MATHEMATICS

Unit 3

Numeracy

(Part 2 of 2)
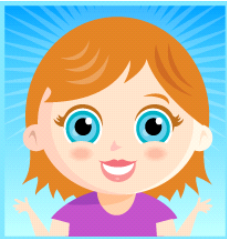
Ratio

Exercise 1

1) Write down the ratio of

   a) dogs to cats
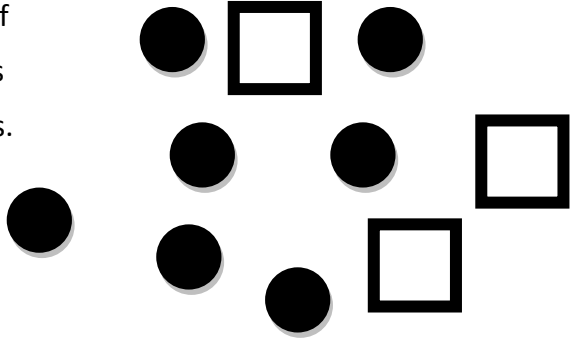
   b) cats to dogs.

2) Write down the ratio of

   a) females to males

   b) males to females.

3) Write down the ratio of

    a) squares to circles
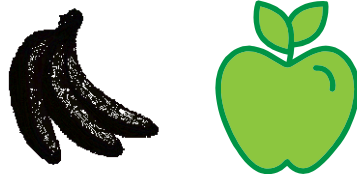
    b) circles to squares.

4) Write down the ratio of
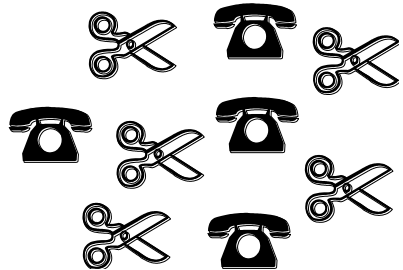
    a) apples to bananas

    b) bananas to apples.

5) Write down the ratio of

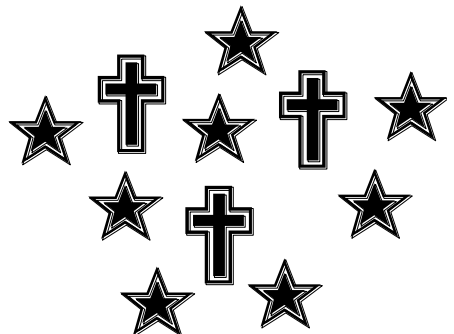   **a)** scissors to telephones

    b) telephones to scissors.

6) Write down the ratio of

    a) stars to crosses

    b) crosses to stars

8 **a)** Write down the ratio of desks to chairs

b) Now try to write this ratio in its simplest form
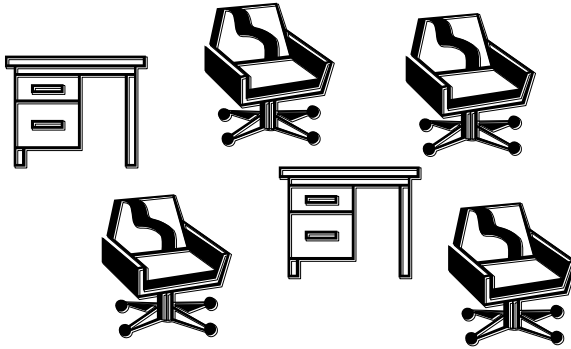
c) Write down the ratio of chairs to desks.

d) Now try to write this ratio in its simplest form

9
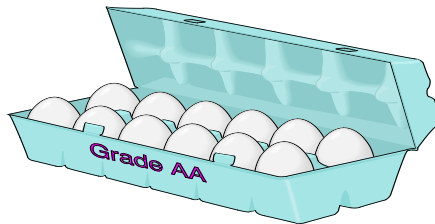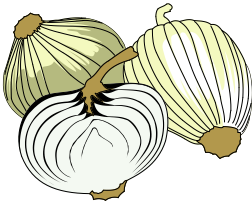
a) Write down the ratio of onions to eggs

b) Now try to write this ratio in its simplest form

c) Write down the ratio of eggs to onions

d) Now try to write this ratio in its simplest form.

10) Fergus the farmer uses 2 dogs to look after his 40 sheep.

    a) Write the ratio of dogs to sheep in simplest form.

    b) Write the ratio of sheep to dogs in simplest form.

11) Fergus also has a herd of 10 cows which has given birth to 30 calves.

    a) Write the ratio of cows to calves in simplest form.

    b) Write the ratio of calves to cows in simplest form.

12) Fergus also has 5 pigs and 25 piglets.

    a) Write the ratio of pigs to piglets in simplest form.

    b) Write the ratio of piglets to pigs in simplest form.

13) Write each of the following ratios in simplest form.

a) 2:8	**b)** 9:3	**c)** 8:4	**d)** 4:12
e) 10:5	**f)** 6:12	**g)** 20:5	**h)** 12:3
i) 6:18	**j)** 5:35	**k)** 7:28	**l)** 6:6
m) 20:4	**n)** 30:3		

Exercise 2

1) Nissan cars use either petrol or diesel.
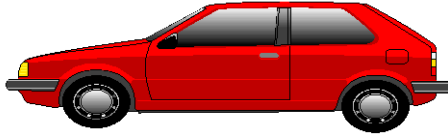
The ratio of petrol to diesel is 5:2.

Copy and complete this table

number of petrol cars	number of diesel cars
5	2
10	
15	
20	
40	
	10
	12
	14
	20

2) Nissan's cars can be either right hand drive or left hand drive.

The ratio of left hand drive to right hand drive is 8:3.

Copy and complete this table

number of left hand drives	number of right hand drives
8	3
16	
24	
40	
80	
	12
	18
	33
	60

3) Find the missing numbers in these pairs of equal ratios:

a) 3:2 = 9: **?**　　　　　**b)** 1:4 = **?** ‹:12　　　**c)** 7:3 = 21: **?**

d) 5:2 = 25: **?**　　　　**e)** 8:3 = **?** :21　　　**f)** 3:5 = **?** ‹:20

g) 4:9 = 20: **?**　　　　**h)** 13:3 = **?** ‹:21.

4) **a)** Two numbers are in the ratio 3:4. If the smaller number is 6,
　　　　What is the larger number?

　　b) Two numbers are in the ratio 7:9. If the larger number is 27,
　　　　What is the smaller number?

5) Copy and complete this table

Class	ratio of boys:girls	boys	girls
2A	1:2	6	
2B	3:1		7
2C	3:2	12	
2D	2:3		15
2E	3:4	6	
2F	5:2		8
2G	3:7		14
2H		20	10

Exercise 3

1) Brian and Norma are given **£32** to share between them

in the ratio 3:5.

a) How much does Brian get?

b) How much does Norma get?

2) George and Evelyn share

   £450 in the ratio 1:2.

   a) How much does George get?

   b) How much does Evelyn get?

