Module 10:
Session plan

Group: _____

Tutor: _____

Location: _____

Aims

- Consolidate numeracy skills around handling and representing data relevant to role in the NHS.
- Prepare for typical questions from the Level 1 National Certificate in Adult Numeracy.

Outcomes

• Read data from tables, graphs and charts.	HD1/L1.1
• Discuss and interpret data represented in graphs and charts.	HD1/L1.1
• Work out mean and range for a set of data.	HD1/L1.3 & L1.4
• Relate data handling to your own experience and work role.	

Activity and time	Tutor activity	Learner activity
Icebreaker 5 minutes	• **Activity 1: Matching temperatures** (N1/L1.2). • If appropriate discuss negative numbers, where they fit on a number line and a few typical examples.	• Activity 1 in threes.
Introduction 15 minutes	• Briefly discuss which numeracy skills participants have used at work or in their everyday life since last session. • Show **slides 2 and 3** giving objectives for the session. • Group discussion of own experiences of working with tables, graphs and charts.	• Contribute and respond. • Offer examples, contribute and respond.

Activity and time	Tutor activity	Learner activity
Reading tables 30 minutes	• Discussion of tables encountered in work role, including examples brought in by participants: What type(s) are they? Are any more difficult than others? • **Slide 4:** Reading tables – what does this table show? • Click so that slide 4 question appears; group discussion about what table shows and what is missing. • Discussion of importance of titles, key, etc. • **Activity 2: Extract information from tables.**	• Contribute and respond. • Discuss in small groups. • Plenary: contribute and respond. • Activity 2 in pairs.
Types of graph and chart 20 minutes	• **Activity 3: What are they showing?** Match titles to charts and suggest labels for axes. • Plenary: what types of charts are there? List these. • **Slide 5:** Types of chart – what do the charts show? Discussion of differences when represented on different charts. • Group discussion of when different charts/graphs are used. • **Slide 5:** Types of data – outline different types of data and relate to different types of chart.	• Activity 3 in threes. • Plenary: share ideas. • Contribute and respond.
Representing data 20 minutes	• **Slide 7:** Representing data – what does this chart show? • Click to reveal second chart. Group discussion: compare and contrast the two. • Draw out importance of scale. • **Activity 4: Comparing charts** – when might some of these charts be useful? • **Activity 5: Extract information from charts.** • **Activity 6: Drawing a chart.**	• Listen and respond. • Contribute to group discussion. • Activity 4 in threes. • Contribute to plenary. • Activity 5 and 6 in pairs or offer for practice at home.

Activity and time	Tutor activity	Learner activity
Break 15 minutes		
Mean and range 25 minutes	• **Slide 8: Calculating the mean** – discussion of working out the 'average' (mean). • **Slide 9:** Summary of working out the mean for this data; generalisation of how to calculate the mean. • **Slide 10:** Summary of working out the range for the data; generalisation of how to calculate the range. • **Activity 7: Finding the mean.** • **Activity 8: Finding the range.** • **Activity 9: Mean and range** – represent data sets from Activity 7 on scales provided in Activity 9. • What do the mean and range tell us?	• Contribute and respond. • Activities 7 and 8 in pairs/threes. • Activity 9 in pairs/threes. (Add data to scales provided). • Discuss how to explain mean and range to someone else. • Contribute to plenary.
Collecting data 20 minutes	• **Slide 11: Collecting data** – if you were collecting this data, how would you do it (and record it)? • Group discussion. • **Slide 12:** Tally charts. • (If appropriate) **Activity 10: Create tally chart** for other days shown in the table on slide 12.	• Contribute and respond. • In pairs, draw tallies for other days.
Using ICT 15 minutes	• If appropriate use ICT to explore representing the same data using different charts. • If not, use time to practise priority areas/practice test questions.	
Summary 15 minutes	• Revisit session objectives (**slide 3**). • Feedback, comments and questions. • Programme journal (**slide 13**). • Discuss opportunities to apply skills to work and everyday life. • Discuss individual tasks and practice including practice test questions.	• Reflect on session and identify areas for further practice. • Agree independent learning task.

Resources/aids:

- Module PowerPoint presentation
- Activity cards: Matching temperatures
- Activities: 1, 2, 3, 4, 5, 6, 7, 8 and 9
- Handouts: none
- Practice test questions: Graphs and charts
- programme journals
- if available (and appropriate) access to spreadsheets to explore different graphs and charts using the 'Insert chart' function
- flipchart and markers
- square or graph paper
- any supplementary materials.

Assessment evaluation

Individual learning planning

Learner	Skills	Activity/ resources	Evaluation (where next?)

Module 10:
Teacher's notes

Icebreaker

Use **Activity 1: Matching temperatures** as an icebreaker. Ask participants in pairs to match the temperatures to the example that is the best match for that temperature. Then briefly discuss as a group:

How was it?

What knowledge and experience did participants draw on to decide which matched?

How familiar are participants with temperatures in °C?

