



Cumbernauld Academy
Mathematics Department



3rd Level Core

Block 2 - homework booklet

Exercise 6

- In the "Parks and Smencer" sale, which of each pair of offers is **better**:-
 - 25% off or a third off
 - 20% off or $\frac{3}{4}$ of the original price
 - "Buy one, get one free" or "three for the price of two".
- Place in order, smallest to largest:
 - $\frac{3}{5}$, 0.45, 70%, $\frac{2}{3}$
 - 0.21, $\frac{3}{20}$, 17%, $\frac{1}{5}$

MNU 3-07b: By applying my knowledge of equivalent fractions and common multiples, I can add and subtract commonly used fractions.

Exercise 1

1. Find :-

(a) $\frac{3}{5} + \frac{1}{5}$	(b) $\frac{2}{9} + \frac{5}{9}$	(c) $\frac{4}{11} + \frac{5}{11}$	(d) $\frac{5}{8} + \frac{1}{8}$
(e) $\frac{9}{10} - \frac{3}{10}$	(f) $\frac{4}{5} - \frac{1}{5}$	(g) $\frac{6}{7} - \frac{3}{7}$	(h) $\frac{5}{13} - \frac{2}{13}$

2. Find :-

(a) $2\frac{2}{5} + \frac{1}{5}$	(b) $5\frac{2}{7} + \frac{4}{7}$	(c) $3\frac{1}{8} + 2\frac{5}{8}$	(d) $6\frac{2}{9} + 1\frac{5}{9}$
(e) $8\frac{3}{4} - 4\frac{1}{4}$	(f) $7\frac{5}{6} - 3\frac{1}{6}$	(g) $8\frac{4}{5} - 1\frac{2}{5}$	(h) $5\frac{5}{9} - 5\frac{1}{9}$

Find :-

3. (a) $\frac{1}{4} + \frac{1}{2}$	(b) $\frac{1}{2} - \frac{1}{4}$	(c) $\frac{3}{4} - \frac{1}{2}$	(d) $1\frac{1}{2} + 2\frac{1}{4}$
(e) $3\frac{1}{2} - 1\frac{1}{4}$	(f) $2\frac{3}{4} - 1\frac{1}{2}$	(g) $1\frac{3}{4} + 1\frac{1}{2}$	(h) $5\frac{3}{4} - 1\frac{1}{2}$

MNU 3-07c: Having used practical, pictorial and written methods to develop my understanding, I can convert between whole or mixed numbers and fractions.

Exercise 1

1. Change each of the following to a mixed number and simplify where possible :-

(a) $\frac{15}{2}$	(b) $\frac{16}{3}$	(c) $\frac{42}{5}$	(d) $\frac{25}{10}$
(e) $\frac{25}{4}$	(f) $\frac{30}{4}$	(g) $\frac{122}{11}$	(h) $\frac{78}{8}$

2. Change each of the following mixed numbers to a top heavy fraction :-

(a) $3\frac{1}{2}$

(b) $4\frac{1}{3}$

(c) $7\frac{3}{5}$

(d) $10\frac{5}{6}$

(e) $7\frac{8}{9}$

(f) $5\frac{11}{12}$

(g) $10\frac{1}{50}$

(h) $15\frac{8}{15}$

MNU 3-08a: I can show how quantities that are related can be increased or decreased proportionally and apply this to solve problems in everyday contexts.

Exercise 1

1. George has a lot of pets. He has 11 mice, 9 goldfish, 4 cats, 3 dogs and a rabbit!



What is the ratio of :-

- (a) mice to goldfish (b) goldfish to cats
(c) dogs to cats (d) rabbits to mice ?

2. An orchard has 31 apple trees and 27 pear trees. What is the ratio of :-

- (a) apple trees to pear trees (b) pear trees to apple trees
(c) apple trees to total number of trees (d) pear trees to total number of trees ?



3. In December 1999, January 2000 and February 2000, there were 7 rainy days each month.

Write down the ratio of rainy days : dry days for each of these months.

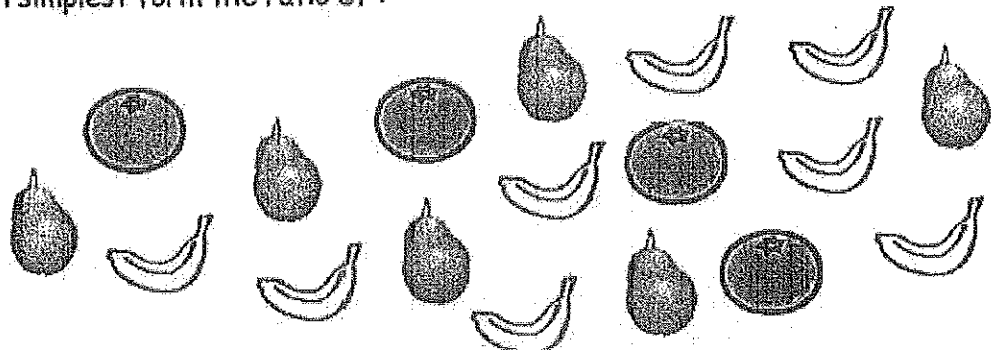
Exercise 2

1. Simplify each of the following ratios :-

- (a) 4 : 6 (b) 5 : 20 (c) 16 : 2 (d) 3 : 12
(e) 10 : 50 (f) 15 : 35 (g) 60 : 24 (h) 21 : 35
(i) 300 : 9000 (j) 18 : 270 (k) 32 : 88 (l) 17 : 51

2. From the picture, write in simplest form the ratio of :-

- (a) oranges to pears
(b) bananas to pears
(c) pears to bananas
(d) pears to oranges
(e) bananas to fruit.