3) Tamsin and Hugh share
   £360 in the ratio 5:4.

   a) How much does Tamsin get?

   b) How much does Hugh get?

4) Ravi and Delia share **£4800 in the ratio 5:7.**

   Calculate how much each person gets?

5) William and Ruth share **£800 in the ratio 2:3.**

   How much does each get?

6) Divide: **a)** 80cm of wire in the ratio 1:3.

   b) 95litres of juice in the ratio 2:3.

   c) 246kg of sand in the ratio 5:1.

7) There are 245 people in a crowd.

Men and women are in the ratio 3:4.

Calculate the number of men and the number of women.

8) Share £175 in the ratio 4:2:1.

9) Share £256 in the ratio 5:2:1.

10) Share £396 in the ratio 6:3:2.

11) Share £455 in the ratio 6:5:2.

12. Share £720 in the ratio 7:6:5.

13) Share £300 in the ratio 6:5:4.

14) Share 950kg of soil between 3 gardeners in the ratio 4:6:9.

15) Share 4200ml of water between Mr Brown, Mrs Jones and Mr Westwater in the ratio 3:7:2.

16) A carton containing 2000 millilitres of milk exactly fills 3 glasses belonging to Dieter, Jan and Joe.

If the amounts each glass holds are in the ratio 11:8:6, how much milk does each child receive?

Direct Proportion

Exercise 1

1) If 5 books cost £15, find the cost of 8.

2) If 7 apples cost 63p, find the cost of 12.

3) If 4 batteries cost 180p, find the cost of 7.

4) If 5 bottles of beer cost £2·45, find the cost of 12.

5) Toy cars cost £3·36 for 8. Find the cost of 10 cars.

6) Crisps cost £1.32 for 12 packets. Find the cost of 20 packets.

7) Stair carpet costs £78 for 12 m. Find the cost of 15 m.

8) The total weight of 7 ceramic tiles is 1750 g.
   How much do 11 tiles weigh?

9) A machine fills 2000 bottles in 10 minutes.
   How many bottles will it fill in 7 minutes?

10) The total contents of 8 cartons of fruit drink is 12 litres.
    How much fruit drink is there in 3 cartons?

11) Find the cost 15 cakes if 9 cakes cost £2·07.

12) Find the cost of 7 screws if 20 screws cost £4·60.

13) Pencils cost 75p for 3. How much will a dozen cost?

14) 8 bars of soap cost £1·56. How much will 12 bars cost?

15) A car travels 456 km on 40 litres of petrol.
    How far should it go on a full tank of 60 litres?

16) 72 books weigh 9 kg. How many books would weigh 6 kg?

17) A hotel charge for 5 days was £115.
    What would the charge be for 8 days?

18) 15 articles cost £2·10. Find the cost of 36 of the same articles.

Exercise 2

1) A machine takes 20 seconds to make 8 coins.
   How long does it take to make 50 coins?

2) A plane flies 50 km in 15 minutes.
   How long will it take to fly 300 km?

3) If 8 pencils cost 56p, how many can be bought for 70p?

4) 6 pineapples can be bought for £3·12.
   How many can be bought for £5·20?

5) If 20 m² of carpet costs £150.
   What area of carpet can be bought for £90?

6) Oranges cost £1·68 for 12. How many can be bought for £90.

7) Oranges cost £1·40 per dozen. Find the cost of 27 oranges.

8) 500 two-pence coins placed in a row measure 13 metres.
   What would 75 coins measure?

9) A stack of 350 sheets of paper is 2·1 cm high.
   How high would 500 sheets stand?

10) A car uses 10 litres of petrol in 75 km. How far will it go on 8 litres?

11) A wire 11 cm long has a mass of 187 g.
    What is the mass of 7 cm of this wire?

12) A shopkeeper can buy 36 toys for £20·52.
    What will he pay for 120 toys?

13) 7 cycles cost £623.

    a) What is the cost of 3 cycles?

    b) How many cycles can be bought for £979?

14) 11 pens cost £9·35.

    a) What is the cost of 15 pens?

    b) How many pens can be bought for £17?

15) A car travels 210 km on 30 litres of petrol.
How much is needed for a journey of 245 km?

16) A light aircraft flies 375 km on 150 litres of fuel.
How much fuel is needed for a journey of 500 km?

17) A tank travels 140 miles on 40 gallons of fuel.
How much fuel is needed for a journey of 245 miles?

18) A 600 cm^2 pane of glass costs £25.

    a) What area of glass costs £52?

    b) Calculate the cost of a pane of glass of area 750 cm^2.

19) 300 cm^3 of lead weighs 3390 g. Calculate

    a) The weight of 500 g of lead.

    b) The volume of lead that weighs 5085 g.

20) A 250 ml tin of varnish will cover 4·5 m^2.

    a) What area will a 450 ml tin cover?

    b) **H**ow much varnish is needed to cover an area of 3·6 m^2.

21) A tree's shadow is proportional to its height.

A tree 12 m tall casts a shadow of 18 m.

Calculate the length of the shadow of a 10 m tall tree.

Exercise 3

1) 2½ m of metal tube cost £1·40. Find the cost of 7½ m.

2) 3¼ kg of sweets costs £2·60. Find the cost of 4½ kg.

3) The cost of a phone call lasting 3 minutes 30 seconds was 52·5 p.
    At this rate, what was the cost of a call lasting 5 minutes 20 seconds?

4) 80 cm^3 of calcium weigh 120 g.

    a) Calculate the weight of 60 cm^3.

    b) What volume of calcium weighs 270 g?

5) This is a recipe for 6 scones.

    110 g self raising flour
    20 g butter
    750 ml milk
    1 tablespoon caster sugar

    How much of each ingredient is needed to make 15 scones?

6) Francis stores holiday snaps on his computer.

    His 24 photos take 10·704 megabytes of memory.

    How much memory would a film with 36 photos need, assuming that the memory requirement is directly proportional to the number of photos.

7) 800 cm^3 of mercury weigh 10·88 kg. Calculate

    a) Weight of 350 cm^3

    b) The volume of 7·5 kg of mercury, correct to 1 decimal place.

8) At lunchtime it takes the canteen 15 minutes to serve 120 pupils in Danielle's year. Another year group has 16 more pupils.

    How much **longer** should it take to serve them?

9) It takes Joanne 2 hours to fly 688 miles from Rome to Paris.

At the same speed how long would it take her to fly from Rome to London, which is an extra 220 miles away?
Give your answer correct to the nearest minute.

10) The telephone directory for Graham's area weighs 1·95 kg and has 1600 pages. How much, correct to 3 significant figures, would you expect a directory with

a) 100 more pages to weigh

b) 100 fewer pages to weigh?

11) A girl makes a model of a ship which id 576 ft long and has one mast 54 feet high. If the length of the model is 4 feet, what length must she make the model mast?

12) In his will a man left each of his employees a legacy proportional to the number of years he had been employed by his firm.
An employee with 35 years' service received £2625.
How many years' service had an employee who received £4050.