If appropriate, discuss negative numbers in the context of temperatures. Discuss/demonstrate where they fit on a number line – and typical everyday examples (icy weather, freezer temperatures, etc).

Introduction

Discuss what participants have done since the last session:

- Did they have opportunity to apply the work on ratios at work?
- What skills practice have they done?
- Are there any bits (or questions) in particular that are causing difficulty?

Outline the aims and objectives of the module (show **slides 1–3**).

Reading tables

As a whole group discuss examples of tables encountered in their work roles:

What type(s) are they?

Are any more difficult than others?

Show **slide 4: Reading tables** and discuss: what does this table show?

Click so that slide 4 question appears and use this to further reflect as a group on what the table shows and what is missing from it. Use this to draw out the importance of titles, key, etc for tables and charts.

Offer **Activity 2: Extract information from tables** for participants to work on in pairs (or save until later if more appropriate).

Types of graph and chart

Ask participants to do **Activity 3: What are they showing?** In threes, match titles to the charts provided and also suggest possible labels for the axes. Use plenary to share ideas. As a group, collect together a list of the different types of chart/graph.

Use **slide 5: Types of chart** to discuss what the two charts show and to discuss the differences when the same data is represented on these two different charts. (Draw out the concept that a pie chart shows proportions of a 'whole amount'. Draw links as appropriate to work done on ratios, etc). Extend this to reflect on when different charts/graphs are used and are most appropriate.

Use **slide 5: Types of data** to outline the two different types of data and (where possible) relate these to what participants have said about the uses of the different types of chart. If this has not come out of the discussion, introduce the idea of different charts being more useful for continuous or discrete data (although you don't need to use the terminology):

Which chart or graph might you use to record data using the examples in the top section of slide 5 (number of patients, number of cars)?

Which might you use to record data using the examples in the bottom section of slide 5 (patient's temperature, baby's weight)?

Representing data

Show **slide 7: Representing data** and discuss:

What does this chart show?

What does it tell us? (Summarise the data/trend of data).

Click to reveal the second chart on slide 7 and discuss:

How do the two charts compare and contrast?

(What do they show? How are they different?)

Use this to draw out discussion of the importance of the scale used on a graph/chart:

What different impressions do the two charts possibly give?

How could someone use this to influence the person looking at this data?

Which chart might you use and when?

Ask participants to do **Activity 4: Comparing charts** in threes, discussing the similarities and differences between the charts. Try to identify, for some of the charts, when they might be a useful version. In the plenary share ideas.

Offer participants activities 5 and 6 to work on in pairs as appropriate:

Activity 5: Extract information from charts

Activity 6: Drawing a chart.

Mean and range

Use **slide 8: Calculating the mean** to discuss working out the 'average' (mean) of a set of data. Encourage participants to offer their existing knowledge re. this and then use **slide 9** to summarise working out the mean for the data given in the table on slide 8 and to generalise the formula for how to calculate the mean. Have participants got any other ways they remember of writing this?

Discuss the range for the data in the table on slide 8 – what is the 'range'? Use **slide 10** to summarise how to work out the range for this data and to generalise how to calculate the range.

Offer participants activities 7–9 to do in pairs:
Activity 7: Finding the mean
Activity 8: Finding the range.

In **Activity 9: Mean and Range** ask participants to represent the data sets from Activity 7 on the number lines provided in Activity 9, by putting a symbol for each number on the appropriate place on the number line. (So for example in question two there will be three circles – or whatever symbol chosen – above the number 5 on the number line, as there are five instances of 5 in the data set). After participants have done this activity, use it to lead a plenary discussing:

What do each of the words mean and range tell us?
What does it mean if the range is big (or small) for a set of data?
Whereabouts does the mean fall in the set of data?

If appropriate encourage participants to think about balancing (weighing) scales and the mean as a measure of the 'average'.

Collecting data

Use **slide 11: Collecting data** (the same table as on slide 8) to discuss:

If you were collecting this data, how would you do this (and record it)?

If appropriate, draw out that the data is different to the data sets in activities 7 and 8 as in this case the data has already been grouped and counted up whereas in Activity 7 it is raw data, not yet collated. Hopefully, participants will come up with the idea of using a tally chart (if not introduce the idea). Use **slide 12: Tally charts** to check that all participants are happy with the concept of using a tally with batches of 5 to count up data – and counting up in fives to add up the numbers.

If appropriate offer **Activity 10: Create tally chart** (for other days shown in the table on Slide 12) for participants to do in pairs.

Practice

If appropriate use ICT for participants to explore representing the same data using different types of charts, different axis scales, etc.

If not, use time to practise priority areas/practice test questions:

- practising the skills covered in this module
- practising priority areas for them (individually/in pairs)
- trying some of the Practice test questions in pairs.

Encourage participants to identify areas from this or previous sessions which they would like to practise further. (Use Programme journals to help review this).