3. On a trip to D & M's there were 8 teachers and 120 pupils. Write in simplest form, the ratio of :-

- (a) teachers : pupils (b) pupils : teachers (c) teachers : people (d) people : pupils.

- Change the following to pounds sterling. (Give your answer to the nearest penny).
 (a) 1000 € (b) 72 € (c) 125 € (d) 1880 €
- A coat costs \$250 in New York. Cathy has £160. Does she have enough money?
- I changed £200 into Swiss Francs and spent 136 Francs on holiday.
 I came home and exchanged the remaining amount into dollars for my next trip to Hong Kong.
 How many dollars did I receive?

MNU 3-10a: Using simple time periods, I can work out how long a journey will take, the speed travelled at or distance covered, using my knowledge of the link between time, speed and distance.

Exercise 1

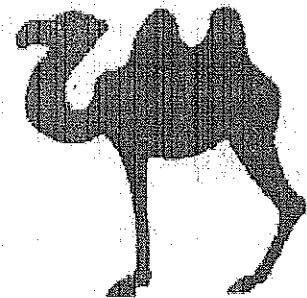
- Change the following 12 hour clock times to 24 hour clock times :-
 (a) 2:15 am (b) 4:20 am (c) 6 am
 (d) 5:20 pm (e) 1:45 pm (f) 7 pm
 (g) 6:25 am (h) 9:50 pm (i) 1:15 am
 (j) 10:35 am (k) midnight (l) 12:20 am
- Change the following 24 hour clock times to 12 hour clock times :-
 (a) 0430 (b) 1040 (c) 0704
 (d) 1450 (e) 1735 (f) 2050
 (g) 0150 (h) 2145 (i) 2205
 (j) 1902 (k) 0000 (l) 0555
- How long is it from :-
 (a) 2:45 pm to 5:45 pm (b) 4 am to 8:30 am
 (c) midnight to 4:30 am (d) 7:55 pm to 9:15 pm
 (e) 3:40 am to 5:10 am (f) 4:10 am to 9:35 am?
- A show started at 7:35 pm and went on till 10:15 pm.
 For how long had the show lasted?
- I boarded a train at 11:55 am and my journey lasted for 2 hours and 35 minutes.
 At what time did I reach my destination?

Exercise 2

- How far, in miles, will you have covered :-
 - running at 9 mph for 2 hours ?
 - driving at 35 mph for 3 hours ?
- What distances are covered by the following :-
 - a truck, travelling for 30 minutes at a speed of 60 m.p.h. ?
 - a sail on a yacht for 1 hour 30 minutes, at an average speed of 12 km/hr ?
- What distances are covered by the following :-
 - a car, going at an average speed of 36 m.p.h., for $\frac{1}{4}$ of an hour ?
 - a marathon runner, running at a speed of 16 km/hr for 1 hour 45 minutes ?
- A ship left Plymouth at 0215 and arrived at Cherbourg in France at 0745.
The ship sailed at an average speed of 30 km/hr.
How long did the sail take and how many kilometres had the ship travelled ?

Exercise 3

- Calculate the average speed for these journeys :-
 - 24 miles travelled in 2 hours.
 - 42 km travelled in 6 hours.
 - 280 miles travelled in 4 hours.
 - 1000 km travelled in 40 hours
 - 35 000 miles travelled in 7 hours.
 - 180 000 km travelled in 3 hours.
- Find the average speed of :-
 - a bus travelling 20 miles in 30 minutes. (how far does it travel in 1 hour ?)
 - a man walking 2 miles in $\frac{1}{2}$ hour
 - a camel crossing the 6 miles of dessert in $\frac{1}{2}$ hour |
 - a train which travels 20 miles in $\frac{1}{4}$ hour.
 - a cyclist covers 30 km in 1 hour 30 minutes. ($1\frac{1}{2}$ hrs)



Exercise 4

- Calculate the time taken for each of these journeys :-
 - sailing 20 km at 10 km/hr.
 - driving 400 miles at 50 m.p.h.
 - running 400 m at 8 m/sec.
 - flying 700 km at 200 km/hr.

2. How long, in hours and minutes, did the following journeys take :-
- a lorry, travelling 45 km at an average speed of 30 km/hr ?
 - a coach, travelling 150 miles at an average speed of 60 m.p.h. ?

