

UNIT 1 *Mathematical Diagrams*

Extra Exercises 1.1

1. Use the table opposite to find the distances between:
 - (a) Carlisle and Perth,
 - (b) Glasgow and Inverness,
 - (c) Newcastle and Edinburgh,
 - (d) Perth and Middlesbrough,
 - (e) Fort William and Perth,
 - (f) Carlisle and Fort William,
 - (g) Newcastle and Carlisle.

*Distances
in miles*

98							
209	135						
97	48	102					
258	157	65	173				
95	147	280	191	308			
60	106	239	154	266	38		
146	42	102	62	114	192	151	

2. Which two of the towns listed in the table in question 1 are closest together?
3. Which two of the towns listed in the table in question 1 are farthest apart?
4. David leaves Carlisle and travels to Glasgow, and then on to Inverness. From there he travels to Edinburgh and finally back to Carlisle.
Use the information given in the table in question 1 to calculate how far he travels altogether.
5. Pauline drives from her home in Middlesbrough to Perth, calling at a friend's house in Glasgow on the way. She then travels directly back to her home.
Use the information given in the table in question 1 to calculate how far she travels altogether.

UNIT 1 *Mathematical Diagrams***Extra Exercises 1.2**

1. Draw a flow chart to describe how to prepare a slice of buttered toast.

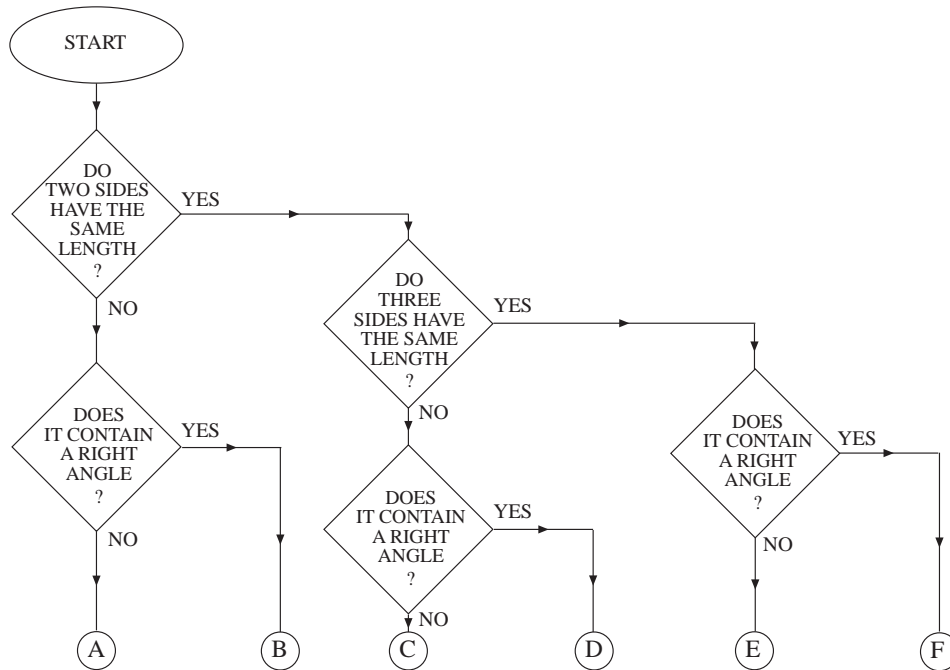
2. Draw a flow chart that describes how to adjust the temperature of the water in a bath.

3. Draw a flow chart that a driver should follow when stationary at a set of traffic lights with the red light showing.

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Extra Exercises 1.3

1. The following flow chart gives instructions for sorting triangles:



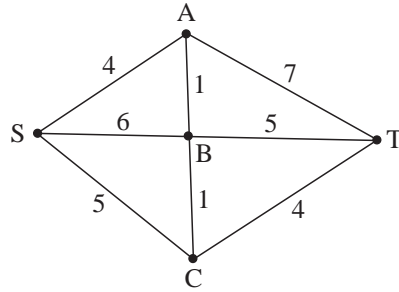
- (a) It is impossible for a triangle to arrive at one of the outputs. Which is this output?
 - (b) Draw a triangle that would appear at each of the possible outputs.
2. Draw a flow chart to classify quadrilaterals as *squares*, *rectangles* or *other*.
 3. Draw a flow chart to classify polygons as either *regular* or *irregular*. (A regular polygon has sides that are all the same length and interior angles that are all the same size.)