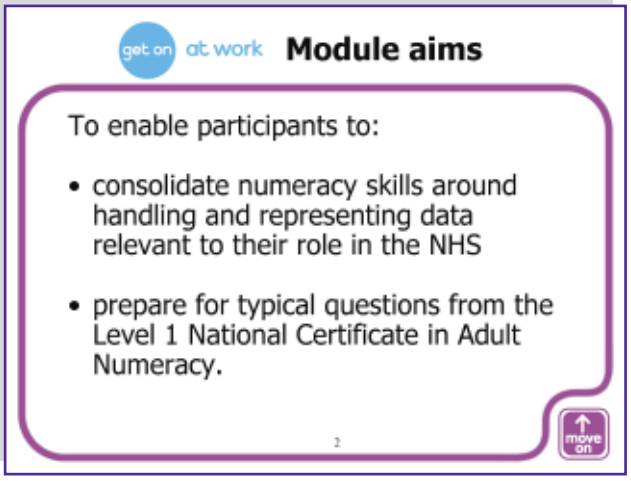
Offer **Practice test questions: Graphs and charts.**

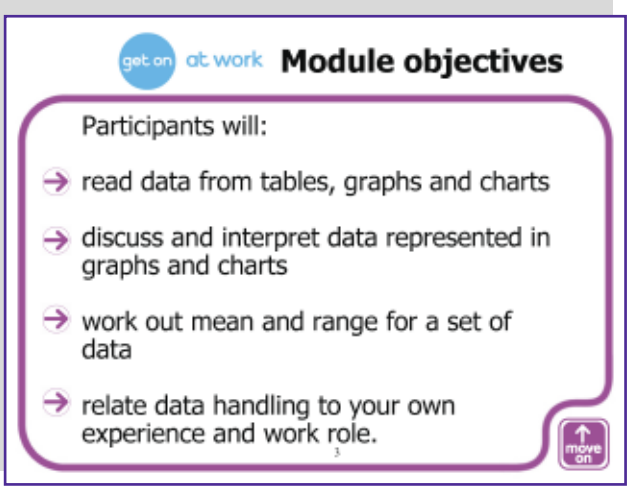
Encourage participants to decide which to try now and which to do at home before the next session. (Best to do ones they are less confident about in the session so they can get support and suggestions to move them forward with any bits they get stuck on). Explain that you will, however, review the questions next session and discuss any questions participants were not sure about.

Summary

- Revisit the session objectives (**slide 3**) and reflect on how the session went. Encourage the group to identify any aspects they are still unsure about/want to practice further and encourage them to use the free resources available to do this (**slide 14**) between sessions.
- Encourage participants to reflect on what worked well for them as an individual and to think about which strategies/information helped them most in understanding, remembering or learning more about handling data and interpreting graphs and charts.
- Encourage participants to identify opportunities to relate what they have learned to their work context/role between sessions, eg noting tables, graphs and charts around them and the features of these.
- Encourage the participants to record relevant information on a **programme journal (slide 13)**.


get on at work
Move On in the NHS
move on


get on at work
Module aims
To enable participants to:
• consolidate numeracy skills around handling and representing data relevant to their role in the NHS
• prepare for typical questions from the Level 1 National Certificate in Adult Numeracy.
2
move on


get on at work
Module objectives
Participants will:
read data from tables, graphs and charts
discuss and interpret data represented in graphs and charts
work out mean and range for a set of data
relate data handling to your own experience and work role.
3
move on

get on at work

Reading tables

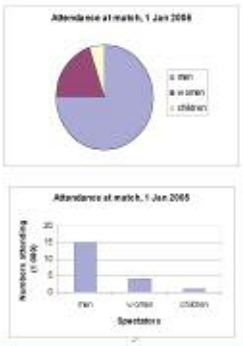
H/Sol Alicante	7	HB	750	FB	1010	14	HB	1076	FB	1568
H/Valentine Star	7	HB	600	FB	950	14	HB	989	FB	1300
H/Sol Malaga	7	HB	570	FB	900	14	HB	976	FB	1288
H/Explendia	7	HB	500	FB	845	14	HB	855	FB	1015

How much does it cost to stay in Hotel Sol Malaga for 7 nights full board?

move on

get on at work

Types of chart



move on

get on at work

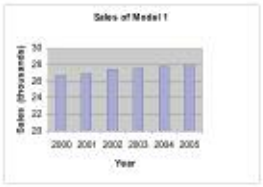
Types of data

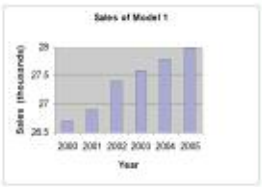
- You collect some data by counting, for example:
  - the number of patients in one hour
  - the number of cars passing.
- You collect other data by measuring, for example:
  - a patient's temperature
  - the weight of a baby.

move on

get on at work

Representing data





7

move on

get on at work

Calculating the mean

The number of patients seen in a clinic one week was recorded as follows:

Days	Mon	Tue	Wed	Thu	Fri
No. of patients	65	74	86	79	71

What was the average number of patients seen per day?