13) Travelling at 60 mph a train takes a certain time to do a journey of 400 miles. How far would an aeroplane travelling at 330 mph go in the same time?

14) If the cost of carriage of 35 tons for a certain distance is £1540, what weight can be carried the same distance for £2750.

15) It is estimated that 2 tons of coal occupy 81 cu ft. How many tons of coal are there in a stack of coal 15 ft long, 12 ft broad, and 9 ft high.

16) A fitted carpet for a room 4 m by 3 m costs £1200. How much will the same kind of carpet cost for a room 5 m by 2 m?

17) In order to measure the height of a lamp post, a boy measures the lengths of the shadows cast by the lamp post and by a stick, 3 ft 8 in high. He finds the lengths of the shadows to be 8 ft 9 in and 2 ft 9 in respectively. Find the height of the lamp post.

Inverse Proportion

Exercise 1

1) If 6 men build a wall in 10 days, how long will it take 4 men?

2) If 8 men build a wall in 3 days, how long will it take 6 men?

3) If 10 men build a wall in 7 days, how long will it take 7 men?

4) If 6 men dig a trench in 6 days, how long will it take 9 men?

5) If 40 women complete a job in 21 days, how long will it take 7 women?

6) If 24 women complete a job in 39 days, how long will it take 36 women?

7) If 18 women complete a job in 17 days, how long will it take 34 women?

8) If 15 men can build a wall in 6 hours, how long will it take 5 men?

9) If 6 men can dig a trench in 12 hours, how long will it take 24 men?

10) 4 men can build a shed in 9 hours. How long would it take 6 men?

11) If 4 pipes empty a bath in 1 hour, how long will it take 2 pipes?

12) If 1 tap fills a bath in 30 minutes, how long will it take 2 taps?

13) A ship has enough food to supply 600 passengers for 3 days.
How long would the food last for 300 passengers?

14) A farmer has enough hay to feed 8 horses for 2 days.
How long would the hay last for 2 horses?

15) 8 people can unload a ship in 15 hours. How long will it take 3 people?

16) A farmer employs 12 men to do a job in 10 days.
How long would it have taken 5 men?

17) A bridge was painted by 8 men in 6 days.
How long would it have taken 12 men?

18) 4 men can do a job in 12 hours.
How many men would it take to do the job in 2 hours?

19) 6 women can do a job in 8 hours.
How many women would it take to do the job in 6 hours.

20) Usually it takes 5 hours for 12 men to do a job.
How many men are needed to do the job in 2 hours?

Exercise 2

1) A garrison has enough food to last 1000 soldiers for 21 days.
How long will the food last for 1400 soldiers?

2) A ship has sufficient food to last 900 people for 4 weeks. How long
will the food last for 1200 people?

3) If a quantity of food can last 20 people for 6 days, how long would it
last 30 people?

4) If a 700 watt microwave oven took 4 minutes to cook a piece of
meat.
How long would it take an 800 watt microwave to cook the same
meat?

5) A car travelling at 80 km/h completes a certain journey in 60
minutes.
How long would it take for a car travelling at 120 km/h?

6) A car travelling at 60 km/h completes a journey in 90 minutes.
How long would it take for a car travelling at 180 km/h?

7) Six friends each pay £70 towards renting a ski chalet. At the last
minute two more pals are invited on the holiday.
If the cost is shared equally, how much will each of them pay?

8) Nine teams each of four pupils enter a quiz.
They are reorganised into six teams.
How many will be in each team now?

9) At Highmoor School there are 8 lessons of 35 minutes each day.
They change to a new timetable of 7 lessons a day.
If the total teaching time remains the same how long is each lesson with the new timetable?

10) Comfy Coaches have two sizes of coach. The larger has 72 seats and the smaller 48 seats. To take fans to an away match they reckon they need exactly eight of the larger coaches.
How many small coaches would be needed for the same number of fans?

11) A piece of land can be divided into 20 individual allotments each with an area of 120 m^2. It is decided to increase the number of allotments to 24. Calculate the area of each of these allotments.

12) Five lottery winners each received £840 000. If the same amount was shared between seven winners, how much would each person receive?

13) Eight friends rent a caravan for a fortnight's holiday. They each agree to pay £73·50.
One of them has to drop out, leaving seven of them to share the same bill.
How much does each of them have to pay?

14) Main Street High School holds a monthly lottery for charity.
In January two winners each receive £450.
In February the total prize money is the same. If there are three winners how much does each one win?

15) Mike takes on the challenge of walking from John O'Groats to Land's End. His target is to average 20 miles a day and that will mean a total walk of 42 days.
If he averaged 24 miles a day, how many days would it take?

16) A team of 14 relay runners plans to run between Glasgow and Fort William. Each of them will run 20 km. They recruit two more runners to share the distance. How far will each member run now?

17) Trendy Textiles Plc give the workface of 60 employees a Christmas bonus of £250 each.
The following year the total bonus remains the same but there are ten fewer employees. How much is each worker given?

18) Gill has enough food to last her five horses for 12 days.
How many days will the food last if the number of horses is:

    a) increased by one

    b) decreased by one?

19) When the speed of a car is 24 mph, a certain journey takes 80 minutes. What must the speed be for the same journey to take 60 minutes?

20) A ship has enough coal in its bunkers to last 6 days, if it uses 105 tons per day. If it uses 140 tons per day, how long should the coal last?
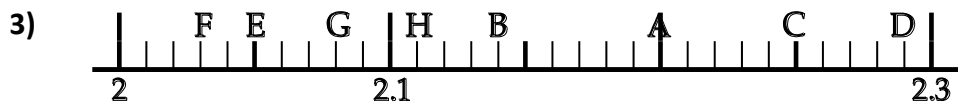
Exercise 3

1) A journey takes 6 hours travelling at 80 km/h. How long would the journey take at 100 km/h?

2) If 45 workers can complete a job in 12 weeks, how many extra workers would it take to finish the job in 10 weeks?

3) A journey takes 4½ hours at 70 mph. On the return journey the average speed is 60 mph. How much longer does the return journey take?

4) If 20 people take 7 days to harvest crops, how many days less would it take 35 people?

5) A farmer can feed 60 cattle for 8 weeks.
If he sells 20 of the cattle how much longer will the feeding stuff last?