UNIT 1 *Mathematical Diagrams*

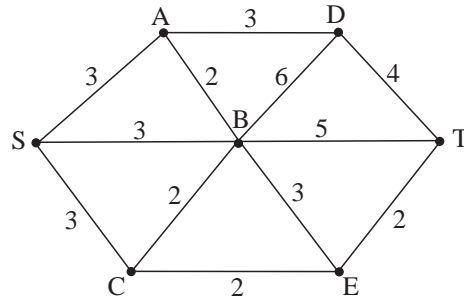
Extra Exercises 1.4

1. Find the shortest route from S to T in each of the networks below:

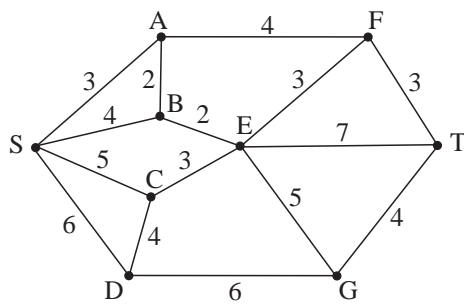
(a)



(b)



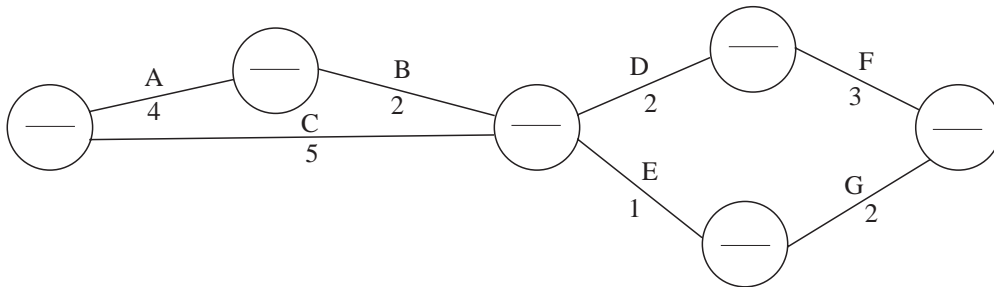
(c)



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Extra Exercises 1.5

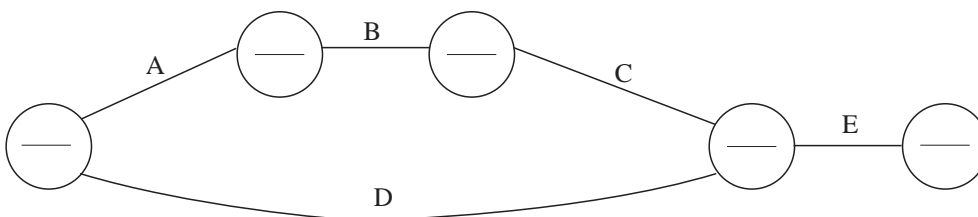
1. Find the critical path and shortest completion time for the following network:



2. Rachel is going to redecorate her room and put in some new furniture. The tasks she must carry out are listed below:

<i>Task</i>	<i>Preceded by</i>	<i>Time (hours)</i>
A Paint woodwork		2
B Hang wallpaper	A	4
C Lay new carpet	A B	2
D Assemble new furniture		5
E Move furniture into bedroom	A B C D	1

The activity network is shown below:



