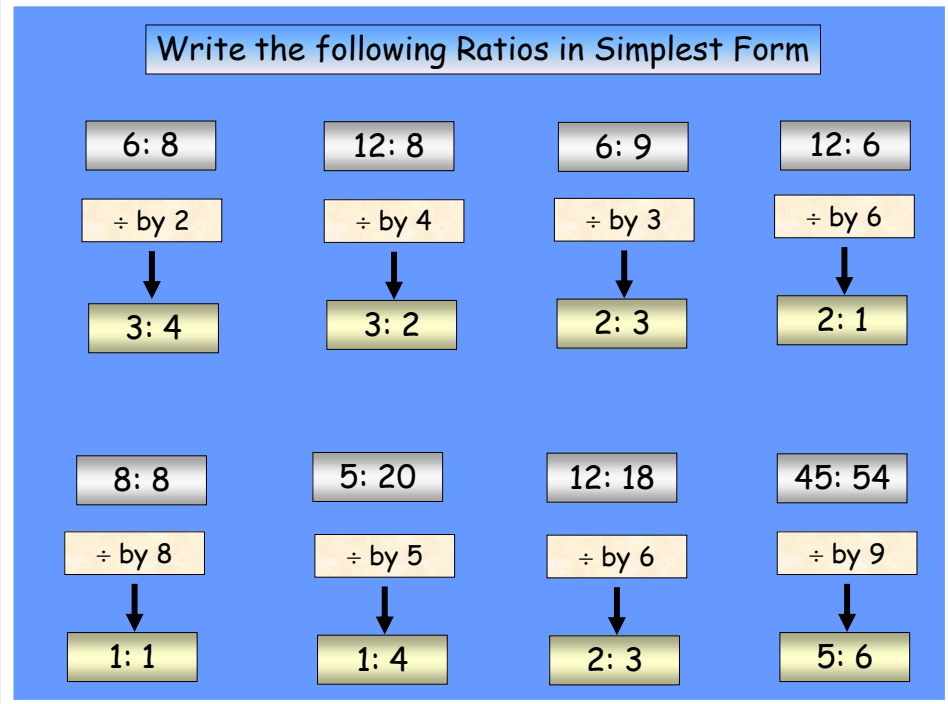


Simplify ratio

To simplify a ratio, we need to divide both numbers by a common factor.
6 and 8 can both be divided by 2 (2 is a common factor),

So, the ratio 6 : 8 can be simplified to

$$= \frac{(6 \div 2)}{3} : \frac{(8 \div 2)}{4}$$



Divide quantity in given ratio

To divide in a given ratio, you normally need to start by working out the value of one part
Example: Divide £40 in the ratio 1:3

1+ 3 = 4 so altogether we need to split the £40 into 4 equal parts.
£40 ÷ 4 = £10 so 1 part = £40
3 parts = 3 x £10 = £30
So, our ratio of 1: 3 means the £40 is split into
£10 : £30

Example 2:
divide £20 in the ratio 2:3
2+3 = 5, so altogether we need to split the £20 into 5 parts
£20 ÷ 5 = £4, so 1 part = £4
2 parts= 2 x 4; 3 parts = 3 x 4
so, our ratio of 2 : 3
is £8 : £12

Working out total amounts

Sometimes we are not given a total amount, but a value for 1 of the ratios

Example: Orange squash is diluted in the ratio of 4 parts water for 1-part squash. How much water should be added to 25 ml of squash

	water		squash
ratio	4	:	1
Amount	?	:	25 ml

25ml is equivalent to 1 part in the ratio, so the water will be 4 parts so 4 x 25 = 100ml

Proportion

Proportions are similar to fractions: “1 in every 4” is another way of writing ¼
Proportion questions can take several different forms

Recipes
A recipe for soup for 4 people needs 200g of carrot, 2 onions, 40g butter

a. How much carrots would you need for 12 people
   4people need 200g of carrots
   12 people need 3 x 200 = 600g
b. how many onions would you need for 2 people
   a. 4 people need 2 onions
   b. 2 people need 2 ÷ 2 = 1 onion

Scale
Exchange rate is £1 = $1.60 How many dollars can you get for £50
£50 = 50 x 1.6
£50 = $80

Best Buy
I can buy 3 cans of coke for £1.50 or 2 cans for 90p. Which is best value.
To solve this, you need to find out how much 1 can would be worth in each case

3cans = £1.50 — 2 cans = 90p
1 can = 1.50÷ 3 = 50p — 1 can = 90 ÷ 2 = 45p
Therefore 2 cans for 90p is better value

Ratio and Proportion: Exercise 14

1. Simplify the following ratios
a. 5:10 b. 8:12 c. 16:20 d. 9:12

2. Divide £24 in the following ratios
a. 5:3 b. 5:1 c: 7 :5

3. A recipe for 3 people for bolognese sauce requires 300ml of chopped tomatoes. How much tomatoes would be required for a. 1 person, b. 5 people

4. I can buy 2 tins of baked beans for £1.30 or a pack of 6 for £3. Which is the best value

5. The exchange rate is £1 = 1.1 euros. A pair of sunglasses costs £20. What would it be in euros

6. AREA PERIMETER VOLUME

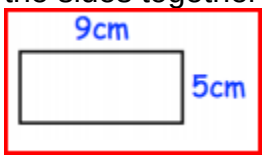
Perimeter of shape, area of 2d shapes (rectangle, triangle, and compound shapes, volume of 3d shapes (cuboids, prisms)

Perimeter of a shape is the total distance around the outside of the shape. It is measured in mm, cm, m.

Area of a shape is how much surface a shape covers. It is measured in mm^2, cm^2, m^2.
Volume is how much space something takes up. It is measured in mm^3, cm^3, m^3.