6) A journey takes 12 hours at 75 km/h.
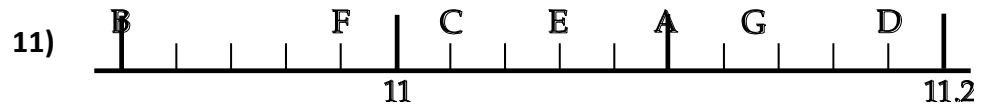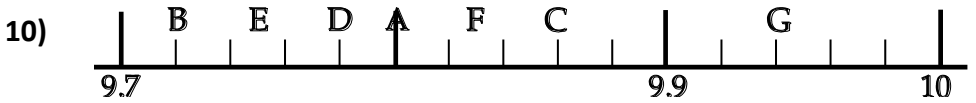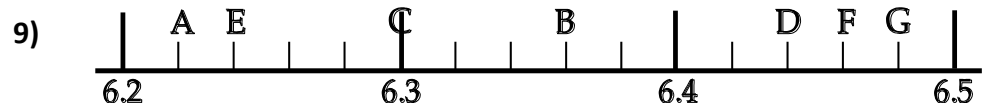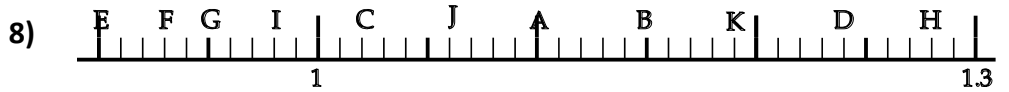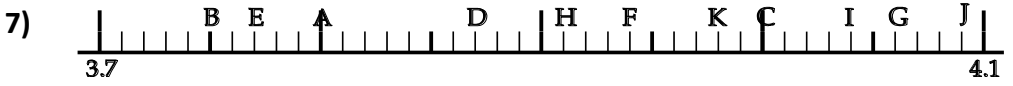How much longer would the journey take at 60 km/h?

7) A plane flies for 8 hours at 330 mph. If the plane did the same journey at 440 mph how much less time would it take?

8) A contract takes 189 men 54 days to complete. How much longer would it take 126 men?

9) At a scout camp there is enough food for 160 boys for 12 days. If 40 boys fewer than expected turn up, how much longer would the food last?

10) A man walks for 8 hours at 5 mph.
Had he walked at 4 mph how much longer would he have taken?

11) Four lucky people share the lottery roll-over.
They each get £2 187 500.

If one more person had shared the prize, how much less would each person have received?

12) At an average speed of 80 km/h, Barbara can drive from Glasgow to Edinburgh in 54 minutes.

How much time would it save if she could increase her average speed by 10 km/h?

13) A container of shampoo will fill 800 small bottles each of 60 ml.

   a) How many large 250 ml bottles could be filled from the container?

   b) The container will fill 320 medium sized bottles.
   Calculate the volume of a medium sized bottle.

14) A contractor undertakes to do a certain job in 12 days. He employs 50 men, but finds that after 8 days only half of the work is done. How many men will he require to have working at the job during the remaining time to complete the work in time?

15) A builder contracts to complete a job in 48 days, and employs 14 people to do so. After 16 days the work is held up for 11 days by bad weather. How many extra people would now be needed to finish the job on time?
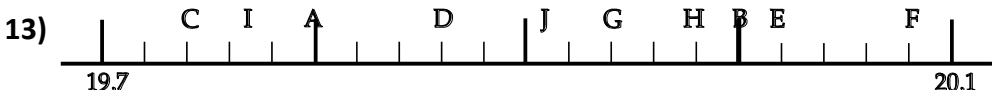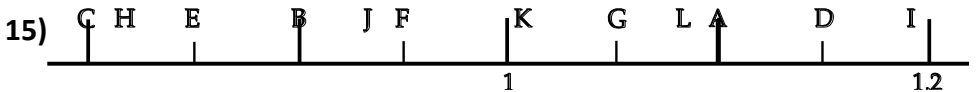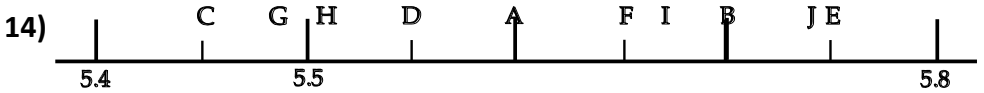
Reading Scales

Exercise 1

In each of the following questions, write down the number marked by each letter (eg A = 4.·62)
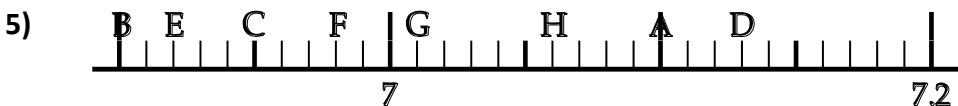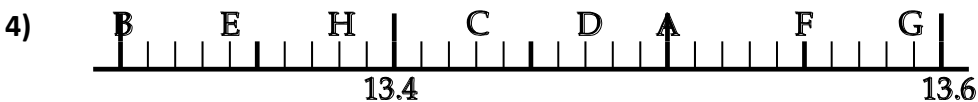
1)

2)

3)

4)

5)

6)

H   D   K A   J   E   F   G   B   I   C
15   15.3

7)

B   E   A   D   H   F   K   C   I   G   J
3.7   4.1

8)

E   F   G   I   C   J   A   B   K   D   H
1   1.3

9)

A   E   C   B   D   F   G
6.2   6.3   6.4   6.5

10)

B   E   D   A   F   C   G
9.7   9.9   10

11)

B   F   C   E   A   G   D
11   11.2

12)

D   G   F   A   H   E   C   B
8.3   8.6

13)
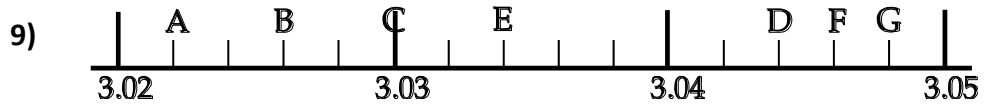

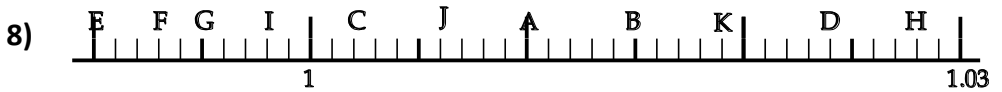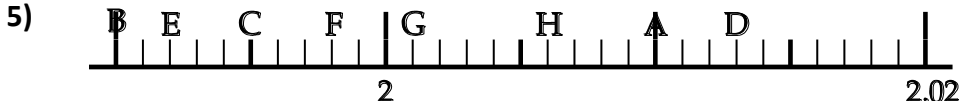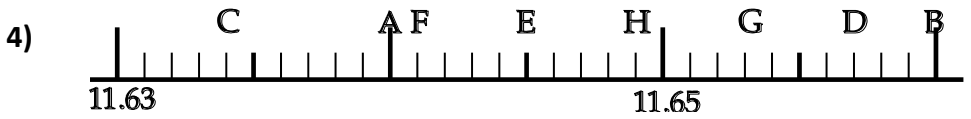19.7   C   I   A   D   J   G   H   B   E   F   20.1

In Questions 14 and 15 below, some of the letters will have to be estimated as best you can.