8

move on

get on at work

Calculating the mean

$$\text{Mean} = \frac{65 + 74 + 86 + 79 + 71}{5} = \frac{375}{5}$$

$$\textit{Mean} = \frac{\textit{sum of all values}}{\textit{number of values}}$$

9

move on

get on at work Calculating range

Range = 86 – 65 = 21 patients

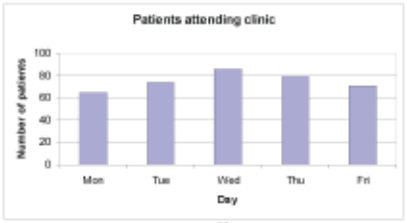
Range = largest value – smallest value

10

move on

get on at work Collecting data

Mon	Tue	Wed	Thu	Fri
65	74	86	79	71



11

move on

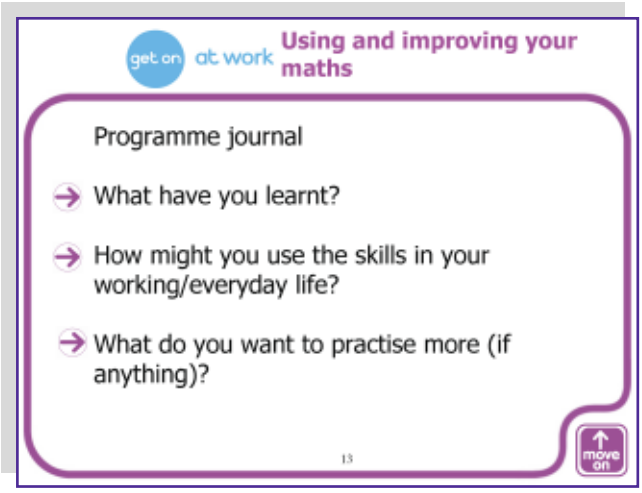
get on at work Tally charts

Mon 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

Tue

12

move on


get on at work
Using and improving your maths
Programme journal
What have you learnt?
How might you use the skills in your working/everyday life?
What do you want to practise more (if anything)?
13
move on


Move On contacts
get on
at work
with
move on
Move On web site
www.move-on.org.uk
BBC skillswise
www.bbc.co.uk/skillswise
Key Skills Support
www.keyskills4u.com
14
move on

Module 10: Activity 1
Matching temperatures

Room temperature	28 °C
Temperature of an ice cube	200 °C
Hot water from a tap	-5 °C
A bowl of hot soup	55 °C
A snowy day	80 °C
A hot summer day	0 °C
Oven	18 °C

Module 10: Activity 2
Extract information from tables

(1) The table below shows the number of patients seen in different walk-in centres one afternoon.

(a) How many children were seen in Gaston?

(b) How many men were seen in Old Swan?

(c) Which walk-in centre had the most women patients?

Number of patients seen in walk-in centres one afternoon			
Walk-in centre	**No of women**	**No of men**	**No of children**
Gaston	9	4	3
Huyton	11	7	6
Liverpool	16	11	8
Old Swan	13	9	7
St. Helens	12	9	5

(2) Use the information in the Car hire table to answer the questions.

Car hire			
	Hire period		
Vehicle type	**3 days**	**7 days**	**14 days**
Fiat Punto	£110	£190	£330
Ford Fiesta	£115	£185	£355
Ford Ka	£150	£190	£360
Ford Focus	£190	£260	£470
Ford Mondeo	£210	£290	£499
Volkswagen Golf	£135	£220	£399

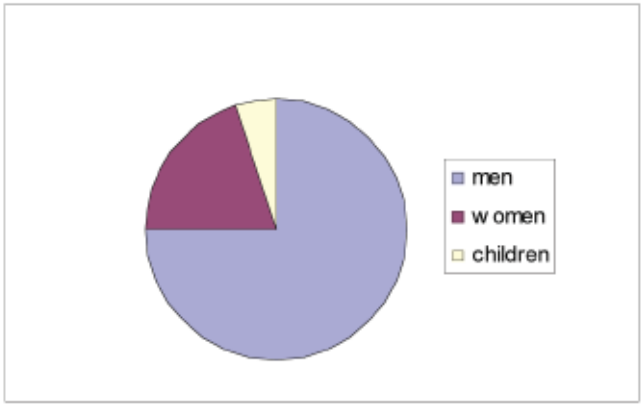
(a) How much does it cost to hire a Ford Ka for seven days?

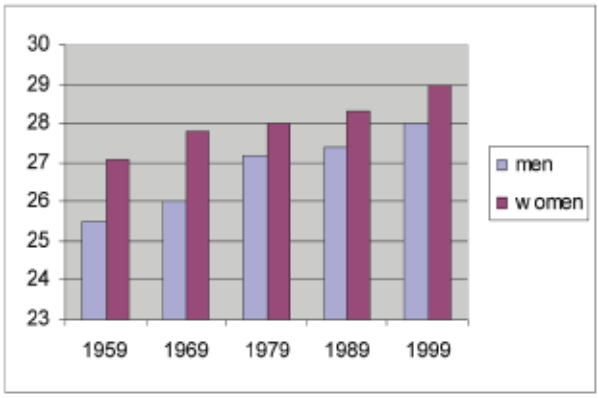
(b) You pay £470 to hire a car. What car is it? How long have you hired it for?