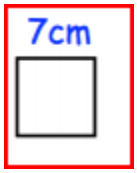
To find a perimeter, you add up the lengths of all the sides

You can work out the area of squares and rectangles by multiplying the lengths of the sides together



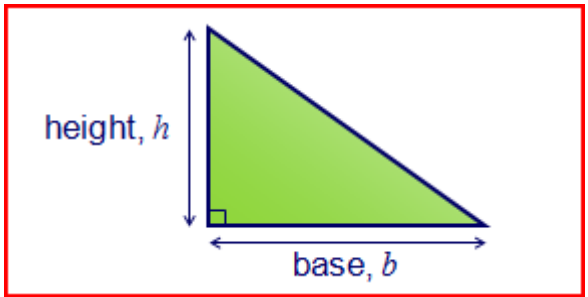
Area = 9 x 5 = $45cm^2$

Work out the area of this square



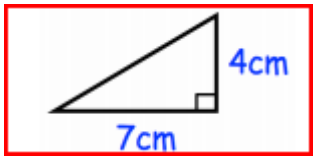
Because all sides of a square are equal, the area will be 7 x 7 = $49cm^2$

To work out the area of a triangle, you need to multiply the length of the base by its height, and then divide by two

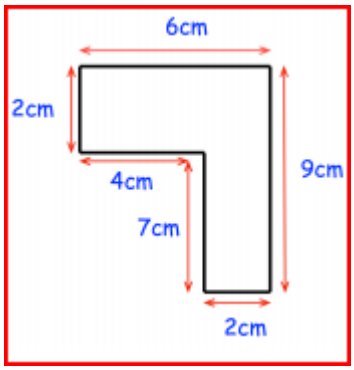


$$\text{Area of a triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

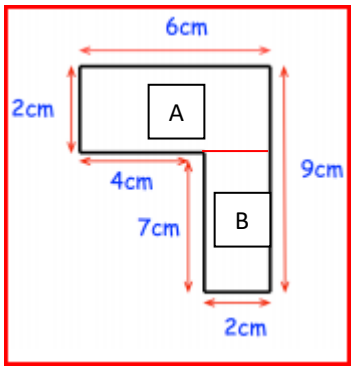
$$= \frac{1}{2}bh$$



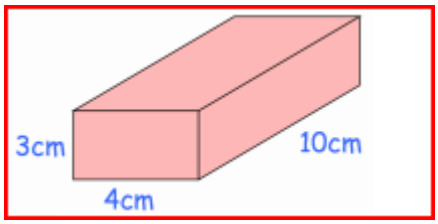
So, area = ½ x 4 x 7 = 14 cm²
To work out the area of **compound shapes**, you need to split the shape up into recognisable shapes:



- shape A's area is 6 x 2 =12. Shape B's area is 7 x 2 =14. So, the area of the total shape is 12 + 14 = 26cm²



You can work out the volume of **cubes and cuboids** by multiplying the length, width and the height together:



Volume = 3 x 4 x 10 = 70 cm³

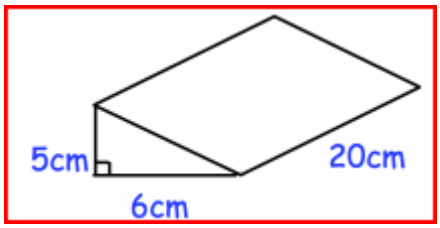
Make sure the units are all the same - if they are not you will have to change them

Jack has a suitcase that is 1.1m long, 0.6m wide and 20 cm deep. What is the volume of the suitcase?

We need to change 20cm into metres. 100 cm = 1m so 20 ÷ 100 = 0.2m
So, our volume is 1.1 x 0.6 x 0.2 = 0.132 m³

Volume of prisms. A prism is a 3D shape that has a constant area of cross section, i.e it has the same shape all the way through
Volume of prism = cross sectional area x length.

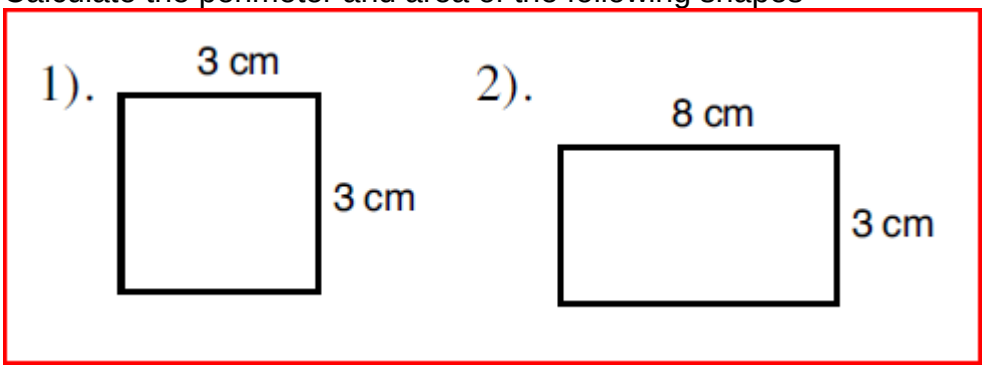
In this example, we work out the area of the front face which is a triangle and multiply it by the depth(20cm)



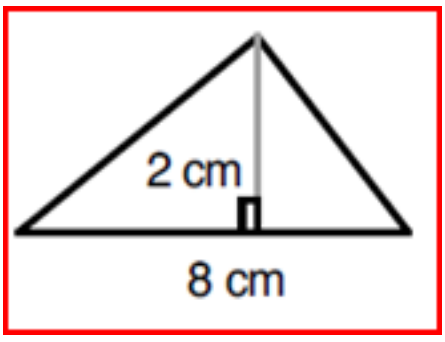
Area of triangle = ½ x 5 x 6 = 15
Volume = 15 x 20 = 300cm³