14)

5.4   C   G   H   D   A   F   I   B   J   E   5.8 (5.5)

15)

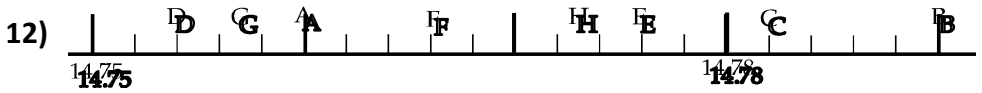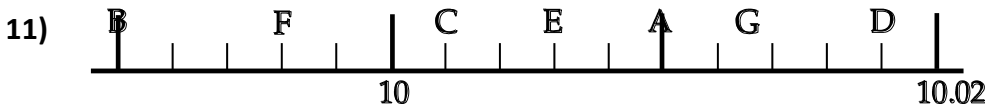C   H   E   B   J   F   K   G   L   A   D   I   1   1.2

Exercise 2

In each of the following questions, write down the number marked by each letter (eg A = 4·353)
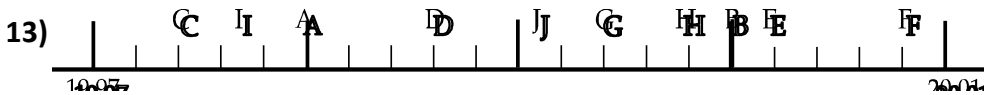
1)

4.35   A   E   G   H   C   D   B   F   4.36   4.37   4.38

2)

8.97   H   A   E   B   C   D   F   G   8.98   9

3)

5   H   F   G   A   C   D   B   E   5.02   5.03

4)

C   A F   E   H   G   D   B

11.63   11.65

5)

B E   C   F G   H   A   D

2   2.02

6)

H   D   K A   J   E   F   G   B   I   C

18   18.03

7)

B E A   D H F   K C   I G J

6.07   6.11

8)

E F G I C   J A   B   K   D   H

1   1.03

9)

A   B   C   E   D F G

3.02   3.03   3.04   3.05

10)

B E   F   C   A   G   D

8.07   8.08   8.1

11) B   F   C   E   A   G   D

10   10.02

12) D G A   F   H E   C   B

14.75   14.78

13) C I A   D   J G H B E   F

10.05   20.01

In Questions 14 and 15 below, some of the letters will have to be estimated as best you can.

14) G C   D H A I   F   B   E   J

6.36   6.37   6.4

15) C H E   B J F   K   G   L A   D   I

1.5

1   1.02
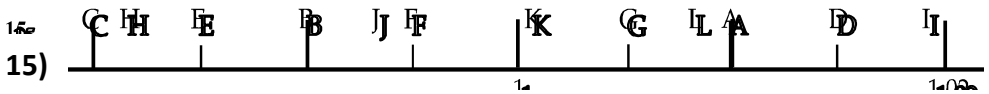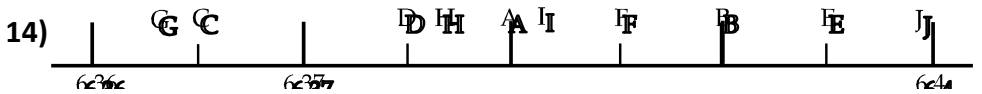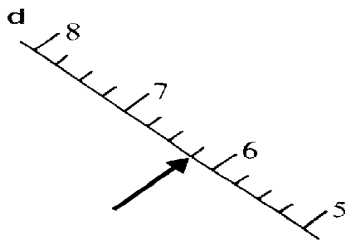
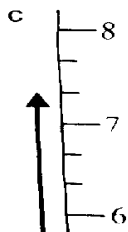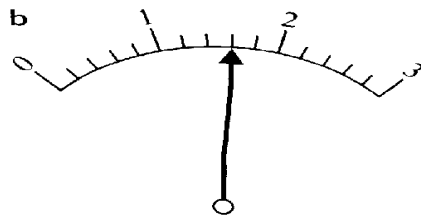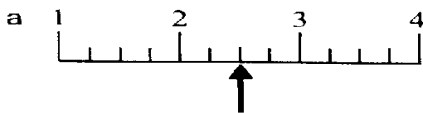**16)** What reading is indicated by the pointer on this weighing machine?
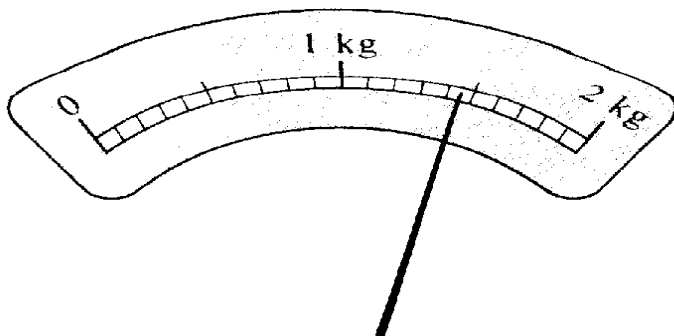
17) **a)** What reading is shown in each thermometer?
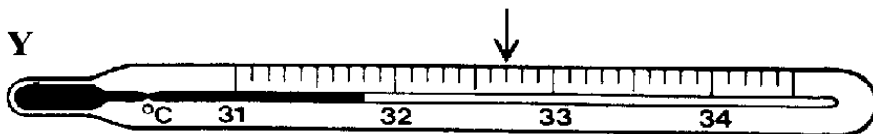
b) What temperatures are indicated by the 2 arrows on the thermometers?

18) Write down the reading to which each arrow points in these diagrams.

19) What is the reading on this barometer scale?
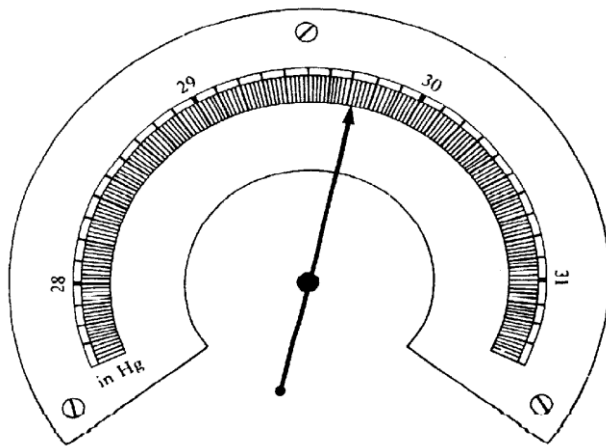
20) **a)** What is the reading in mph shown on the speedometer?
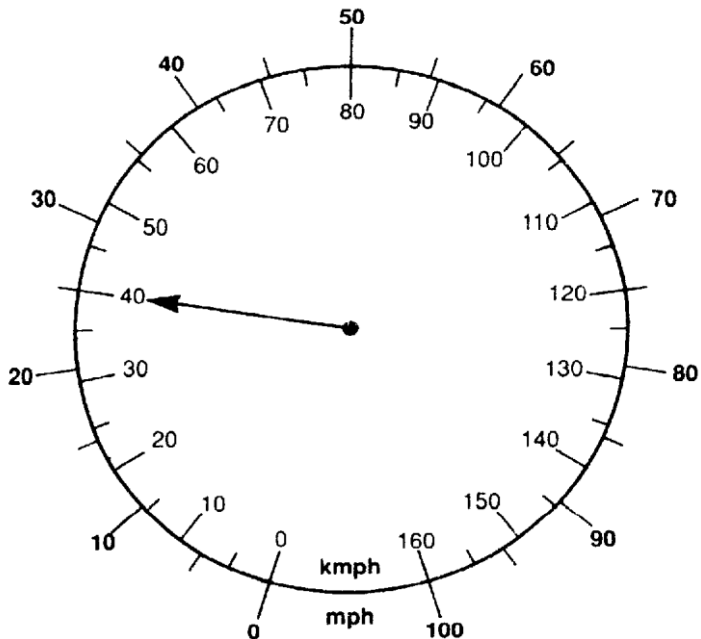
b) The max speed limit for motorways is 70 mph. Use the speedometer scales to find this speed in km per hour.