3. (a) Use this distance chart to find how far it is from :-

- Zarat to Fharr
- Khumley to Hartoom.

(b) A Land-Rover averages 45 km/hr in the dessert. How long would it take to drive from Zarat to Hartoom ?

Zarat			
120	Khumley		
180	80	Hartoom	
210	100	60	Fharr

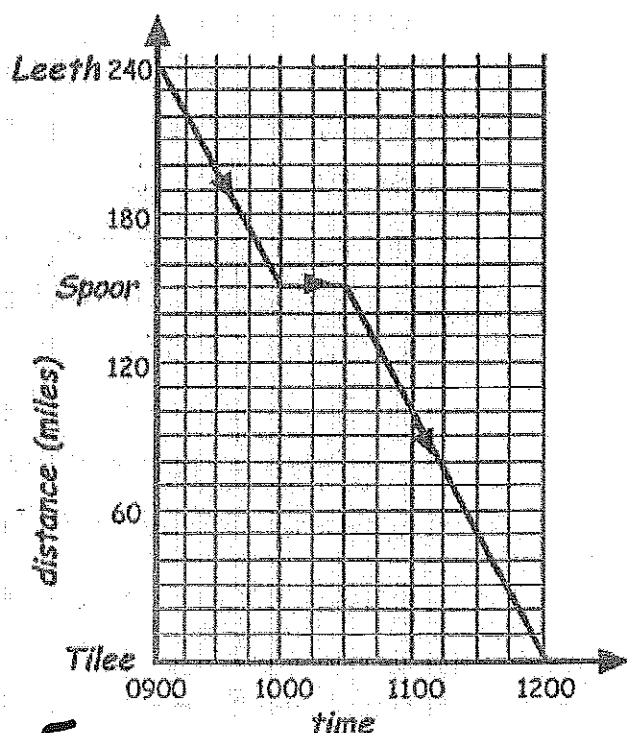
distances in km

Exercise 5

- A motor-cyclist covered a distance of 35 miles in half an hour. What was his average speed ?
- A truck travelled 90 miles at an average speed of 40 miles per hour. How long, in hours and minutes, did it take to complete its journey ?
- A small plane, flying at a steady speed of 240 km/hr, takes $1\frac{1}{2}$ hours to fly from Downlee Island to the mainland. How far had it flown ?
- It took me $2\frac{1}{2}$ hours to drive from Harwood to Deefield. Calculate my average speed for the journey.

Exercise 6

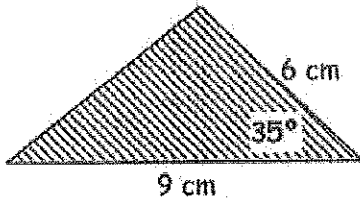
- This graph indicates a pilot's journey in his light plane from Leeth back to Tilee.
 - How long did it take to fly from Leeth to Spoor ?
 - How long did he stop in Spoor ?
 - At what time did he set off from Spoor to head to Tilee ?
 - When did he arrive in Tilee ?
 - Calculate the speed of the plane :-
 - from Leeth to Spoor.
 - on the runway at Spoor.
 - from Spoor to Tilee.



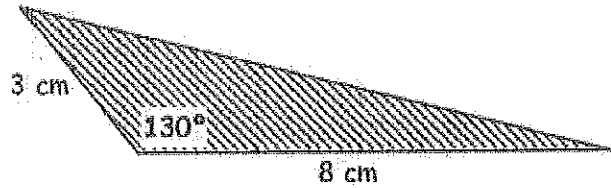
Exercise 2

1. Make accurate drawings of the following triangles :-

(a)



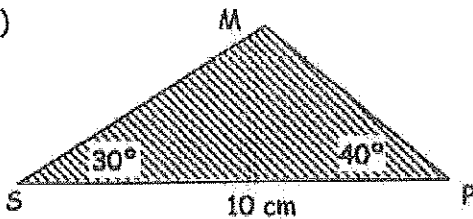
(b)



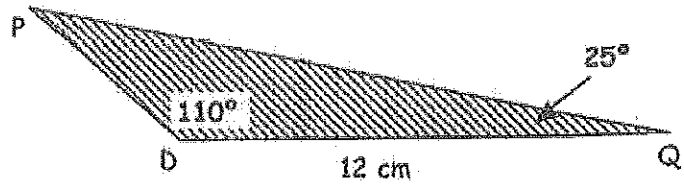
2. Make an accurate drawing of $\triangle ABC$ where $AB = 11$ cm, $BC = 9$ cm and $\angle ABC = 73^\circ$.