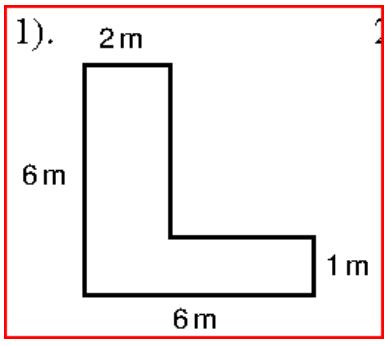
Area Perimeter Volume: Exercise 15

1. Calculate the perimeter and area of the following shapes

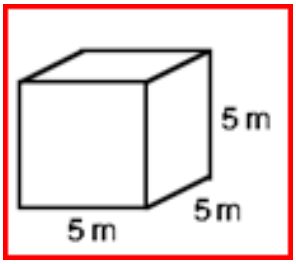


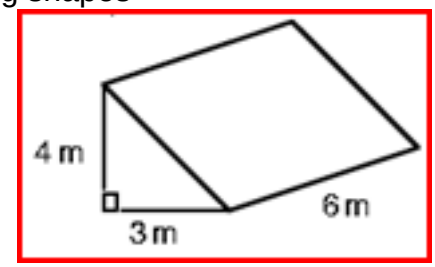
2. Find the area of the following shapes





3. Find the volume of the following shapes





7. AVERAGES AND PROBABILITY

Calculation of Mean, mode, median, range, interpretation of averages, calculation of probability, probability of something not happening

Mean

When you asked to find the mean of something it is just another way of asking you to find the average.

To do this you simply add all the integers together and divide by however many numbers there are.

For example

2,3,4,3,2,6,7

To find the mean simply add all the numbers together

2+3+4+3+2+6+7+3=30

There are 8 numbers, so we divide 30 by 8. This gives us a mean of 3.75

Median

When we are asked to give the median number that simply refers to the number in the middle. First place the numbers in order of size:

2,2,3,3,3,4,6,7

We count along, and whichever number lies in the middle is the median. In our set of data above we have an even amount of numbers:

Position of number 1, 2, 3, 4, 5, 6, 7, 8

Our data 2,2,3,3,3,4,6,7

As we can see the numbers in the position of 4 and 5 are the median numbers. When there is an even amount of numbers the rule is to add the two middle numbers together and divide by two.

3 + 3 = 6/2 = 3. Hence the median in this data set is 3

Mode

The mode refers to the number that occurs the most. In our set of data that number is 3. Hence the mode is 3.

Range

The range in a set of data refers to the difference between the highest and the lowest number. In our set of data, the lowest number is 2 and the highest number is
7. We simply subtract 2 from 7 and this gives us a value of 5. 5 is the range for this data set.

Try remembering this rhyme:

Hey diddle diddle, the median's the middle,

You add, then divide, for the mean.

The mode is the one that you see the most,

And the range is the difference between.

Statistics: Exercise 16

Using the following numbers 15 20 17 43 39 2

find the:

1. Mean

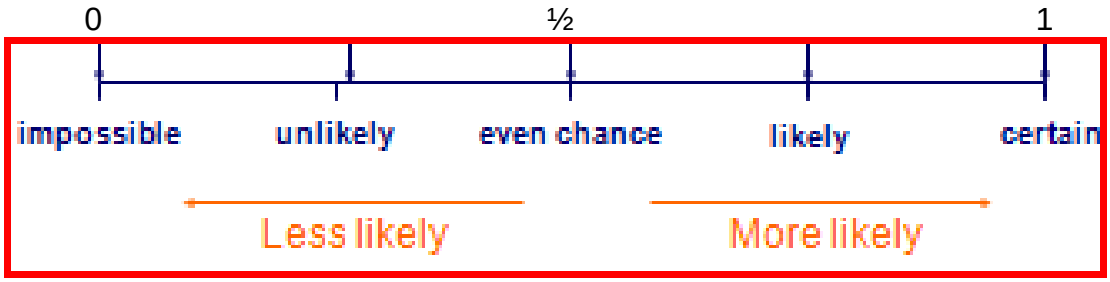
2. Mode

3. Median

4. Range

PROBABILITY

The probability of an event is how likely that outcome is. It can range between 0(impossible) and 1 (certain). It can sometimes be shown on a probability scale



An impossible event has a probability of 0
A certain event has a probability of 1.
An even chance (or 50-50) has a probability of ½

Probability can be given as a fraction, a decimal or a percentage
Example: What is the probability of getting a head when tossing a coin. There are only 2 possible outcomes – a head or a tail and each is equally likely so the probability of getting a head is 1 out of 2 or ½ or 50%

The probability of an event is defined as

$$\frac{\text{number of ways that an event can occur}}{\text{Total number of outcomes}}$$

If you roll a dice, there are 6 possible outcomes, 1,2 ,3 ,4 ,5, 6.
The probability of rolling a 1 is 1/6
There are 3 even numbers (2,4,6) so the probability of rolling an even number is 3/6 =1/2

The total probability of all possible events will add up to 1. This means that the probability of something happening and not happening will add up to 1. E.g. probability of rolling a 2 is 1/6. Probability of not throwing a 2 is 5/6.

Probability: Exercise 17

1. There are 11 red balls, 6 blue balls and 3 white balls in a bag. If one ball is taken at random, from the bag, what is the probability that the ball is:
   a. Red b. white c. not blue

2. The probability that it will rain tomorrow is 0.65. What is the probability that it will not rain?

3. You roll an ordinary dice. What is the probability that you get:

   a. An odd number b. A number greater than 4? c. A number less than 1?

8. ALGEBRA

Algebra uses letters to represent values in equations and expressions. You need to be able to simplify and manipulate algebraic expressions

Simplify

$4a \times 5b = 4 \times 5 \times a \times b = 20ab$
$2a \times 3a = 2 \times 3 \times a \times a = 6a^2$

Collect like terms.
To do this you need to add together the terms that are the same

$3a + 5a = 8a$
$6a - 2a = 4a$
$2a + 6b + 2a + 4b$. Here we add the a's together and add the b's together
$= 4a + 10b$

Substitution.