c) The standard speed limit in built up areas is 30 mph. Use the speedometer scales to find this speed in km per hour.

d) The national speed limit for single roads is 60 mph. Use the speedometer scales to find this speed in km per hour.

e) The speed limit for a bus on a dual carriage way is 60 mph. Use the speedometer scales to find this speed in km per hour.

Conversion of Units

Exercise 1

Complete the Conversion of Units Worksheet

Exercise 2

1) A container holds 750 kg. 6 of these containers are loaded onto a lorry. Find the total weight of the load, giving your answer in tonnes.

2) A tank in the shape of a cuboid measures 45 cm by 50 cm by 75 cm. Find the volume of water the tank can hold, giving your answer in litres.

3) A bottle of shampoo holds 220 ml. A box contains 48 bottles. Find the total number of litres of shampoo in the box.

4) In a race one lap of the track measures 400 m. If an athlete completes 26 laps of the track find how many kilometres she has run?

5) If a baby rabbit weighs 255g, find the weight of 8 baby rabbits, giving your answer in kilograms.

6) If 2·1 litres of washing up liquid is divided equally among 3 empty containers, how many cubic centimetres are put in each container?

7) A relay race has a total length of 2·4 km. How far did each of the 4 runners run in metres?

8) A roll of ribbon has length 40 m. How many pieces measuring 4 cm can be cut from the roll?

9) By how many centimetres is 2 m longer than 0·64 m?

10) A bag of flour holds 1·5 kg. A cake can be made using 250 g of flour. How many cakes can be made from the whole bag?

11) A fish weighs 75 mg and the water in its tank weighs 2·5 kg. If the tank weighs 450 g find the total weight in:

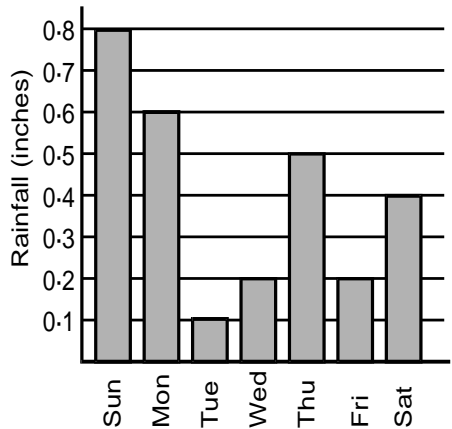   **a)** milligrams   **b)** grams   **c)** kilograms

Statistics

Graphs

Exercise 1- Bar Graphs and Histograms

1) This bar graph gives the amount of rain which fell on each day of a week.

a) Which day had the highest rainfall?

b) Which day had the lowest?

c) On what days did the same amount fall?

d) Give the rainfall for each day?

e) What was the total rainfall for the week?

2) A histogram shows the favourite sports played by 4C1.

a) How many pupils chose football as their favourite sport?

b) How many preferred badminton?

c) What was the total amount of pupils in the class?

d) How many pupils chose a **racket** sport?

e) How many pupils' favourite sports are played using a ball?

Favourite Sport
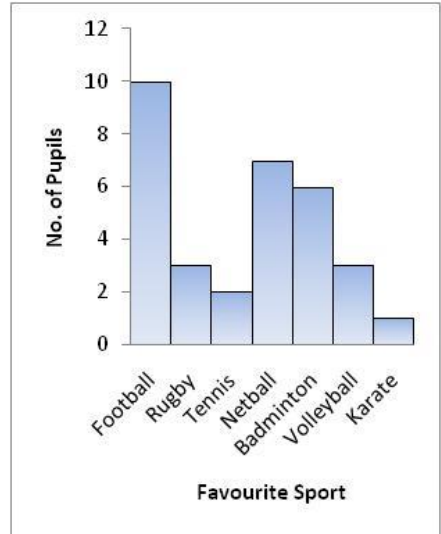
3) Here is a bar chart showing class attendance for one week.

a) Which day had the best attendance?

b) Which day had the lowest attendance?

c) What was the total attendance for the week?

d) What was the **average** attendance?

Day
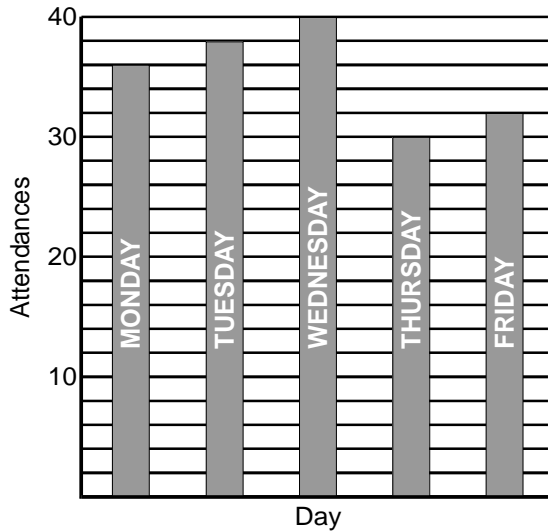
4) This Bar Chart was made following a survey of an S4 class asking the pupils their favourite subject and their 2nd favourite subject.

a) How many pupils are in the class (careful)?

b) How many pupils chose Maths as their favourite subject?

c) How many pupils chose Maths as their 2nd favourite subject?

d) How many pupils chose PE as their favourite or their 2nd favourite subject?

e) How many people did not choose Drama as either their favourite or 2nd favourite subject?

f) Calculate the percentage of pupils for all the favourite subjects.

g) Calculate the percentage of pupils for all the 2nd favourite subjects.

h) Does the total of **(f)** and **(g)** equal 200?

Discuss this result with your partner.
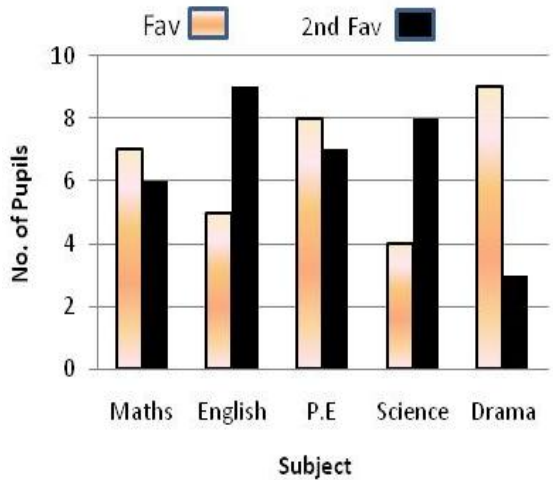
5) Working with a partner survey your class to find each pupil's favourite fruit. Now make a Bar Chart showing the information.