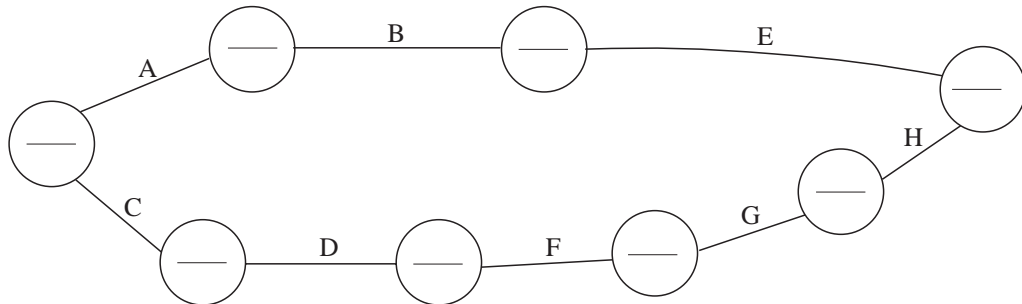
Find the critical path and the shortest possible completion time.

Extra Exercises 1.5

3. Andrew and Andrea have been asked to carry out the tasks listed below:

<i>Task</i>	<i>Time (mins)</i>	<i>Preceded by</i>
A Load dishwasher	10	
B Run dishwasher	65	A
C Put dirty clothes in washing machine	5	
D Run washing machine	40	C
E Empty dishwasher	8	A B
F Transfer clothes to tumble drier	3	C D
G Dry clothes in tumble drier	50	C D F
H Put clothes away	15	C D F G

The activity network is shown below:



- (a) Find the shortest possible completion time.
- (b) If Andrew had to do all the tasks himself, what would be the shortest possible completion time?

Extra Exercises 1.5

4. The following table lists the stages involved in the construction of a piece of flat-pack furniture:

<i>Task</i>	<i>Time (mins)</i>	<i>Preceded by</i>
A Open box	10	
B Check sections against list	30	A
C Check fixings against list	20	A
D Assemble shell	40	A B
E Cut back to size	40	A B
F Screw shell together	20	A B C D
G Assemble drawers	20	A B
H Glue drawers	10	A B G
I Fit drawers in shell	30	A B C D E F G H

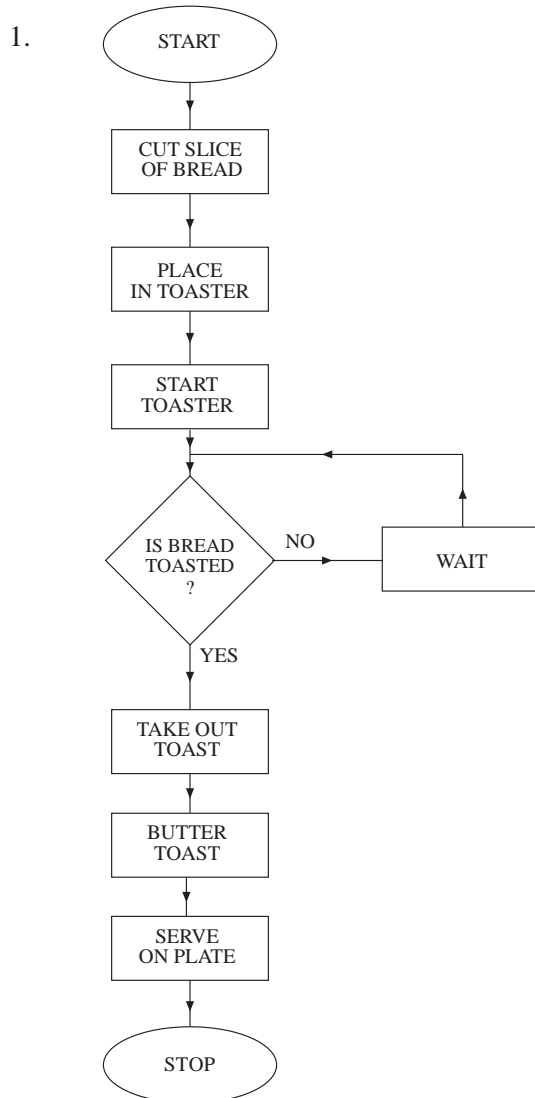
- (a) Draw a network diagram for this construction.
- (b) Find the critical path and the minimum construction time.
- (c) If one person is needed to carry out each task, how many people are needed to complete the construction in the minimum time?
5. The table below gives the tasks needed to complete a certain project. Determine the critical path and the minimum completion time (in days).