We substitute the numbers into the expressions, i.e we replace the letters with numbers
If a =3, b=4, c=7, find the value of

$a + b$
$= 3 + 4$
$= 7$

$2a = 2(3) = 2 \times 3 = 6$
$3c = 3 \times 7 = 21$

$4a - 2b = (4 \times 3) - (2 \times 4) = 12 - 8 = 4$
$a^2 + b = (3 \times 3) + 4 = 9 + 4 = 13$

This skill is used to put numbers into formula
$V = u + at$
If u = 6, a =2, t = 3, find V

$V = u + at$
$= 6 + (2 \times 3)$
$= 6 + 6$
$V = 12$

$S = d \div t$ where s represents speed, d represents distance, t represents time

A bus travels 100 metres in 10 seconds. Work out the speed it was travelling

$S = d \div t$
$= 100 \div 10 = 10$ meters per second

ALGEBRA: Exercise 18

1. If a = 2, b = 3, c = 4

a. Find 2a + b b.3a – 2b c. c^2 -a

2. Using the formula F= 2c + 30. Find F if:

a. C = 20 b. C = 0 c. C =25

d If F = 60, find C

Edge Hill University

Numeracy Revision

Answers

Addition: Exercise 1

1. 0.9 + 11 = 11.9
2. 2.34 + 32.6 = 34.94
3. 3.45 + 78.2 = 81.65
4. 113.89 + 11.45 = 125.34
5. 16.7 + 000000000.5 = 17.2

Subtraction: Exercise 2

1. 11 – 0.9 = 10.1

2. 32.6 – 2.34 = 30.26

3. 78.2 – 3.45 = 74.75

4. 113.89 - 11.45 = 102.44

5. 16.7 – 0.5 = 16.2

Multiplication: Exercise 3

1:	**2:**	**3:**	**4:**	**5:**
11	23	57	54	74
x 21	x 9	x 19	x 10	x 93
231	207	1083	540	6882

6:	**7:**	**8:**	**9:**	**10:**
14	0.37	0.17	7.4	7.2
x 0.81	x 56	x 13	x 4	x 6.7
11.34	20.72	2.21	29.6	48.24

Division: Exercise 4

1:	**2:**	**3:**	**4:**
056	083	060	0085
12 | 672	12 | 996	20 | 1200	17 | 1445

5:	**6:**	**7:**	**8:**
055	070	0099	0082
18 | 990	11 | 770	14 | 1386	20 | 1640

BIDMAS: Exercise 5

1:	2:	3:
20 – 3 x 5	11 + 8 ÷ 2	8 – (3 x 2) ÷ 6
= 5	= 15	= 7

4:	5:	6:
$3 + 2^2$	$(4^2 - 10) + 4$	5 x (8 – 3) - 20
= 7	*=10*	*=5*

Factors and Multiples: Exercise 6

1: List all the factors of 20: 1,2 4, 5,10,20

2: List the first 10 multiples of 5: 5,10,15,20,25,30,35,40,45,50

3: Find the Lowest Common Multiple of 4 and 6
Multiples of 4: 4,8,**12**,16,20
Multiples of 6: 6,**12**,18,24,30
Lowest Common Multiple (LCM) = 12

4: Find the Highest common Factor of 20 and 18
Factors of 20: 1,2,4,5,10,20
Factors of 18: 1,2,3,6,9,18
Highest Common Factor (HCF) = 2

Rounding: Exercise 7

1: round the following to the nearest 10

a. 467	b. 5433	c. 89	d. 87003
470	**5430**	**90**	**87000**

2: round the following to 1 decimal place

a. 36.37	b. 6.88	c. 0.89	d. 0.499
36.4	**6.9**	**0.9**	**0.5**

3.Round the following to 1 significant figure

a. 670	b. 27	c. 0.77	d. 23.09
700	**30**	**0.8**	**20**

4. Estimate

a. 35.3 + 92	b. (34 + 73) ÷ 5
120	**20**

Negatives: Exercise 8

1: 4 – 6	2: 3 - 6	3: -2 + 6	4: -7 - 2	5: -4 + 3
-2	**-3**	**4**	**-9**	**-1**

UNITS OF MEASURE: Exercise 9

1: convert the following to cm

a. 15mm	b. 2m	c. 0.5m
1.5	**200**	**50**

2.Convert the following to g

a. 2 kg	b. 10kg	c. 0.3kg
2000	**10000**	**300**

3. Convert the following into cl

a. 20ml	b. 2 litres	c. 0.5 litres
2	**200**	**50**

Fractions: Exercise 10

1. $\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$	**2.** $\frac{1}{8} + \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$	**3.** $\frac{1}{6} + \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$
4. $\frac{1}{10} + \frac{1}{2} = \frac{6}{10} = \frac{3}{5}$	**5.** $\frac{3}{4} + \frac{3}{16} = \frac{15}{16}$	**6.** $\frac{1}{10} + \frac{3}{5} = \frac{7}{10}$
7. $\frac{1}{4} - \frac{1}{6} = \frac{1}{12}$	**8.** $\frac{3}{5} - \frac{3}{8} = \frac{9}{40}$	**9.** $\frac{3}{4} - \frac{3}{5} = \frac{3}{20}$
10. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$	**11.** $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$	**12.** $\frac{2}{3} \times \frac{4}{9} = \frac{8}{27}$
13. $\frac{3}{5} \div \frac{1}{2} = \frac{6}{5} = 1\frac{1}{5}$	**14.** $\frac{4}{9} \div \frac{1}{9} = \frac{36}{9} = 4$	**15.** $\frac{2}{5} \div \frac{1}{10} = \frac{20}{4} = 4$

Fractions: Exercise 10b

1. 1/3 of 15 **5**
2: 1/5 of 40 **8**
3: ¼ of 24 **6**

4 2/3 of 27 **18**
5: 2/5 of 50 **20**
6: 3/7 of 21 **9**

Percentages: Exercise 11

1). Find 40m as a percentage of 50m.