Exercise 2- Pie Charts

1) This pie chart shows the results of a
survey into brands of coffee bought by
900 people.
Use the pie chart for information and
calculate the number of people who
buy each brand of coffee.
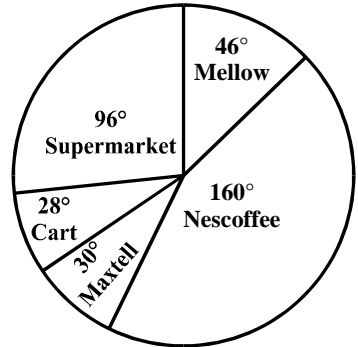
2)

HOBBY	Number of Pupils	Calculation	Angle
Sport	102	$\frac{102}{240} \times 360° =$	153°
Music	54		
Reading	60		
Collecting	18		
Other	4		
No hobby	2	$\frac{2}{240} \times 360° =$	3°
	240		360°

The table above shows information on 240 people who were asked
what their favourite hobby was.

Copy and complete this table and then display the information on a
Pie Chart.

Stem & Leaf Diagrams

Exercise 1

1) This stem and leaf diagram shows the distance travelled by a taxi on different hires.

    a) Write out level 3 in full.

    b) How many journeys are shown?

    c) What is the **second longest** journey?

    d) If journeys of length 25 km or less are classed as Type A journeys, How many journeys were there?

km travelled

```
1 | 4 6 7
2 | 3 4 4 8 9
3 | 0 2 7
4 | 2
```

n = 12

2|3 represents 23 km

2) This stem and leaf diagram shows the distance travelled by a taxi on different hires.

    a) Write out level 3 in full.

    b) How many journeys are shown?

    c) What is the **second longest** journey?

    d) If journeys of length 25 km or less are classed as Type A journeys, how many Type A journeys were there?

km travelled

```
0 | 5 6
1 | 3 7 8
2 | 2 2 8 9
3 | 4
4 | 2 3
```

n = 12

2|1 represents 21 km

3) This stem and leaf diagram shows the distance travelled by a taxi on different hires.

a) Write out level 3 in full.

b) How many journeys are shown?

c) What is the **second longest** journey?

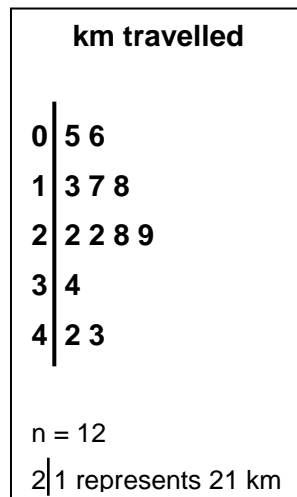**d)** If journeys of length 25 km or less are classed as Type A journeys, how many Type A journeys were there?

km travelled

```
1 | 2 5 7
2 | 4 4 6 7 8
3 | 1 2 3 6
4 | 4 4
5 |
6 | 4
```

n = 15

2|1 represents 21 km

4) This stem and leaf diagram shows the concentration level of a chemical in a number of samples

a) Write out level 7 in full.

b) A level of 85 or below is safe. How many safe samples are there?

c) How many samples were unsafe?

d) What is the average concentration of the safe samples?

units of chemical

```
 6 | 8
 7 | 2 3 7
 8 | 4 8 8
 9 | 1 8
10 | 3 4 6 8
11 | 2 5
```

n = 15

8|1 represents 81 units

5) This stem and leaf diagram shows the concentration level of a chemical in a number of samples

    a) Write out level 7 in full.

    b) A level of 85 or below is safe. How many safe samples are there?

    c) How many samples were unsafe?

    d) What is the average concentration of the safe samples?

units of chemical

```
 5 | 4
 6 |
 7 | 2 8 8 9
 8 | 3 6 7 7 7
 9 | 0 2 5
10 | 8
```

n = 14

8 4 represents 84 units

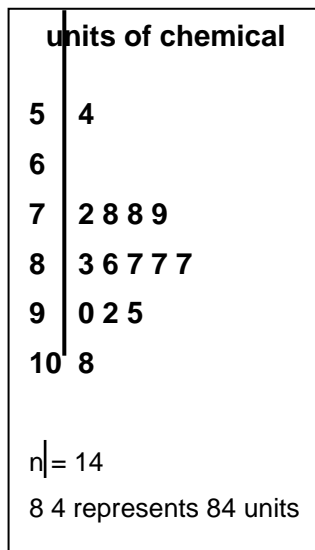**6)** This stem and leaf diagram shows the concentration level of a chemical in a number of samples

    a) Write out level 7 in full.

    b) A level of 85 or below is safe. How many safe samples are there?

    c) How many samples were unsafe?

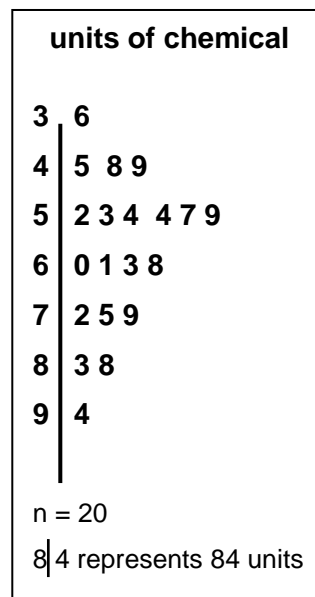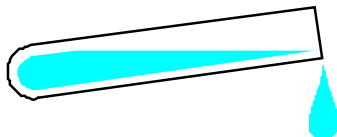   **d)** What is the average concentration of the safe samples?

units of chemical

```
 3 | 6
 4 | 5 8 9
 5 | 2 3 4  4 7 9
 6 | 0 1 3 8
 7 | 2 5 9
 8 | 3 8
 9 | 4
```

n = 20

8 4 represents 84 units

7) The times, in seconds to run a race for competitors is given in the stem and leaf diagram.

   a) What was the winning time?

   b) How many sub 10 second times were there??

   c) What percentage of the competitors had a time of less than 12 secs?

   d) Write out level 10 in full.

time (seconds)	
9	8 9
10	2 7 8
11	5 6 8 9
12	0 2 3 8
13	7

n = 14

11|9 represents
11·9 seconds

8) The times, in seconds to run a race for competitors is given in the stem and leaf diagram.

   a) What was the winning time?

   b) How many sub 10 second times were there??

   c) What percentage of the competitors had a time of less than 12 secs?

   d) Write out level 10 in full.

time (seconds)	
8	9
9	2 8
10	4 6 6 7
11	0 5 6
12	3 4 5 8 8
13	2 7 8

n = 18

11|6 represents
11·6 seconds

Fractions as Percentages

Exercise 1

Write the fractions below as percentages

1) $\dfrac{7}{50}$ 2) $\dfrac{3}{50}$ 3) $\dfrac{12}{25}$ 4) $\dfrac{7}{20}$ 5) $\dfrac{13}{20}$

6) $\dfrac{7}{10}$ 7) $\dfrac{3}{10}$ 8) $\dfrac{9}{10}$ 9) $\dfrac{16}{40}$ 10) $\dfrac{34}{40}$

11) $\dfrac{12}{80}$ 12) $\dfrac{36}{90}$ 13) $\dfrac{7}{70}$ 14) $\dfrac{12}{75}$ 15) $\dfrac{9}{75}$

16) Which is most, $\dfrac{3}{5}$ or $\dfrac{4}{7}$?

