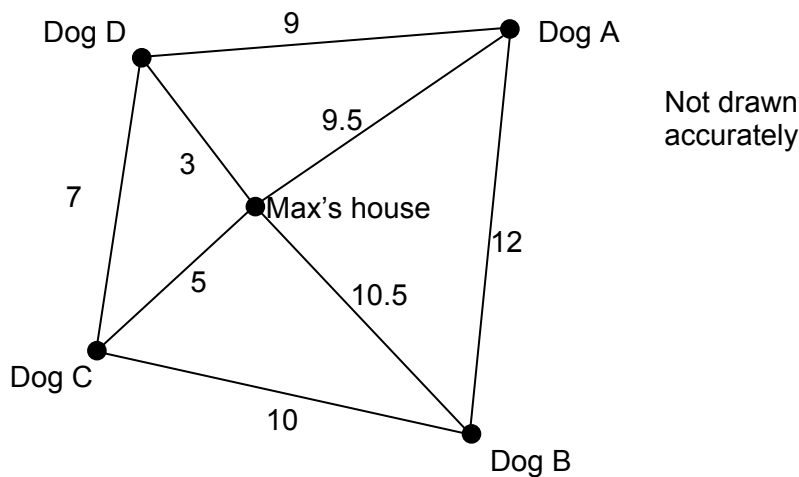


<b>Main task</b>	Foundation GCSE and Level 1 Functional Skills students
<b>Suggested uses</b>	1 Independent starter 2 Whole lesson on systematic strategies and/or non-calculator number work
<b>Must previously cover</b>	Adding and multiplying integers and decimals without a calculator
<b>Extension</b>	Foundation GCSE and Level 1 Functional Skills students

**Starter** (Worksheet 1)

Max owns a dog-walking business.  
 He sets off from home and collects four dogs in his van.  
 Then he drives to the park next to his house and walks the dogs.  
 The diagram shows the distances he drives in miles.



What is the shortest route that Max can take?

**Answers**

Possible routes are

MABCDM

MBCDAM

MCDABM

and MDABCM

(or reverse routes going anticlockwise)

Shortest route is MDABCM (or MCBADM)  $(3 + 9 + 12 + 10 + 5 = 39 \text{ miles})$

**Links to Level 1 Skills Standards**

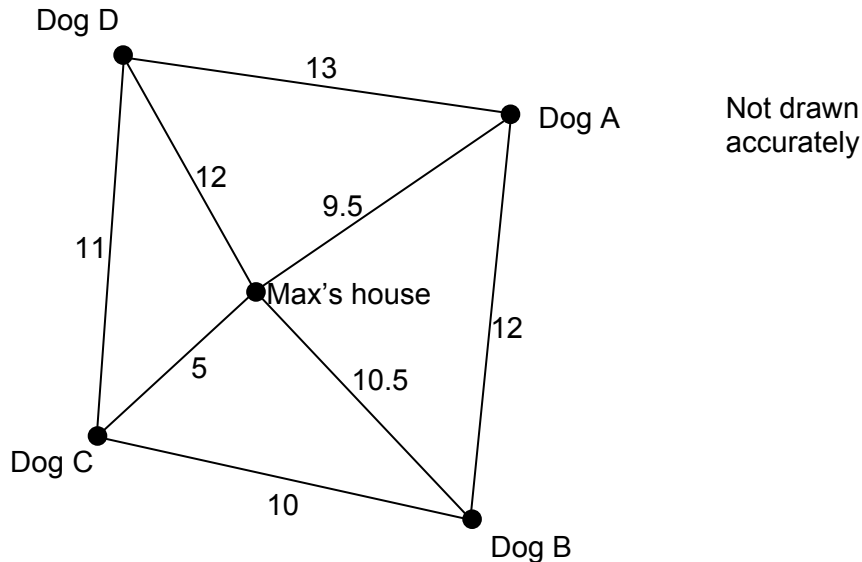
Skills standard		Evidence
Ra	Understands problem and starts to access it	Identifies one possible route with no repetition
Rc	Chooses mathematics to find a solution	Attempts to find total distance for that route
Rb	Identifies the problem and decides on the method to use	Identifies four different routes
Aa	Uses mathematics to find a solution	Finds correct total for shortest route
Ab	Checking	Checks total is shortest

**Links to GCSE**

Assessment Objectives			GCSE 4360			GCSE 4365	Linked Pair Pilot Methods and Applications			
AO1	AO2	AO3	Unit 1	Unit 2	Unit 3	Linear	M1	A1	M2	A2
	✓			N1.2		N1.2	N2			

**Extension** (Worksheet 2)

The owners of Dog D move house.  
The diagram shows the new distances in miles.



Max increases the price he charges the owners of Dog D.  
He works out the extra mileage he takes to collect and drop off Dog D.  
He charges 34p a mile.

- (a) How much **extra** does Max charge the owners of Dog D?
- (b) Why might the owners of Dog D object?

**Answers**

- (a) New shortest route is now MCDABM (or MBADCM)  
(5 + 11 + 13 + 12 + 10.5 = 51.5 miles)

NB It is not the old route as one of the other routes becomes shorter.

$$51.5 - 39 = 12.5 \text{ miles extra.}$$

$$\text{Twice a day} = 25 \text{ miles extra.}$$

$$25 \times 34\text{p} = \text{£}8.50$$

- (b) Dog D's owners might object as they only live  $12 - 3 = 9$  miles further from Max's house and would expect an increase of  $18 \times 35\text{p} = \text{£}6.30$

**Links to Level 1 Skills Standards**

		Skills standard	Evidence
Extension a	Ra	Understands problem and starts to access it	Finds new shortest route
	Aa	Uses mathematics to find a solution	Calculates new distance
	Rb	Identifies the problem and decides on methods to use	Works out increase and doubles
	Rc	Chooses the mathematics needed to find a solution	Calculates new charge
	Aa	Uses mathematics to find a solution	States charge
Extension b	Rb	Identifies the problem and decides on methods to use	Works out increase and doubles
	Rc	Chooses the mathematics needed to find a solution	Calculates expected charge
	I	Interprets solutions to multistage problems	Comments why owners would object

**Links to GCSE**

	Assessment Objectives			GCSE 4360			GCSE 4365	Linked Pair Pilot Methods and Applications			
	AO1	AO2	AO3	Unit 1	Unit 2	Unit 3	Linear	M1	A1	M2	A2
Extension a		✓			N1.2		N1.2	N2			
Extension b			✓		N1.2		N1.2	N2			