3. Make accurate drawings of the following triangles :-

(a)



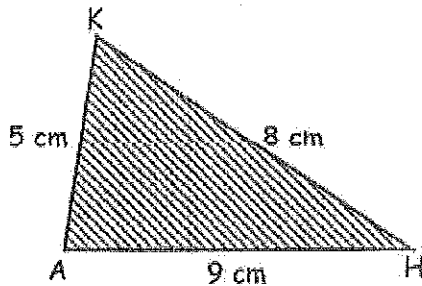
(b)



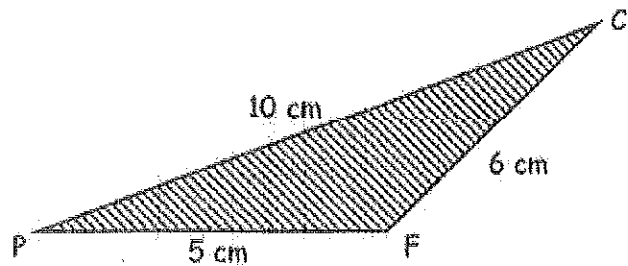
4. Make an accurate drawing of $\triangle DEF$ where $DE = 10$ cm, $\angle DEF = 59^\circ$ and $\angle FDE = 40^\circ$.

5. Make accurate drawings of the following triangles :-

(a)



(b)



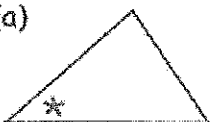
6. Make an accurate drawing of $\triangle XYZ$ where $XY = 10$ cm, $XZ = 9$ cm and $YZ = 6$ cm.

MNU 3-17a: I can name angles and find their sizes using my knowledge of the properties of a range of 2D shapes and the angle properties associated with intersecting and parallel lines

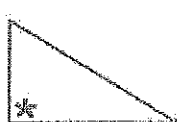
Exercise 1

1. What type of angle is marked with *.

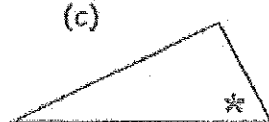
(a)



(b)



(c)



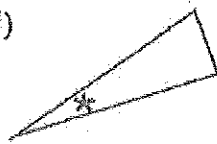
(d)



(e)



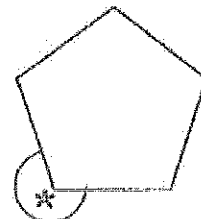
(f)



(g)



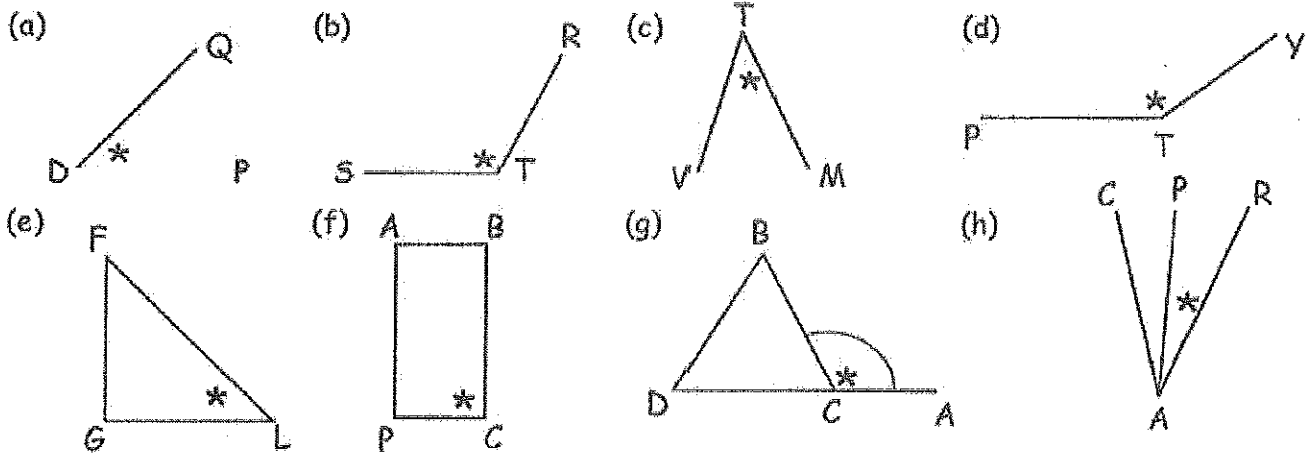
(h)