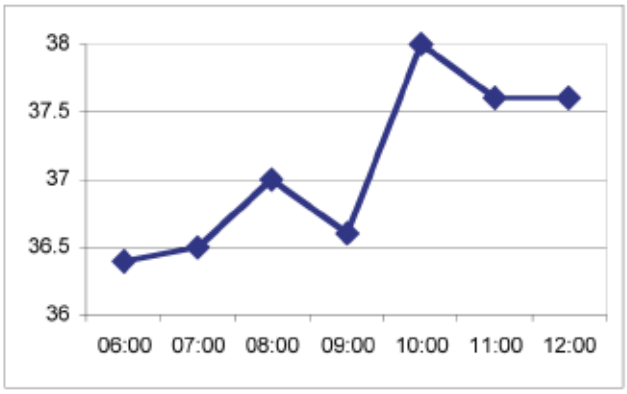
(c) What is the cheapest car you can hire for three days?

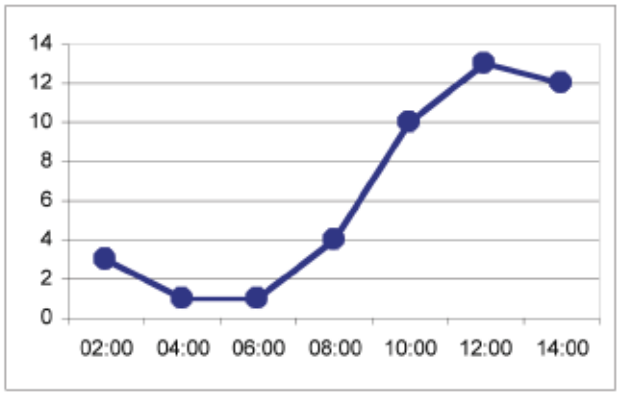
(d) How much more does it cost to hire a Ford Mondeo than a Volkswagen Golf for seven days?

Module 10: Activity 3
Graphs and charts
What are they showing?