<i>Task</i>	<i>Time (days)</i>	<i>Preceded by</i>
A	1	
B	2	A
C	4	A B
D	3	A
E	14	A B C
F	14	A B C
G	16	A B C
H	12	A B C D G
I	14	A B C D G
J	10	A B C D G
K	5	A B C D G H
L	4	A B C D G I
M	6	A B C D G J
N	3	A B C D E F G H I J K L M

Extra Exercises 1.1 Answers

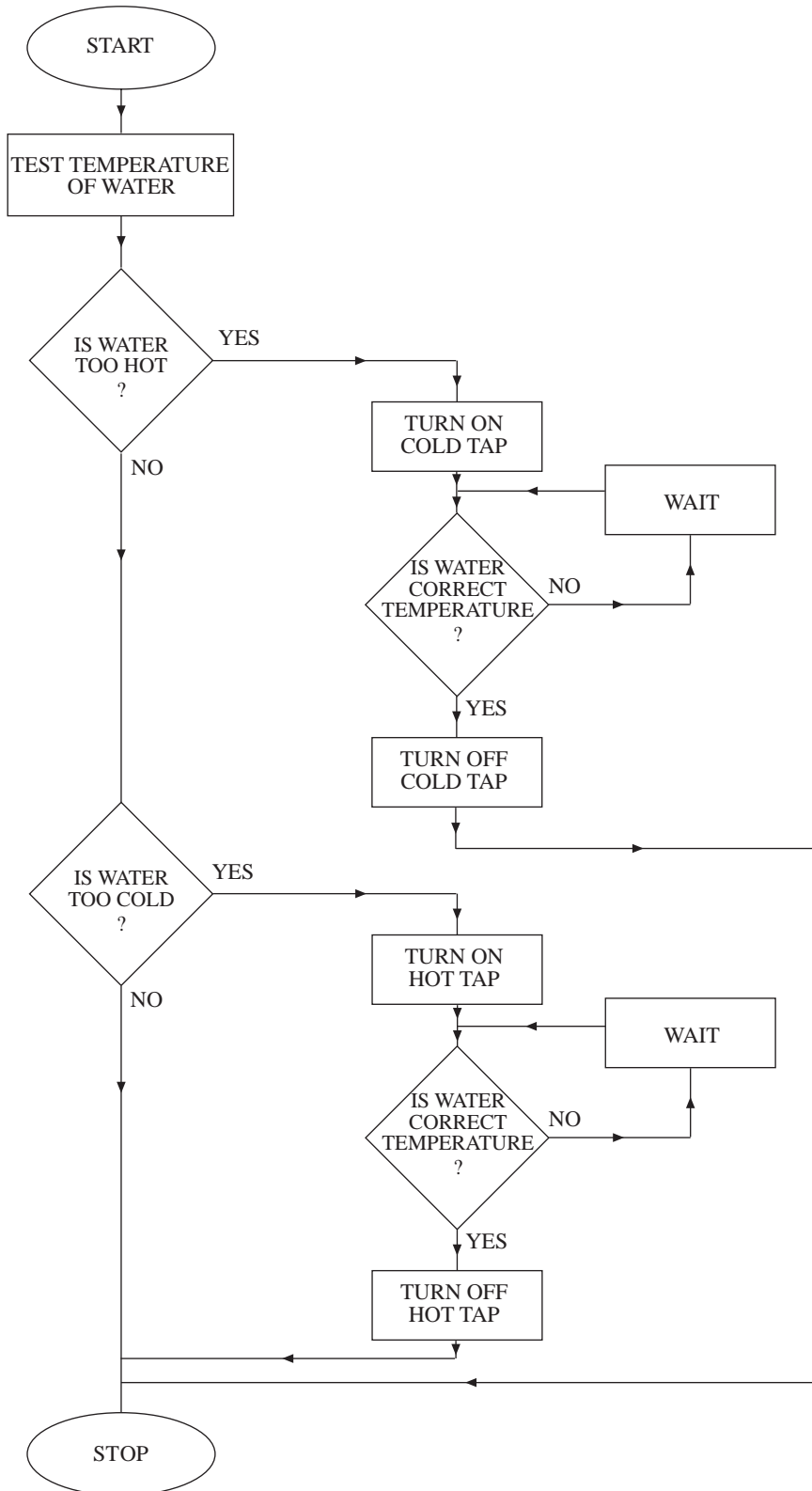
1. (a) 146 miles (b) 173 miles (c) 106 miles (d) 192 miles
 (e) 102 miles (f) 209 miles (g) 60 miles
2. Middlesbrough and Newcastle (38 miles)
3. Middlesbrough and Inverness (308 miles)
4. Distance = $97 + 173 + 157 + 98$
 = 525 miles
5. Distance = $191 + 62 + 192$
 = 445 miles

