

National 5 Applications of Maths
Interpreting Information from Graphs and Tables



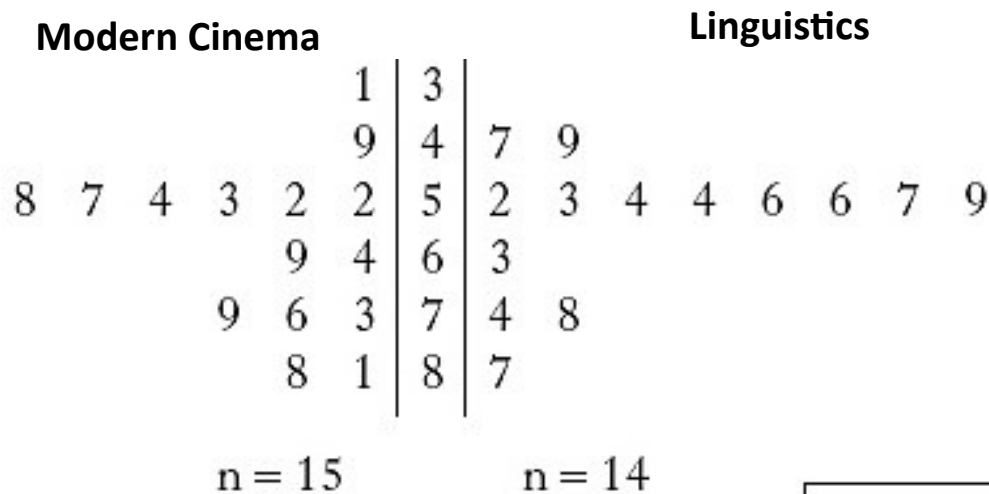
1) [specimen exam paper, adapted]

The table below shows the vehicle tax to be paid on different vehicles. The amount of vehicle tax depends on the CO₂ emissions of the vehicle and the fuel type.

		Tax for Petrol and Diesel Cars				
		Non Direct Debit		Direct Debit		
Bands	CO ₂ emission figure (g/km)	12 months	Six months	Single 12 month payment	Total payable by 12 monthly instalments	Single six month payment
Band A	Up to 100	£0	–	–	–	–
Band B	101 to 110	£20	–	£20	£21	–
Band C	111 to 120	£30	–	£30	£31.50	–
Band D	121 to 130	£110	£60.50	£110	£115.50	£57.75
Band E	131 to 140	£130	£71.50	£130	£136.50	£68.25
Band F	141 to 150	£145	£79.75	£145	£152.25	£76.13
Band G	151 to 165	£180	£99	£180	£189	£94.50
Band H	166 to 175	£205	£112.75	£205	£215.25	£107.63
Band I	176 to 185	£225	£123.75	£225	£236.25	£118.13
Band J	186 to 200	£265	£145.75	£265	£278.25	£139.13
Band K	201 to 225	£290	£159.50	£290	£304.50	£152.25
Band L	226 to 255	£490	£269.50	£490	£514.50	£257.25
Band M	Over 255	£505	£277.75	£505	£530.25	£265.13

- Alice's car emits 180g/km of CO₂. She pays for her car tax by direct debit in a single six month payment. How much does car tax does Alice pay?
- Morgan owns a car for work that is in band E. He does not pay by direct debit. He buys six months of car tax. Morgan pays half of the car tax, and his employer pays the other half. How much do they each pay?
- Cameron pays for car tax by direct debit in a single twelve month payment. He pays £145. What car tax band is his car in?
- Jai's family own three cars. Two of the cars emit 125g/km of CO₂, and the third car emits 227g/km. Jai does **not** pay by direct debit, and buys car tax for 12 months. Calculate Jai's total annual car tax payment.

- 2) The stem and leaf diagram below shows the exam marks of university students in two classes.



Key		
3 7		represents 73%
8 7		represents 87%

- a) What was the highest exam mark in the Modern Cinema class?
- b) What was the lowest mark in the linguistics class?
- c) How many people scored higher than 65 in the modern cinema class?
- d) What fraction of people scored lower than 55 in the linguistics class? Give your answer as a fraction in its simplest form.
- e) What percentage of people in total across both classes scored more than 70%?
- f) What was the mean mark in the linguistics class?
- g) What was the mean mark in the modern cinema class?
- h) Which class did better on average? **Explain your answer.**

3) [2016 exam paper, adapted]

The bus timetable between Dumfries, Biggar and Edinburgh is shown.