80%

2). What is 40% as a fraction:
2/5

3). what is 35% as a decimal:
0.35
4). Find 30p as a percentage of £6.

5%

5). A computer costs £800 before VAT. If VAT is 20%, how much VAT will you have to pay?
£160

6). A shopkeeper buys a radio for £30 and wishes to sell it for a profit of 40%. How much should he sell it for?
£42

7). Jackie earns £13 000 a year. She is to get a wage increase of 4%. How much will her increase be?
£520

8). Geeta makes a cake for £2 and sells it for £2.50. What is her percentage profit?
25%

9). Alan buys a CD for £16 and sells it for £12. What's his percentage loss?
25%

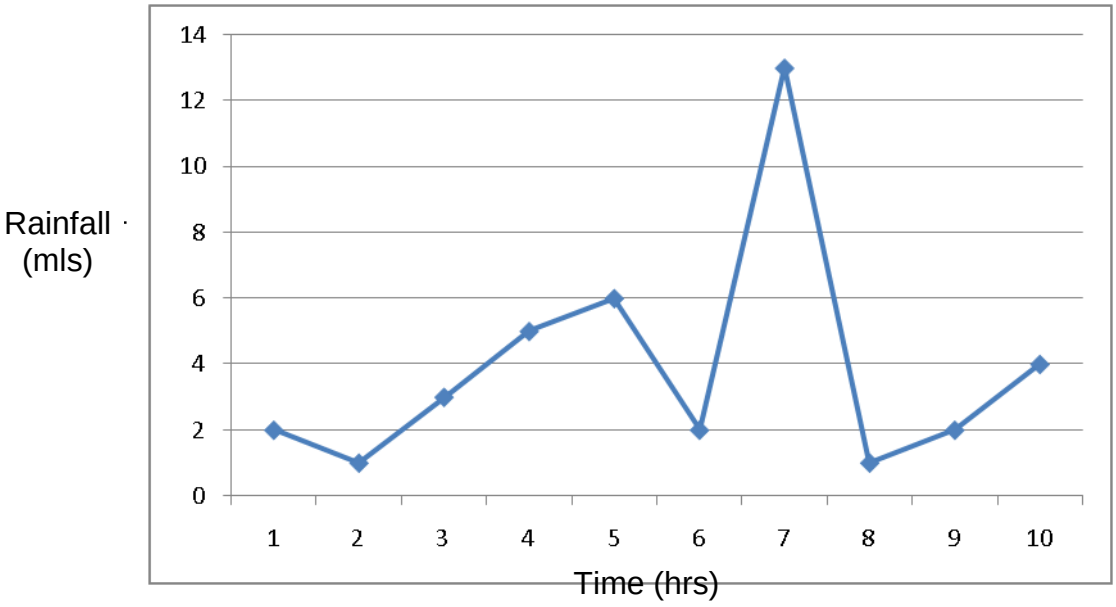
10). Si buys a TV for £100 and sells it for £80. What's his percentage loss?
20%

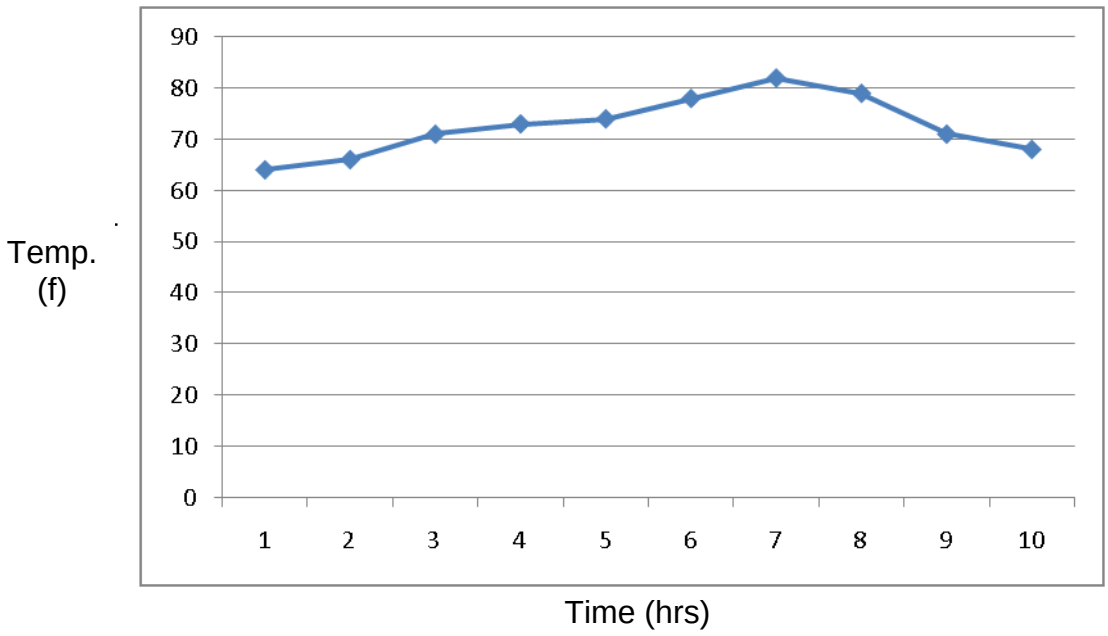
CONVERTING FDP: Exercise 12

5. Convert the following into percentages
   b. 0.4 b. 0.25 c. ½ d. 1/5
   40% 25% 50% 20%
6. Convert the following into decimals
   b. 30% b. 12% c. 1/10 d. 2/5
   0.3 0.12 0.1 0.4