Extra Exercises 1.2 Answers



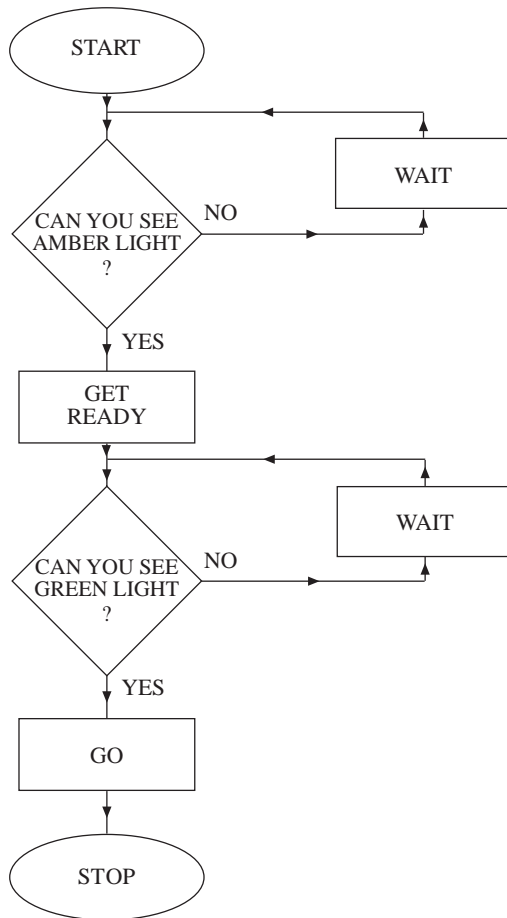
Extra Exercises 1.2 Answers

2.



Extra Exercises 1.2 Answers

3.