Dumfries ● Biggar ● Edinburgh												
Monday to Friday												
Route Number	101	101	101	101	101	102	101	101	101	101	101	102
Dumfries Whitesands Stance 4	0535	0710			0910	1025			1315			1815
Heathhall	0543	0720			0920				1325			
Amisfield Main Rd	0547	0725			0925				1330			
Parkgate	0552	0730			0930				1335			
St Ann's	0557	0736			0936				1341			
Beattock Primary School	0606	0745			0945				1350			
Moffat High St Stance 2	0612	0752			0952				1357			
Holywood						1031						1821
Auldgirth						1039						1829
Closeburn						1046						1836
Thornhill Cross						1050						1840
Durisdeer mill						1100						1850
Troloss						1105						1855
Elvanfoot						1117						1907
Crawford	0633	0813			1013	1128			1418			1913
Abington Village	0640	0820			1020	1135			1425			1920
Abington Service Area	0646	0827			1027	1142			1432			1927
Roberton	0651	0832			1032	1147			1437			1932
Lamington	0657	0838			1038	1153			1443			1938
Coulter	0702	0843			1043	1158			1448			1943
Biggar	0633	0709	0853	0953	1053	1208	1253	1353	1458	1623	1803	1953
Dolphinton	0644	0721	0905	1004	1104	1219	1304	1404	1509	1634	1814	2004
West Linton	0651	0731	0915	1011	1111	1226	1311	1411	1516	1641	1821	2011
Carlops	0655	0735	0920	1015	1115	1230	1315	1415	1520	1645	1825	2015
Silverburn	0702	0741	0927	1021	1121	1236	1321	1421	1526	1651	1831	2021
Penicuik Town Centre Stop C	0707		0932	1026		1241	1326	1426		1656	1836	2026
Flotterstone	0717	0746	0942	1036	1126	1251	1336	1436	1531	1706	1846	2034
Fairmilehead, Swanston Drive	0724	0753	0948	1042	1132	1257	1342	1442	1537	1712	1852	2039
Morningside Station	0732	0801	0956	1050	1140	1305	1350	1450	1545	1720	1900	2045
Tollcross	0740	0809	1004	1058	1148	1313	1358	1458	1553	1728	1908	2050
Lothian Road, Caledonian Hotel	0749	0818	1011	1104	1154	1319	1404	1504	1600	1735	1914	2055
Edinburgh Bus Stance E	0801	0830	1021	1114	1204	1329	1414	1514	1611	1745	1924	2102

- What time does the earliest 102 bus leave Holywood?
- Una catches the bus that leaves Dolphinton at 1509. What time did that same bus leave Dumfries?
- Yvonne lives in Flotterstone. She gets to the bus stop at 1030 and catches the next bus that arrives. The bus is on time. How long will it take to get to Tollcross?
- Graeme lives in Biggar and has a meeting in Edinburgh. His meeting begins at 14:00. He will get off the bus at Edinburgh Bus Stance E and it will take him 20 minutes to walk from the bus stance to his meeting. What is the **latest** bus that he could catch in Biggar?

4) [2017 exam paper, adapted]

Natalie is donating blood.

Whilst donating blood she notices a chart. The chart states that not every blood type can be given to every patient. The table shows which patients each blood type can help. Blood type can be either positive (+) or negative (-).