2. Write what type of angle each of the following is :-

- (a) 47° (b) 91° (c) 176° (d) 180°
 (e) 190° (f) 1° (g) 90° (h) 270°

3. Use 3 letters to name each of the angles marked with * .

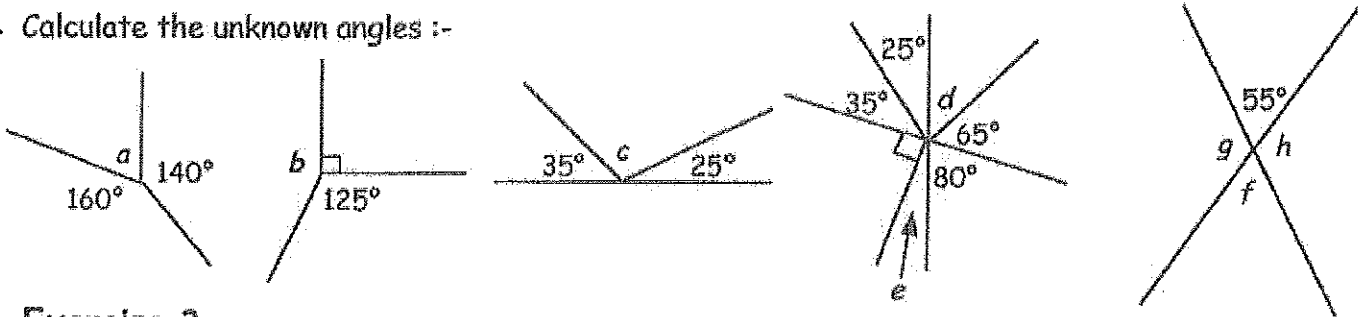


Exercise 2

1. Calculate the size of the unknown angle in each of the following :-

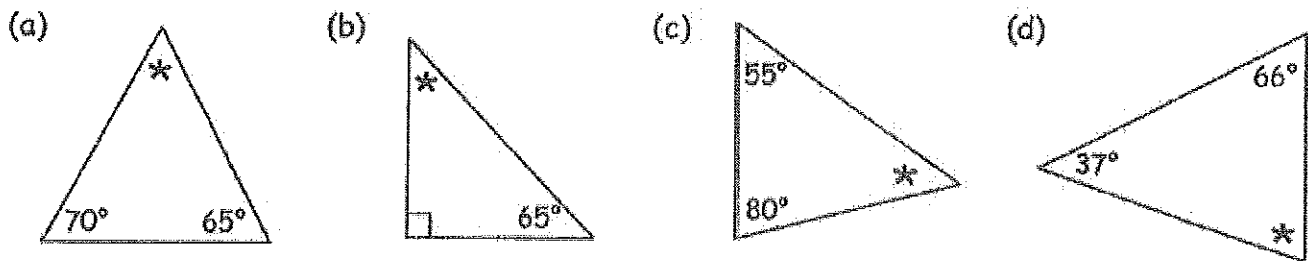


2. Calculate the unknown angles :-



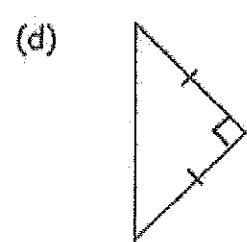
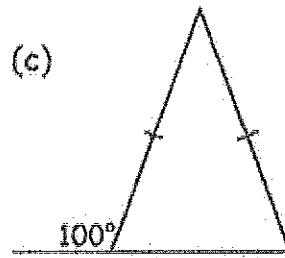
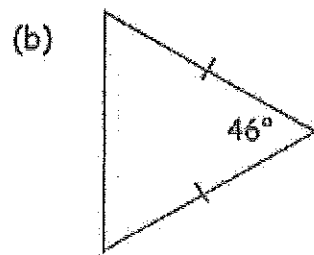
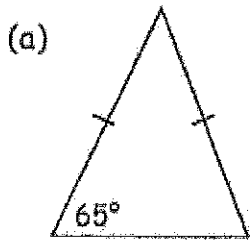
Exercise 3

1. Calculate the size of the angle marked * in each of these triangles :-



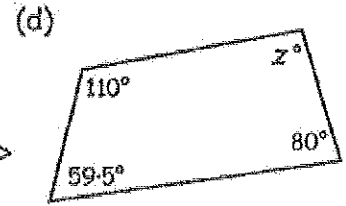
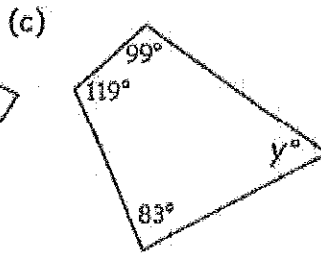
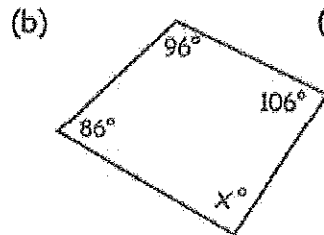
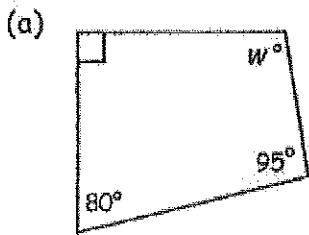
2. Make a neat rough sketch of each of the following diagrams.

Fill in the sizes of all the missing angles.