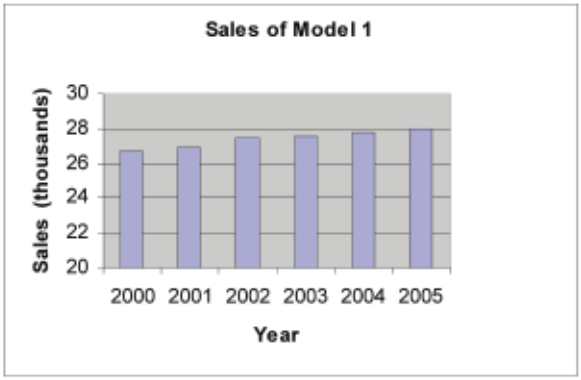
City temperature on 2 May 2007

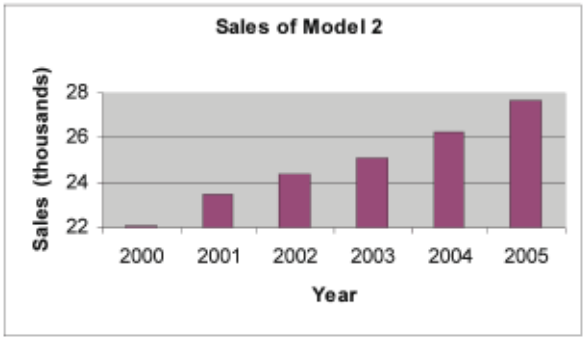
Match attendance on 1 January 2005

Patient's temperature 15/01/08

UK population

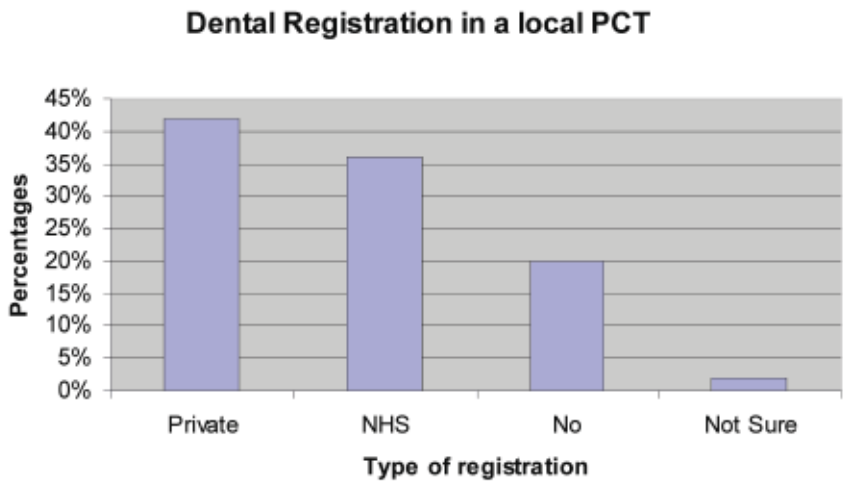
Module 10: Activity 4
Comparing charts





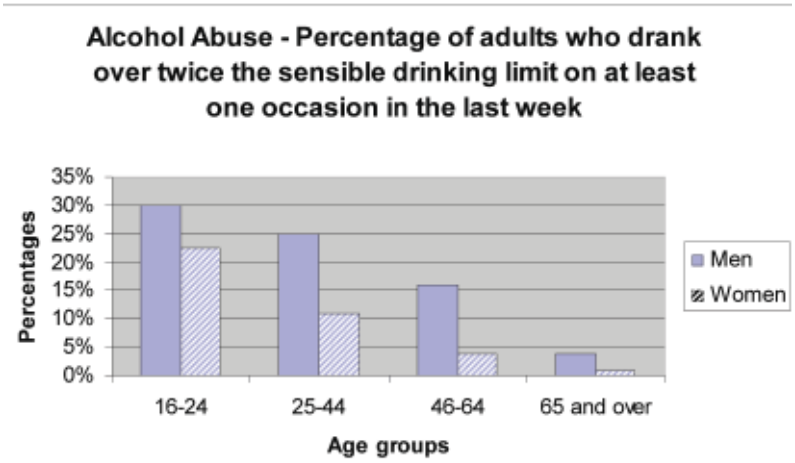
Module 10: Activity 5
Extract information from graphs and charts

(1) The chart below shows the percentage of dental registration in a local PCT.



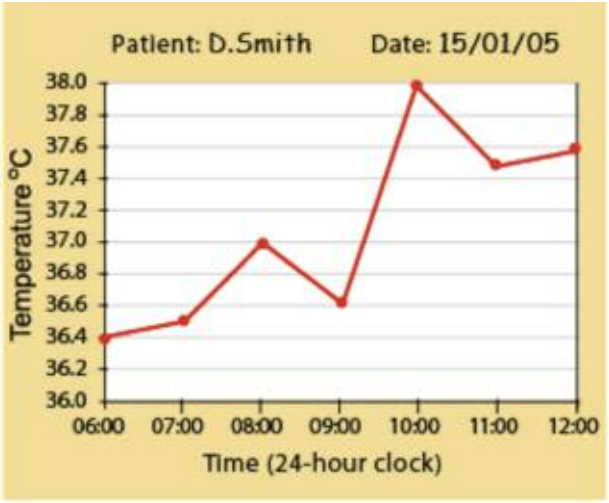
(a) What is the percentage of dentists registered with the NHS?
(b) How many more percent of dentists are registered as private dentists than NHS?
(c) What does this bar chart tell us?

(2) The chart below shows the percentage of adults who drank over twice the sensible drinking limit on at least one occasion in the last week.



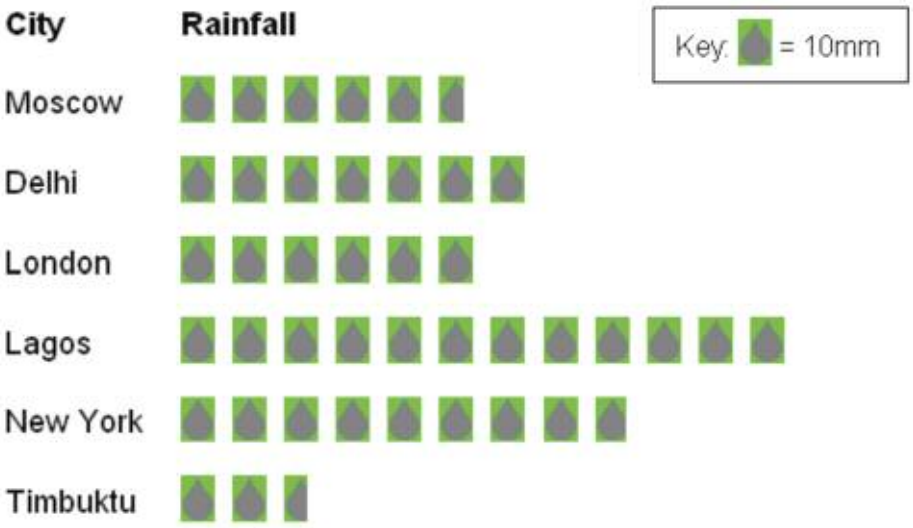
(a) What is the percentage of men who drank over the sensible limit in the16-24 age group?
(b) What is the percentage of women who drank over the sensible limit in the 25-44 age group?
(c) State two findings of this bar chart.

(3) The graph below shows the temperature of a patient over a six-hour period.



(a) What was the patient's temperature at 06.00?
(b) What was the patient's highest temperature?
(c) Estimate the patient's temperature at 08.30.
(d) What was the change in temperature between 09.00 and 10.00?

(4) The pictogram shows the amount of rainfall in six cities in January 2002.