17) Which is most, $\dfrac{23}{30}$ or $\dfrac{21}{27}$?

18) Which is most, $\dfrac{32}{50}$ or $\dfrac{13}{20}$?

19) Jane scored 68% in her maths test whilst Alice scored 15 out of 25. Who had the better result?

20) Ed scored 19 out of 25 in his English test and 14 out of 20 in his Maths test.
In which subject did he do better and by what percentage?

Predictions as Percentages

Exercise 2

1) Sarah is confused by her test marks in English for October and March.

       October: 20 out of 25
       March: 24 out of 30

Calculate her percentage mark for each test. Had she improved? Justify your answer by calculation.

2) Mark sowed three different kinds of flower seeds. The results are shown below.

       Type A produced 40 plants from 50 seeds

       Type B produced 35 plants from 40 seeds

       Type C produced 23 plants from 25 seeds.

Which flower seed was most successful?

Justify your answer by calculation.

3) Two dance clubs are to send representatives to a show.
The representatives are chosen at random.

       Club A has 26 members and 5 tickets to use.

       Club B has 34 members and 7 tickets to use.

In which club does any one person have a better chance of being selected?

Justify your answer by calculation.

4) Three rugby teams play in the same town.

       Team A have won 5 out of their 9 games.

       Team B have won 7 out of their 12 games.

       Team C have won 9 out of their 14 games.

Which team has the best winning record?

Justify your answer by calculation.

5) Gordon sowed three different kinds of flower seeds. The results are shown below.

      Type A produced 42 plants from 60 seeds

      Type B produced 13 plants from 20 seeds

      Type C produced 15 plants from 25 seeds.

Which flower seed was most successful?

Justify your answer by calculation.

6) Two drama clubs are to send representatives to a show. The representatives are chosen at random.

      Club A has 48 members and 9 tickets to use.

      Club B has 32 members and 7 tickets to use.

In which club does any one person have a better chance of being selected?

Justify your answer by calculation.

7) Three football teams play in the same town.

      Team A have won 8 out of their 14 games.

      Team B have won 10 out of their 18 games.

      Team C have won 11 out of their 20 games.

Which team has the best winning record?

Justify your answer by calculation.

8) Theo sowed three different kinds of flower seeds. The results are shown below.

      Type A produced 48 plants from 60 seeds

      Type B produced 35 plants from 45 seeds

      Type C produced 23 plants from 30 seeds.

Which flower seed was most successful?

Justify your answer by calculation.

9) Two opera clubs are to send representatives to a show. The representatives are chosen at random.

   Club A has 30 members and 8 tickets to use.

   Club B has 40 members and 10 tickets to use.

   In which club does any one person have a better chance of being selected?

   Justify your answer by calculation.

10) Three rugby teams play in the same town.

    Team A have won 16 out of their 23 games.

    Team B have won 17 out of their 26 games.

    Team C have won 15 out of their 21 games.

    Which team has the best winning record?

    Justify your answer by calculation.

Mixed Examples

Exercise 3

1) Everyone should eat 5 portions of fruit or vegetables every day. The first food Harry eats one morning is an apple for breakfast:

   a) What percentage of his recommended daily amount has he had?

   b) If he eats a portion of sweet corn with his lunch and a banana after lunch what percentage of Harry's recommended daily allowance has he still to eat?

2) A Mars Bar contains $\frac{1}{5}$ sugar, a Snickers contains $\frac{11}{50}$ sugar and a Topic contains $\frac{7}{25}$ sugar. Which bar has the most sugar in it?

3) 3 breakfast cereals each claim to have a low percentage salt content. In a 500g packet of Cornyflakes there are 7.5 grams of salt, a 1kg packet of Crispie Rice has 16 grams of salt and a 200g packet of Sugar Pops has 2.8 grams of salt.

  a) Calculate the percentage of salt in all 3 cereals
  b) Which cereal has the lowest salt content?

4) The recommended daily amount of salt is 6 grams. Sarah's breakfast had 1·5 grams of salt in it. What percentage of her recommended daily amount has she had?

5) 3 different packets of Cheese and Onion crisps are tested for saturated fat.

  Walkers 30g packet has 3g of saturated fat.

  Golden Wonder 25g packet has 2·6g of saturated fat.

  McCoys 35g packet has 3·4g of saturated fat.

  What crisps would be the healthiest option?

  You must give a reason for your answer.

6) Mesco's the supermarket sells healthy choice ready made meals. They have 1·5 grams of fat per 100 grams. What is the percentage of fat in these meals?

  Angela in the school canteen makes her own versions of these meals. These weigh 300 grams and have a fat content of 4 grams.

  Which meal contains the least percentage of fat?
  Justify your answer by calculation.

7) Before adding milk a 60g portion of All Bran cereal contains 15g of sugar, a 70g portion of Corn Flakes contains 17g of sugar and a 50g portion of Frosties contains 14g of sugar. What would be the healthiest breakfast cereal? You must give a reason for your answer.

8) A 250ml can of Red Bull contains 1ml of caffeine, a 330ml of Coca Cola contains 1·1ml of caffeine and a 500ml can of Diet Irn Bru contains 1·2ml of caffeine. Which of these cans would be the worst to drink if you want to go to sleep soon?

You must give a reason for your answer.

9) John, Peter and James all want to increase their weightlifting. They all train hard and after 2 months John has improved from being able to lift 45kg and can now lift 50kg. Peter could lift 48kg and can now lift 54kg while James could lift 55g and can now lift 61kg.

Which of the 3 boys has improved the most compared to their original weightlifting abilities?

Justify your answer by calculation.

10) We should all drink 8 glasses of water a day. What percentage of your recommended daily amount of water have you drank if you have:

a) 2 glasses

b) 4 glasses

c) 7 glasses

11) Torrison's the supermarket sells healthy choice ready made meals. They have 0·5 grams of fat per 100 grams.

What is the percentage of fat in these meals?

Jessie in the school canteen makes her own versions of these meals. These weigh 400 grams and have a fat content of 1·8 grams.

Which meal contains the most percentage of fat?
Justify your answer by calculation.