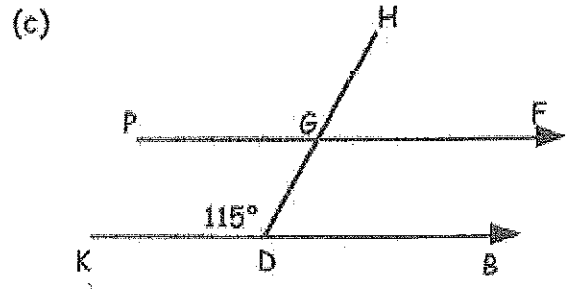
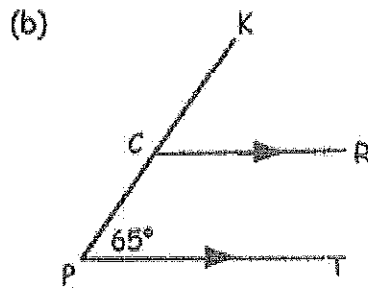
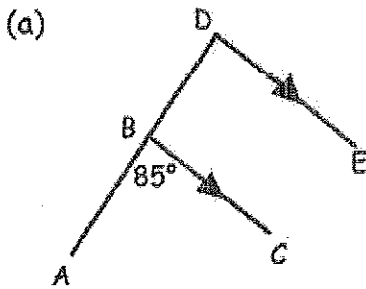
Exercise 4

1. Calculate the values of w , x , y and z in the following quadrilaterals :-

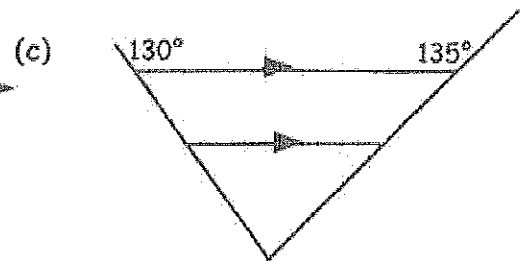
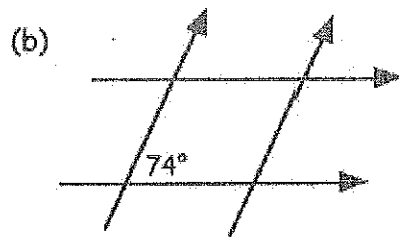
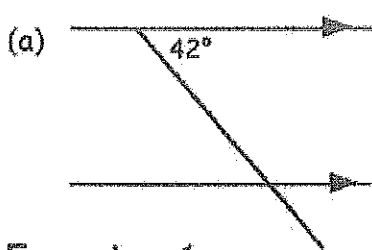


Exercise 5

1. Sketch each of the following and fill in all the angles :-

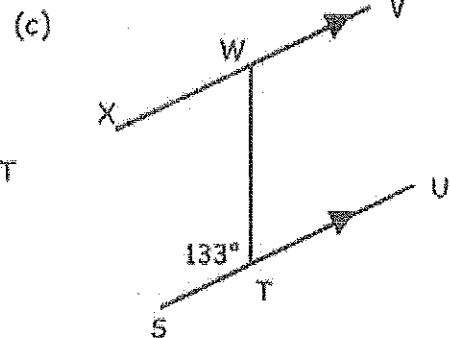
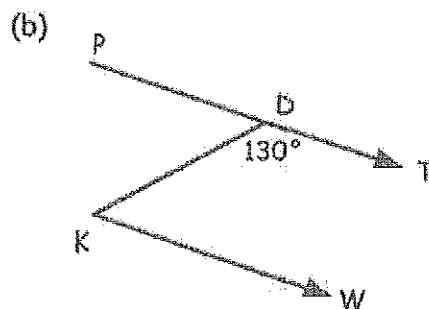
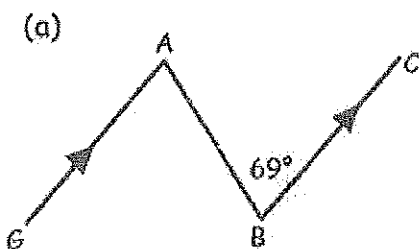


2. Sketch each of the following and fill in all the missing angles :-

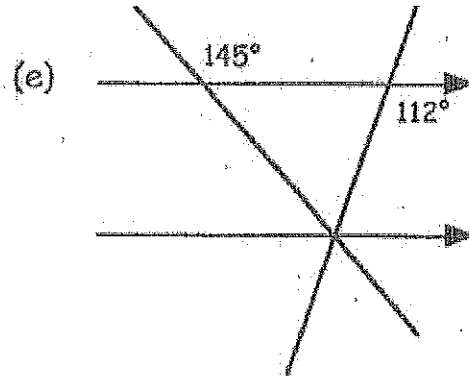
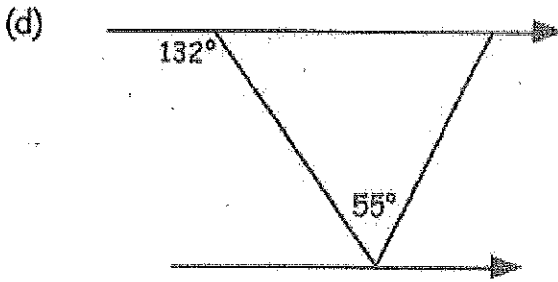
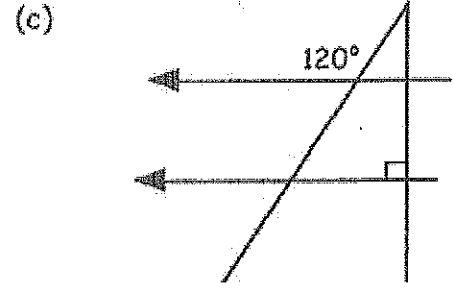
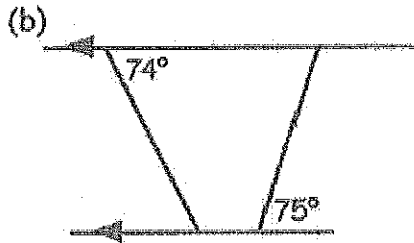
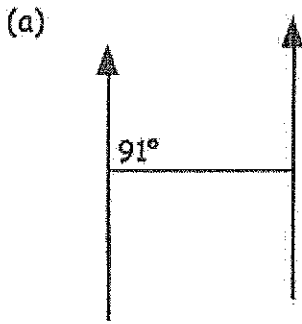