(a) How many millimetres of rain fell in London in January 2002?
(b) Which city has the least rainfall?
(c) What was the approximate amount of rainfall in Moscow in January 2002?

Module 10: Activity 6
Drawing a chart

The table gives the type and number of emergencies in an A&E department.
Draw a bar chart to show this information.

Types of emergency	No of patients
Minor injuries	20
Burns	5
Alcohol related injuries	8
Chest pain	3
Abdominal pain	2
Overdose	1

Module 10: Activity 7
Finding the mean

(a) Find the mean weight of 5 babies born in a maternity unit.
3.6 kg 3.2 kg 4.0 kg 3.4 kg 3.8 kg

(b) Find the mean number of agency staff working in ten wards in one week.
3 5 6 4 7 8 4 3 5 5

(c) The heights of children attending a clinic are:
1.25 m, 1.15 m, 1.19 m, 1.21 m, 1.17 m, 1.23 m
What is the mean height over this session?

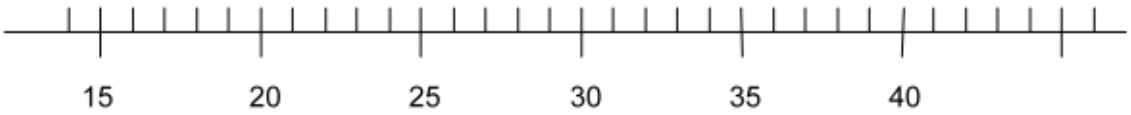
(d) The times taken by staff to complete checks on each patient are:
32 mins, 28 mins, 28 mins, 30 mins, 27 mins, 25 mins, 36 mins, 27 mins, 31 mins, 33 mins, 30 mins, 21 mins
What is the mean time taken per patient?

(e) The number of people attending meetings about changes to the local health provision arrangements were:
155, 205, 175, 165, 275, 230, 260, 175.
What was the mean number of people at the meetings?

Module 10: Activity 8
Finding the range

What is the range for each of the above sets of data?
(a)
(b)
(c)
(d)
(e)

Module 10: Activity 9
Mean and range



Module 10: Practice test questions – Graphs and charts

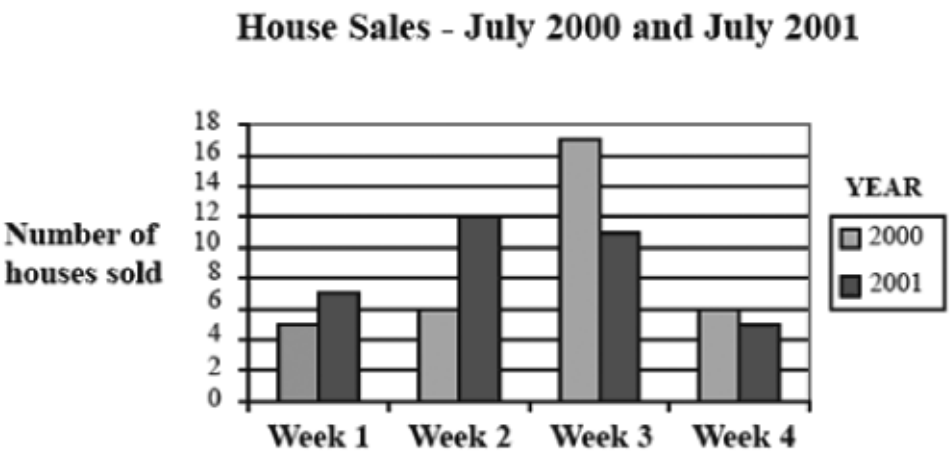
(1) Here is part of a shop catalogue for pocket calculators.

Item Number	Catalogue Number	Description	Power	Digits	Functions	Case	Memory	Colour of case	Price
6	680/453	Sinclair 3D	B	8	64	Wallet	Virtual	Black	£6.75
7	680/522	Texas 23S	S	8	128	Hard	Virtual	Black	£7.75
8	680/344	Casio 125	S	10	128	Hard	Virtual	Blue	£9.99
9	580/238	Texet DF	B	10	79	Wallet	Virtual	Black	£9.25
10	580/212	Sharp 34D	B	10	64	Wallet	Bubble	Blue	£11.50

What is the price of the Texet calculator, which has ten digits, a virtual memory and a black case?

(a) £11.50
(b) £9.99
(c) £9.25
(d) £7.75

(2) The graph shows house sales for July in the years 2000 and 2001.



How many houses were sold in total in the first week in July 2001?

(a) 5
(b) 6
(c) 7
(d) 12

(3) This pictogram shows the number of houses built by Stubbs Builders from March to July 1999.

Number of houses built by Stubbs Builders from March to July 1999

What is missing from the pictogram?

(a) a key
(b) a title
(c) a horizontal scale
(d) a vertical scale

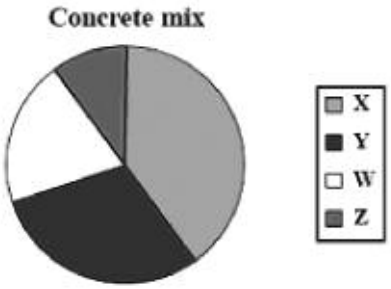
(4) This is part of the train timetable from Bristol to London. A person needs to arrive in London by 8.15 in the morning.