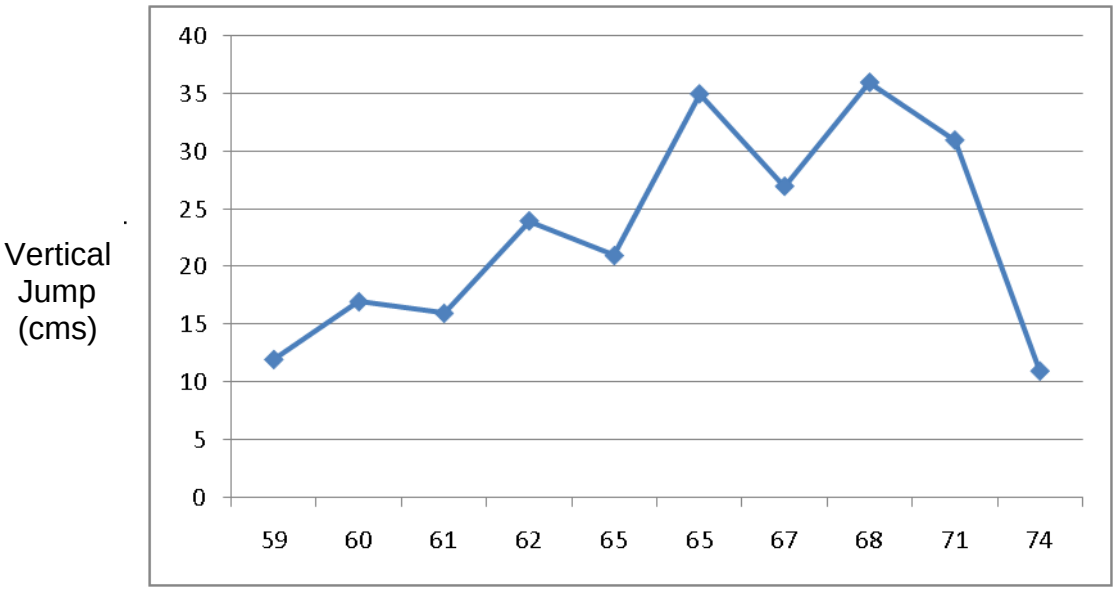
7. Convert the following into fractions – simplify where possible
   b. 25% b. 83% c. 0.2 d. 0.18
   ¼ 83/100 1/5 9/50

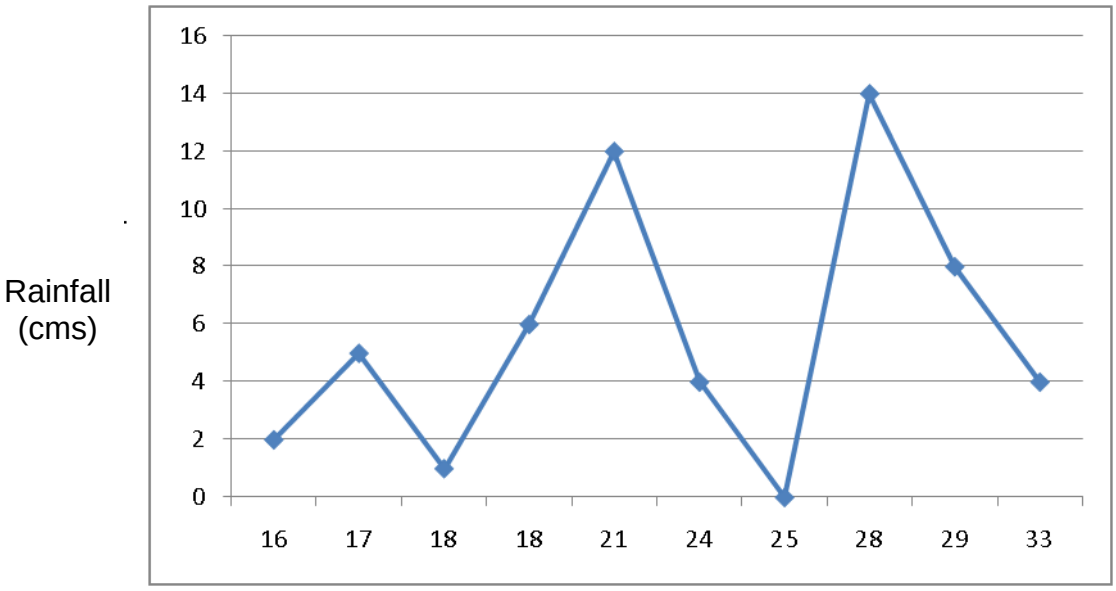
Graphs: Exercise 13a





Graphs: Exercise 13b





Graphs: Exercise 13c

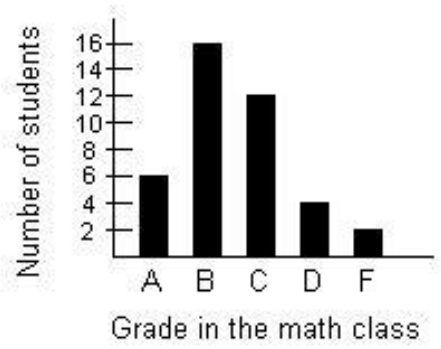
The bar graph below shows the number of students in a math class that received the grades shown. Use this graph to answer questions 1a - 1d.

1a. Find the number of students who received an A.

1b. Find the number of students who received an F.

1c. Find the number of students who passed the course (D or higher).

1d. Which grade did the most students receive?



1a. Find the number of students who received an A.

The bar that associates with the grade A is the first bar on the left. The top of that bar matches with 6 on the vertical axis.

6 students received an A.

1b. Find the number of students who received an F.

The bar that associates with the grade F is the fifth bar from the left. The top of that bar matches with 2 on the vertical axis.

2 students received an F.

1c. Find the number of students who passed the course (D or higher).

We will have to do a little calculating here. We will need to find the number of students that received an A, B C, and D and then ad them together.

The bar that associates with the grade A is the first bar on the left. The top of that bar matches with **6** on the vertical axis.

The bar that associates with the grade B is the second bar from the left. The top of that bar matches with **16** on the vertical axis.