Exercise 6

1. Sketch each of the following and fill in all the angles :-

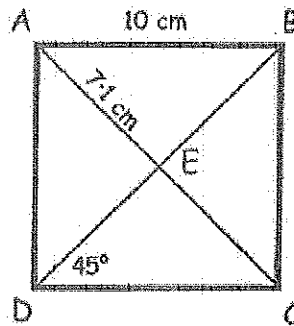


2. Sketch each of the following and fill in all the missing angles :-

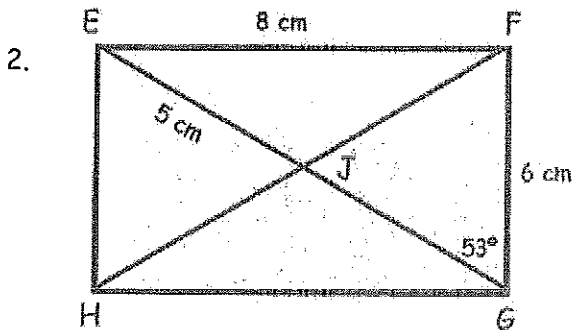


Exercise 7

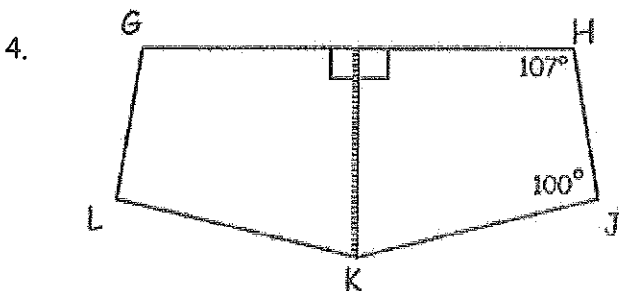
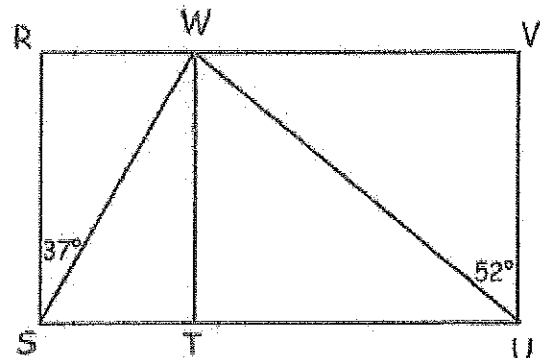
- (a) Make a neat sketch of the square shown.
 (b) Fill in the sizes of every side and angle.



- (a) Make a neat sketch of the rectangle shown.
 (b) Fill in the sizes of every side and angle.



- In this diagram $\angle RSW = 37^\circ$ and $\angle VUW = 52^\circ$.
 Make a fairly large sketch of the figure and fill in the sizes of all the angles.

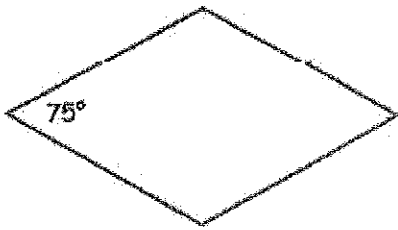


Two congruent quadrilaterals are used to create a shop sign.
 Calculate the size of angle JKL.

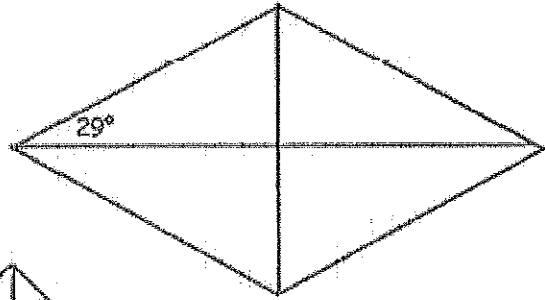
Exercise 8

1. Sketch each of the following rhombii and fill in the sizes of all the missing angles :-

(a)

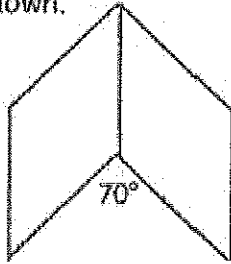


(b)



2. Two identical rhombii are placed as shown.

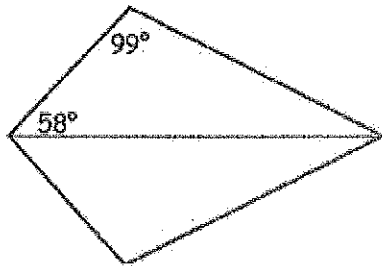
Sketch the diagram and fill in the sizes of all the missing angles.