Bristol	d	0540	0606	0645	0815
Bath	d	0552	0618	0657	0827
Chippenham	d	0603	0629	0708	0838
Swindon	d	0619	0645	-----	0854
Didcot	d	0636	0702	0735	-----
Reading	a	0651	0717	-----	0925
Slough	a	-----	-----	-----	-----
London	a	0721	0753	0818	0956

What is the time of the latest train she can catch from Bristol?

(a) 0540
(b) 0606
(c) 0645
(d) 0815

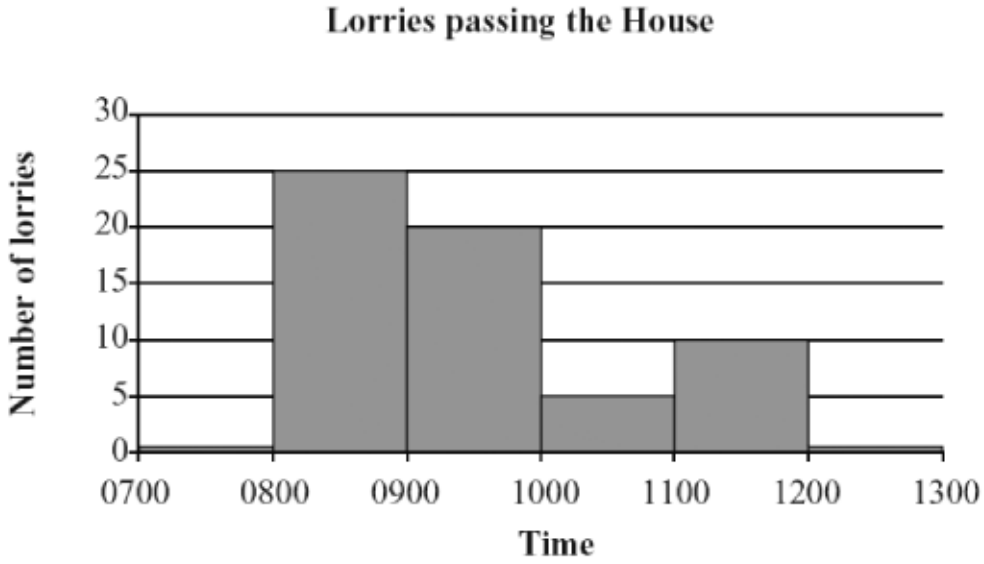
(5) Concrete is a mixture of stones, sand, cement and water in the ratio 4:3 : 2:1.



Which sections of the pie chart show the proportion of sand and cement?

(a) W and X
(b) X and Y
(c) Y and W
(d) Z and W

(6)



Which period had the largest number of lorries passing the house?

(a) 0800 to 0900
(b) 0900 to 1000
(c) 1000 to 1100
(d) 1100 to 1200

(7) A learner driver takes her driving theory test. She answers 30 questions in fifteen minutes. What is the mean time she takes to answer each question?

(a) 2 seconds
(b) 3 seconds
(c) 20 seconds
(d) 30 seconds

(8) This table shows the number of hours a teenager spends watching television each day.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
2	4	0	2	4	4	5

The average (mean) of these numbers is:

(a) 3
(b) 3½
(c) 4
(d) 5.

(9) The range of these numbers is:

(a) 2
(b) 3
(c) 4
(d) 5.

(10) A company makes 80 pizza delivery journeys in one week. The 80 journeys cover 480 miles altogether. What is the average journey distance?

(a) 0.6 miles
(b) 6 miles
(c) 60 miles
(d) 400 miles

Module 10: Activities Answers

Activity 2: Extract information from tables

(1) (a) 3
(b) 9
(c) Liverpool

(2) (a) £190
(b) Ford Focus for 14 days
(c) Fiat Punto
(d) £70

Activity 5: Extract information from graphs and charts

(1) (a) 36%
(b) 6%
(c) More dentists chose to stay private.

(2) (a) 30%
(b) 11%
(c) More men than women drank over the sensible drinking limit.
The older the age group, the smaller proportion would drink over the limit.

(3) (a) 36.4 °C
(b) 38.0 °C
(c) 36.8 °C
(d) 1.4 °C

(4) (a) 60 mm
(b) Timbuktu
(c) 57 mm

Activity 7: Finding the mean

(a) 3.6 kg
(b) 5 staff
(c) 1.2 m
(d) 29 mins
(e) 205 people

Activity 8: Finding the range

(a) 0.8 kg
(b) 5 staff
(c) 0.1 m
(d) 15 mins
(e) 120 people

Practice test questions: Graphs and charts

(1) c
(2) c
(3) a
(4) b
(5) c
(6) a
(7) d
(8) a
(9) d
(10) b