The bar that associates with the grade C is the third bar from the left. The top of that bar matches with **12** on the vertical axis.

The bar that associates with the grade D is the fourth bar from the left. The top of that bar matches with **4** on the vertical axis.

6 + 16 + 12 + 4 = 38 students passed the course

1d. Which grade did the most students receive?

It looks like **more students received a B** than any other single grade.

Graphs: Exercise 13d

The bar graph below shows the number of civilians holding various federal government jobs.

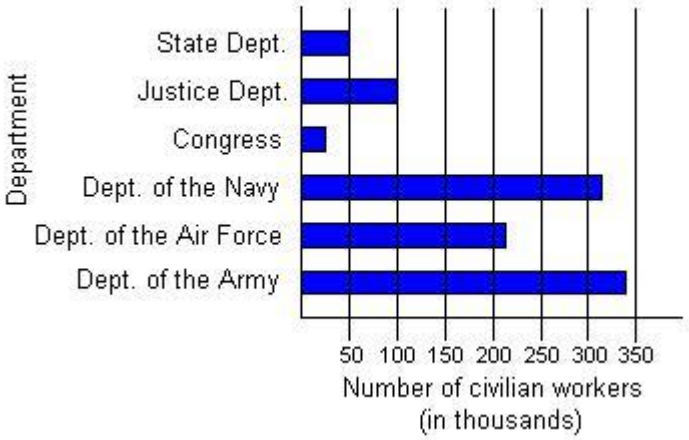
Use the graph to answer questions 2a - 2d.

2a. approximately how many civilians work for Congress?

2b. approximately how many civilians work for the State Department?

2c. approximately how many civilians work for the armed forces (Navy, Air Force, and Army)?

2d. which federal government job listed has the most civilian workers?



2a. Approximately how many civilians work for Congress?

- The bar that associates with Congress is the fourth bar up. The right of that bar lines up a little to the left of 50 on the horizontal axis. Note how the question asks ABOUT how many. In some cases, if it does not directly line up with a number that is marked you may need to approximate. This is very close to and less than 50. A good approximation is 25.

Approximately 25,000 civilians work for Congress.

2b. Approximately how many civilians work for the State Department?

- The bar that associates with the State Department is the sixth bar up. The right of that bar lines up with 50 on the horizontal axis.

Approximately 50,000 civilians work for the State Department.

2c. Approximately how many civilians work for the armed forces (Navy, Air Force, and Army)?

- We will have to do a little calculating on this one. We will need to find the number of civilians that work for each branch of the armed services and then add them up.

  The bar that associates with the Navy is the third bar up. The right of that bar ends between 300 and 350 on the horizontal axis. **310 is a good approximation** for this number.

  The bar that associates with the Air Force is the second bar up. The right of that bar ends between 200 and 250 on the horizontal axis. **210 is a good approximation** for this number.

The bar that associates with the Army is the first bar from the bottom. The right of that bar ends just under 350 on the horizontal axis. **340 is a good approximation** for this number.

Approximately 310,000 + 210,000 + 340,000 = 860,000 civilians work for the State Department.

2d. Which federal government job listed has the most civilian workers?

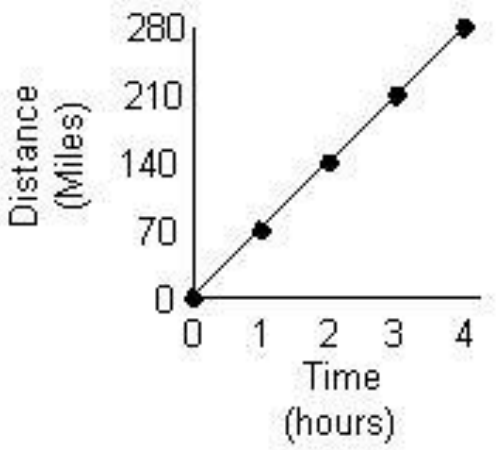
It looks like **the Army has the most civilian workers**.

Graphs: Exercise 13e

The line graph below shows the distance travelled of a vacationer going 70 mph down I-40 from 0 to 4 hours. Use the graph to answer questions 3a - 3b.

3a. How far has the vacationer travelled at 3 hours?

3b. How long does it take the vacationer to travel 140 miles?



3a. How far has the vacationer travelled at 3 hours?

- The point that matches with 3 on the horizontal axis also matches with 210 on the vertical axis.

The vacationer has travelled 210 miles.

3b. How long does it take the vacationer to travel 140 miles?

- The point that matches with 140 on the vertical axis also matches with 2 on the horizontal axis.

It takes the vacationer 2 hours to travel 140 miles.

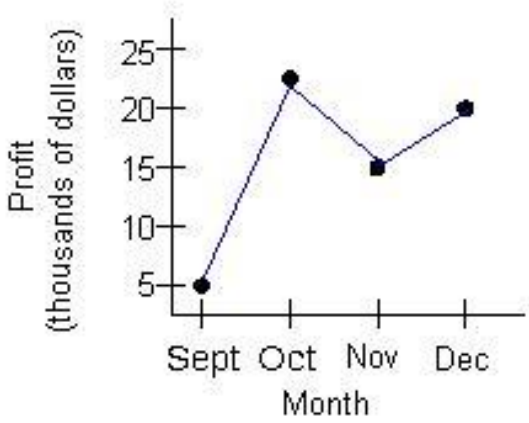
Graphs: Exercise 13f

The line graph below shows the profit a local candy company made over the months of September through December of last year. Use the graph to answer questions 4a - 4c.

4a. Approximately how much was the profit in the month of October?

4b. Which month had the lowest profit?

4c. What is the difference between the profits of November and December?



4a. Approximately how much was the profit in the month of October?

- The point that matches with October on the horizontal axis also matches between 20 and 25 on the vertical axis. It looks to be about 23.

The profit for the month of October is about

$23,000. 4b. Which month had the lowest profit?