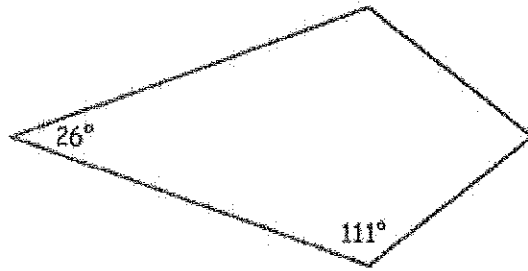
Exercise 9

1. Sketch each of the following kites and fill in the sizes of the missing angles :-

(a)

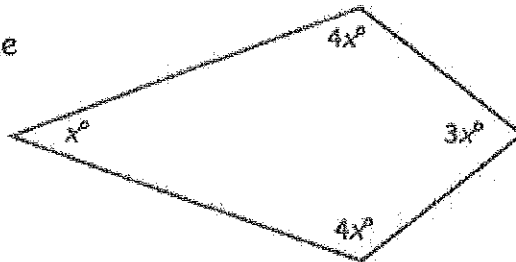


(b)



2. (a) Calculate the value of x in this kite.

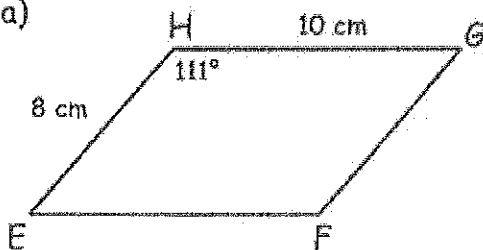
(b) Now sketch the kite and fill in the sizes of all its angles



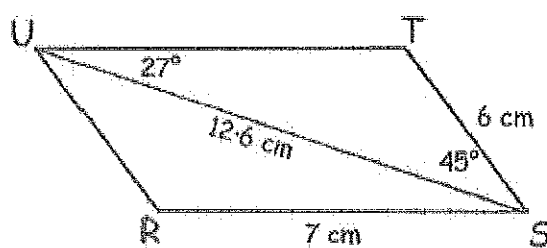
Exercise 10

Sketch each of the following parallelograms and fill in the sizes of all angles and sides :-

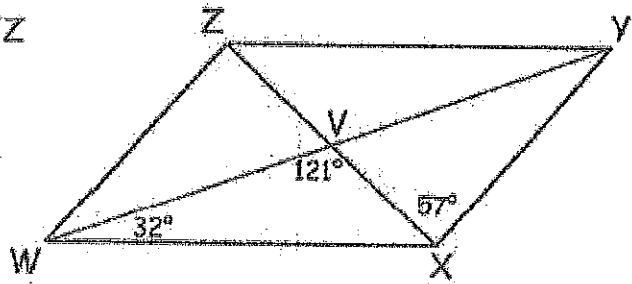
1. (a)



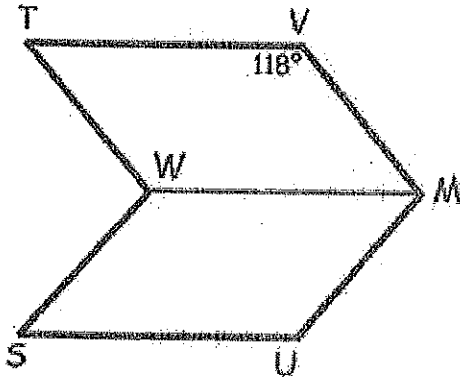
- (b)



2. Make a largish sketch of parallelogram WXYZ and fill in the sizes of all of its angles.



3.



Two identical parallelograms are shown. Line MW is an axis of symmetry.

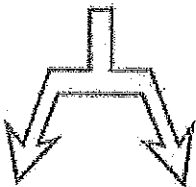
Calculate the size of reflex angle SWT

MNU 3-19a: I can illustrate the lines of symmetry for a range of 2D shapes and apply my understanding to create and complete symmetrical pictures and patterns

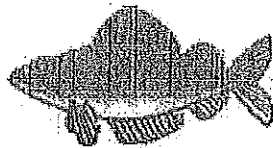
Exercise 1

1. Write down how many lines of symmetry each of these shapes has.

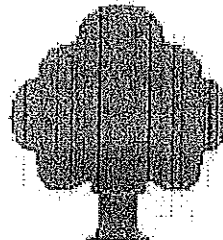
(a)



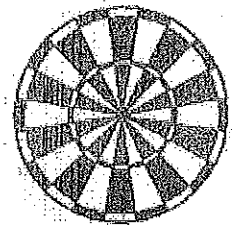
(b)



(c)



(d)



2. Copy and complete each diagram so that each dotted line is a line of symmetry:-