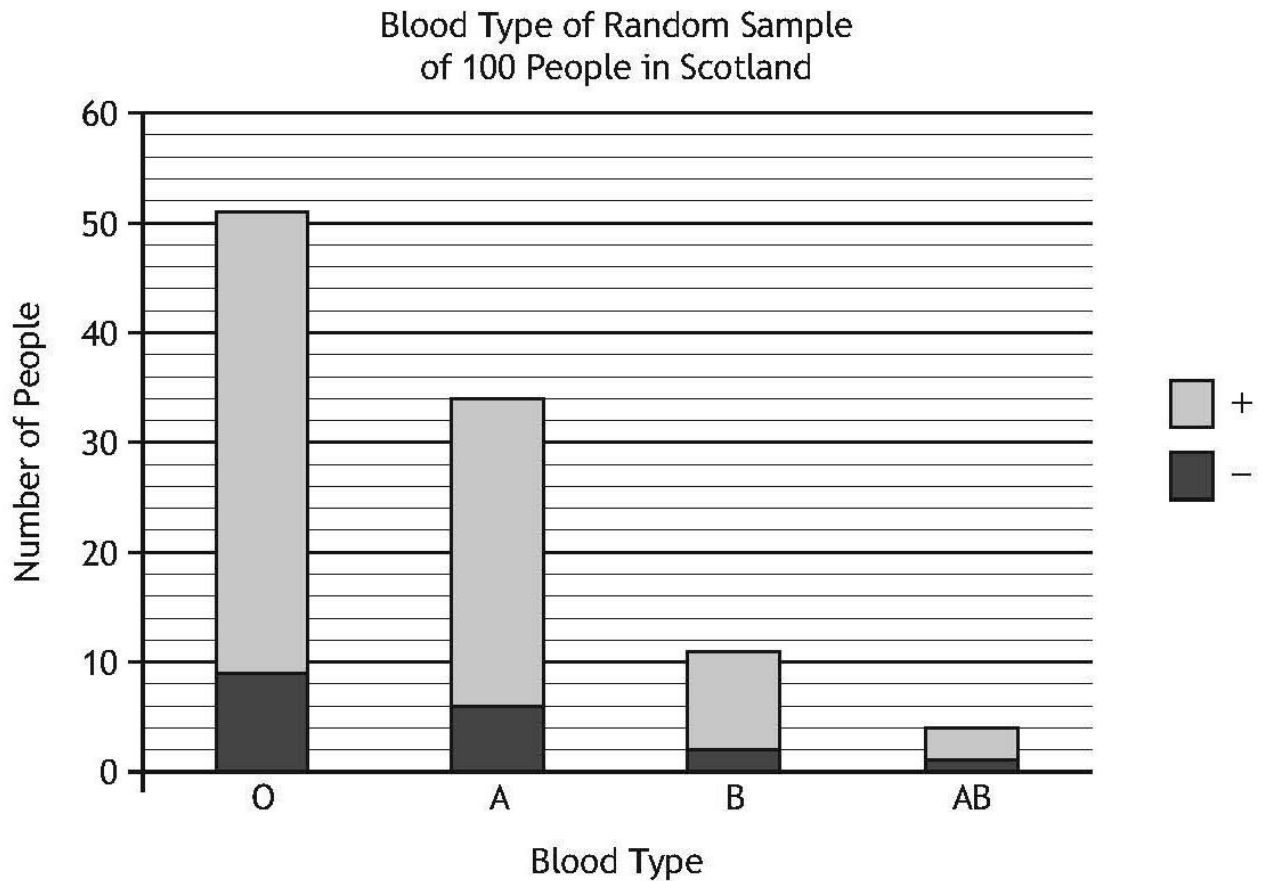
		Donor's Blood Type							
		O-	O+	B-	B+	A-	A+	AB-	AB+
Patient's Blood Type	AB+								
	AB-								
	A+								
	A-								
	B+								
	B-								
	O+								
	O-								

For example the blood of a donor with blood type AB- can only be given safely to a patient with blood type AB+ or AB-.

- Natalie's blood type is B+. State the blood types of patients that Natalie could donate to.
- Helena is a blood donor. She has a blood type that means she can donate to any other person. What is Helen's blood type?
- Iqra is a blood donor. She has a blood type that means she can only donate to two other blood groups. Her blood group is negative. What is Iqra's blood type?
- Ken is a patient. He has blood type A- (A negative). His partner is blood type B+ (B positive). Can Ken receive a blood transfusion from his partner?

5) [2017 exam paper, adapted]