Extra Exercises 1.3 Answers

1. (a) F

(b) A scalene triangle without a right angle

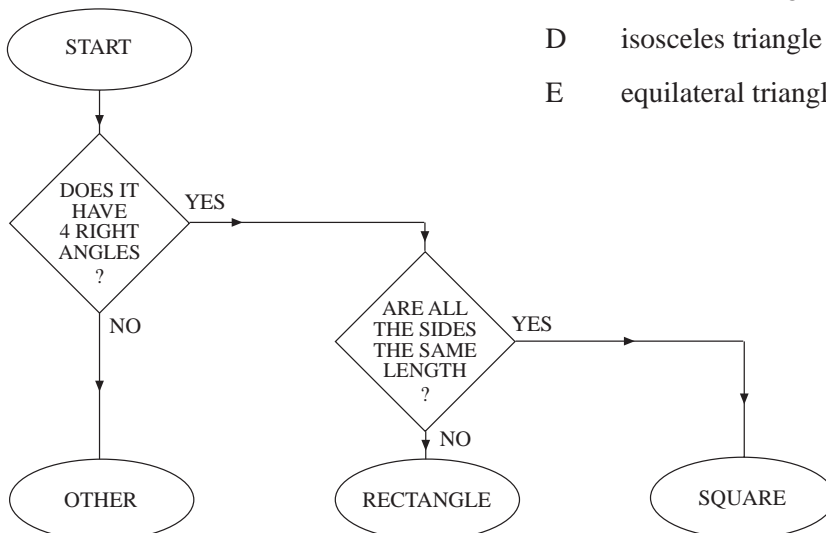
B scalene triangle with a right angle

C isosceles triangle without a right angle

D isosceles triangle with a right angle

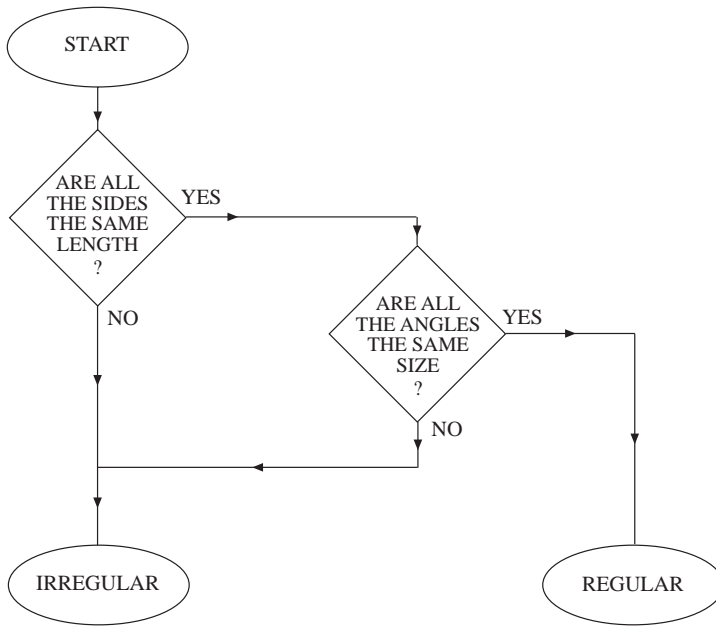
E equilateral triangle

2.



Extra Exercises 1.3 Answers

3.



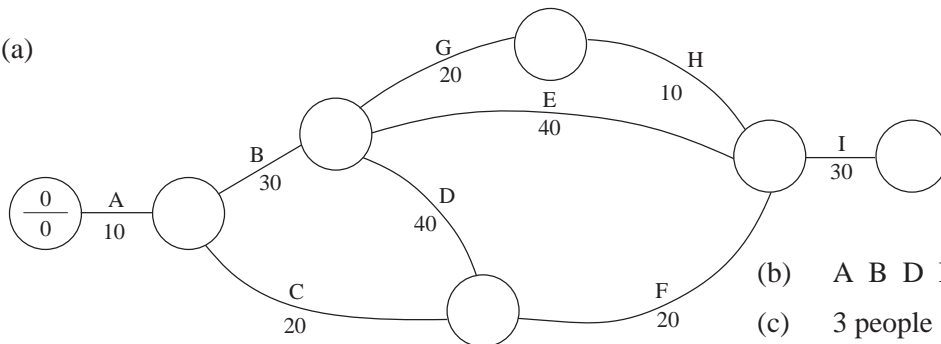
Extra Exercises 1.4 Answers

1. (a) S C T (9) (b) S C E T (7) (c) S A F T (10)

Extra Exercises 1.5 Answers

1. A B D F (11)
 2. A B C E (9 hours)
 3. (a) C D F G H (113 mins)
 (b) Still 113 minutes. He would have had to load the dishwasher while the washing machine was running and empty the dishwasher while the tumble drier was running.

4. (a)



- (b) A B D F I (130 mins)
 (c) 3 people

5. A B C G I L N (44 days)