It looks like September had the lowest profit.

4c. What is the difference between the profits of November and December?

- The point that matches with November on the horizontal axis also matches with **15** on the vertical axis.
- The point that matches with December on the horizontal axis also matches with **20** on the vertical axis.

The difference between the profits of November and December would be

20,000 - 15,000 = $5,000

Ratio and Proportion: Exercise 14

1. Simplify the following ratios

a. 5:10 b. 8:12 c. 16:20 d. 9:12

1:2 **2:3** **4:5** **3:4**

2. Divide £24 in the following ratios

a. 5:3 b. 5:1 c: 7 :5

15:9 **20:4** **14:10**

3. A recipe for 3 people for bolognese sauce requires 300ml of chopped tomatoes. How much tomatoes would be required for a. 1 person, b. 5 people

a. 100ml **b. 500ml**

4. I can buy 2 tins of baked beans for £1.30 or a pack of 6 for £3. Which is the best value

1 tin = 65p or 50p

So, 6 for £3 is better value

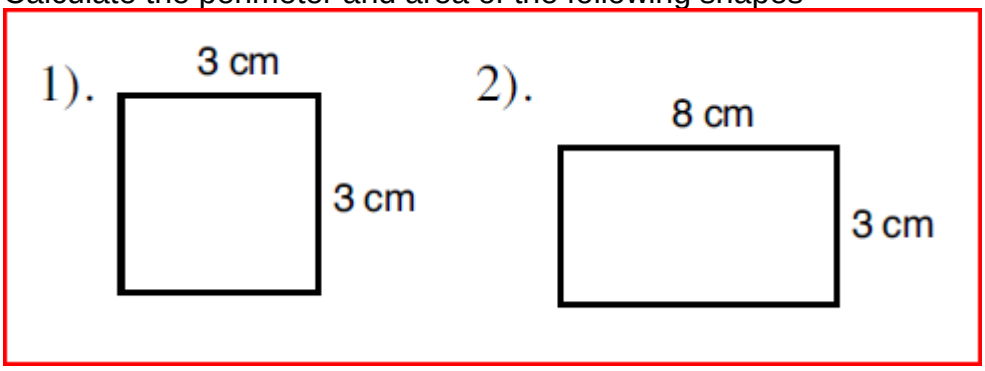
5. The exchange rate is £1 = 1.1 euros. A pair of sunglasses costs £20. What would it be in euros

£10 =11 euros

£20 = 22 euros

Area Perimeter Volume: Exercise 15

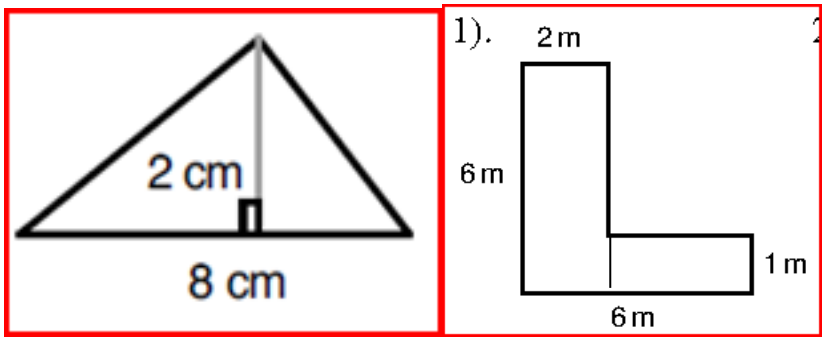
1. Calculate the perimeter and area of the following shapes



Shape 1Area = 3 x 3 = 9cm²; perimeter = 4 x3 = 12cm

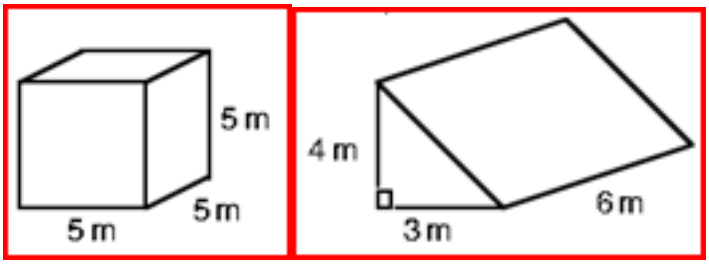
Shape 2 Area = 8 x 3 = 24cm²; perimeter = 8 + 3 + 8 + 3 = 22cm

2. Find the area of the following shapes



Shape 1 area = ½ x 2 x 8 = 8cm²
Shape 2, cut shape vertically area = 12 + 4 = 16cm²

3. Find the volume of the following shapes



Shape 1 volume = 5 x 5 x 5 = 125m³
Shape 2: volume = ½ x 4 x 3 x 6 = 36m³

Statistics: Exercise 16

Find the mean, mode, median and range from the following numbers:

15 20 17 43 39 2

Mean

15+20+17+43+39+2=136
136÷6=22.666

Mode

2 15 17 20 39 43

No number occurs more than any other

Median

2 15 17 20 39 43

17+20=37

37÷2=18.5

Range

43-2=41

Probability: Exercise 17

4. There are 11 red balls, 6 blue balls and 3 white balls in a bag. If one ball is taken at random, from the bag, what is the probability that the ball is:
   b. Red **11/20** b. white **3/20** c. not blue **14/20**

5. The probability that it will rain tomorrow is 0.65. What is the probability that it will not rain?
   1 - 0.65 = 0.35

6. You roll an ordinary dice. What is the probability that you get

   b. An odd number? **3/6** b. A number greater than 4? **2/6** c. A number less than 1? **0**

ALGEBRA: Exercise 18

1. If a = 2, b=3, c=4
   a Find 2a +b **7** b.3a – 2b **0** c. c^2 -a **14**

2. Using the formula F= 2c + 30. Find F if
   a. C = 20 **70** b. C = 0 **30** c. C =25 **80**

   d If F = 60, find C
   15