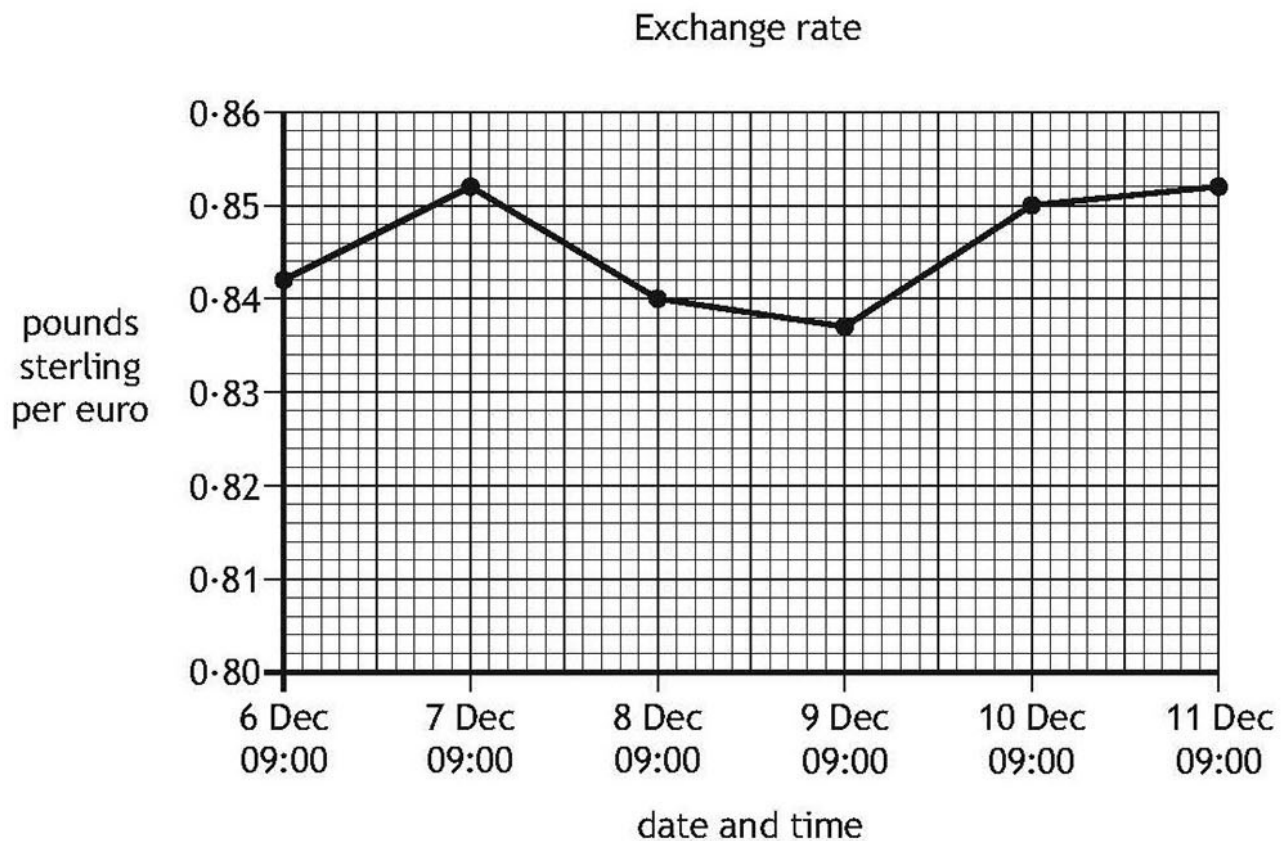
The graph below shows the blood type of 100 randomly chosen people in Scotland.



- a) How many people in this sample had A- (A negative) blood type?
- b) How many people in this sample had B+ (B positive) blood type?
- c) Calculate the total number of people who had a negative blood type.
- d) Kara's blood group is A+ (A positive). Using the graph above and the table from question 4, how many people can Kara donate blood to?
- e) What fraction of people with type A blood are in the A+ (A positive) group? Give your answer in its simplest form.
- f) What is the ratio B- : A- ? Give your answer in its simplest form.

6) [2018 exam paper, adapted]

The graph shows how many pounds sterling could be bought for 1 euro during December 2017.



- a) On one day the exchange rate was 1 euro = £0.85. What was the date and time?
- b) On 8 December at 9am, how many pounds sterling could be bought for 1 euro?
- c) On 6 December at 9am, how many pounds sterling could be bought for 1 euro?
- d) On what date and time could the **fewest** pounds sterling be bought?
- e) Find the percentage decrease from 9am on 7th December to 9am on 8th December.
- f) Find the percentage increase from 9am on 10th December to 9am on 11th December.

7) [2017 exam paper, adapted]

A company buys and sells silver, gold and platinum.

The table shows the price (in US dollars) per ounce of each of these metals, on the first trading day of each month, over the last year.

Month	Price of silver	Price of gold	Price of platinum
Jan	15.60	1170	1275
Feb	17.40	1140	1050
Mar	16.50	1210	1100
Apr	17.00	1200	1150
May	16.70	1190	1100
Jun	16.70	1275	1075
Jul	15.60	1175	1100
Aug	14.50	1190	850
Sep	14.60	1140	975
Oct	14.50	1125	1000
Nov	15.60	1195	1125
Dec	16.50	1200	1200
All prices in US dollars			

- a) What was the price of **three** ounces of gold on the first day in September?
- b) **Five** ounces of platinum were bought for \$5000. Which month was this?
- c) On the first day in October, the company bought 20 ounces of gold, 8 ounces of platinum and 120 ounces of silver. Calculate the total price.
- d) After December, the price of gold rose by 8% and the price of silver fell by 3.5%. Calculate the new price per month of gold and silver after these changes.
- e) What was the percentage increase in the price of platinum from September to October?
- f) On the first day of March, a company bought 100 ounces of silver and 10 ounces of gold. They later sold it all for a total of \$11 000. Calculate their percentage loss.

8) [2018 exam paper, adapted]

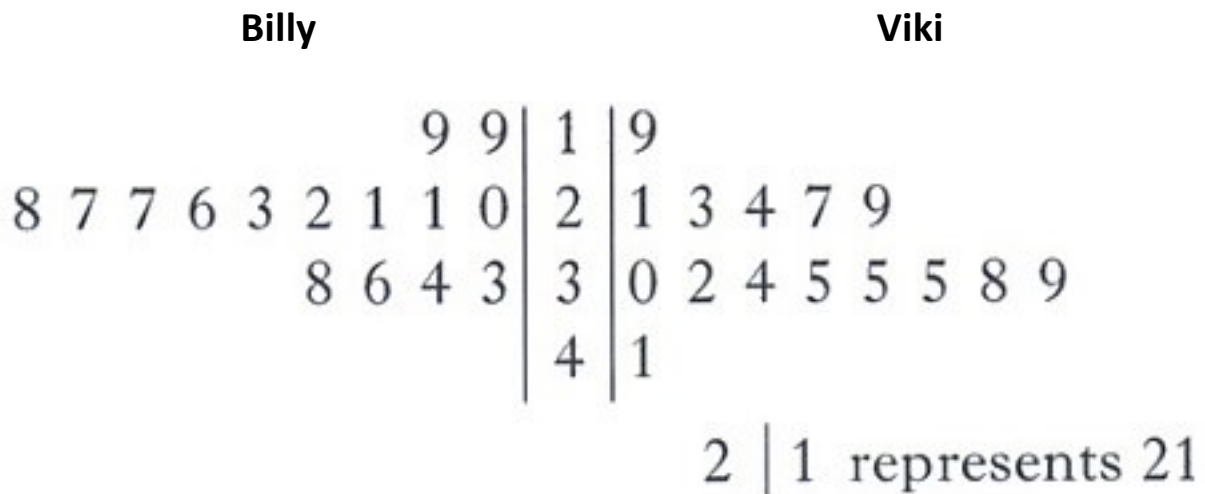
The table below shows prices of five internet packages.

Every package has an initial fee that is paid once, and then users pay two charges every month for line rental and broadband.

Package	Speed (Mbps)	Usage	Monthly line rental	Monthly broadband cost	Initial fee	Length of contract
A	52	25 GB	£8.95	£19.99	£59.99	12 months
B	52	Unlimited	£8.95	£20.99	£59.99	12 months
C	38	50 GB	£7.99	£16.99	£59.99	12 or 18 months
D	52	Unlimited	£7.99	£18.99	£109.99	12 or 18 months
E	52	50 GB	£6.99	£15.99 for 1st 12 months then £19.99	Free	24 months

- a) Which packages offer 18 month contracts?
- b) How many packages offer a speed of 52Mbps?
- c) What is the **total** paid every month for package B?
- d) Lakshmi chooses package A. How much does she pay in total for 12 months, including the initial fee?
- e) John requires:
- A speed of at least 50Mbps
 - At least 40GB usage allowance.
 - A 12 month contract.
- i) Which packages could he choose?
- ii) Calculate the price of each package for 12 months and determine which is cheapest.
- f) Calculate the total price of package E for 24 months.

- 9) Billy and Viki both work at the same library.
 Every day they time how long it takes them to travel to work.
 The stem and leaf diagram below shows their travel times in minutes.



- a) What was Billy's longest journey time?
- b) Viki gets the train to work. If her journey takes more than 33 minutes, the train company will refund her fare. On what percentage of days will Viki get her fare refunded?
- c) Calculate the mean travel time for Billy and the mean travel time for Viki. Explain whose journey to work was quicker on average. Give a reason for your answer.
- d) On what percentage of days was Billy's journey between 25 and 29 minutes long?