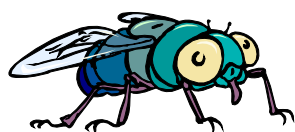
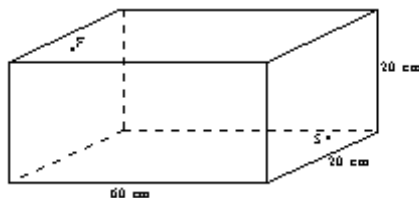


INVESTIGATION # 9



SPIDER WALKS



A spider and a fly are at opposite ends of a 20 cm by 20 cm by 60 cm box. The spider is at point S, 1 cm from the bottom of the box midway between the vertical edges, and the fly is at point F, 1 cm from the top of the box also midway between the vertical edges.

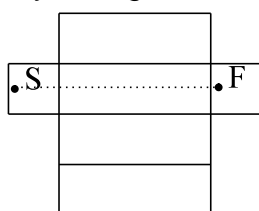
The spider wants to eat the fly, but unfortunately has lost his web spinning and jumping capabilities due to a football injury, so he must walk to the fly. The fly unfortunately has lost the ability to move completely due to a skydiving accident so he stays put.

Your task is to find at least six different paths the spider must take to get to the fly and calculate the lengths of these paths.

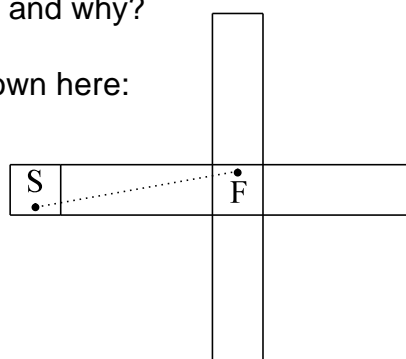
Draw the nets of the box using a scale of 1 cm = 20 cm on graph paper (these may be drawn differently depending on your path). On each net show the position of the spider and the fly and indicate the path the spider may take. Calculate the shortest length of each path. (Pythagorean is needed for an accurate answer, scale measurement will check roughly).

Which path do you think the spider will take and why?

Two examples of what you might do are shown here:



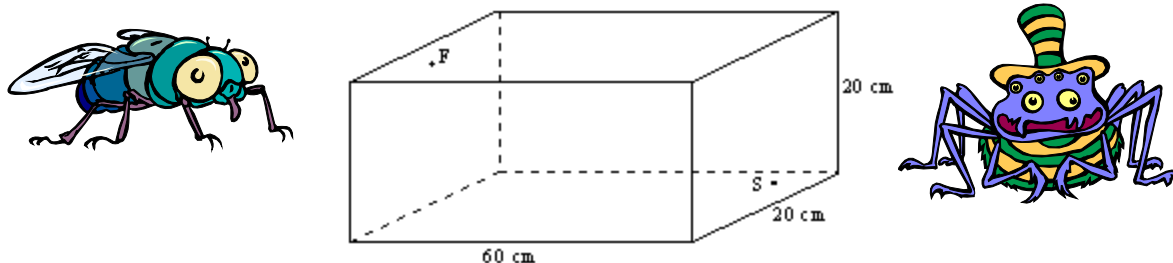
$$\begin{aligned}\text{Path distance} &= 19 + 60 + 1 \\ &= 80 \text{ cm}\end{aligned}$$



$$\begin{aligned}\text{Path distance:} \\ SF^2 &= 80^2 + 18^2 \\ SF &= 82 \text{ cm}\end{aligned}$$

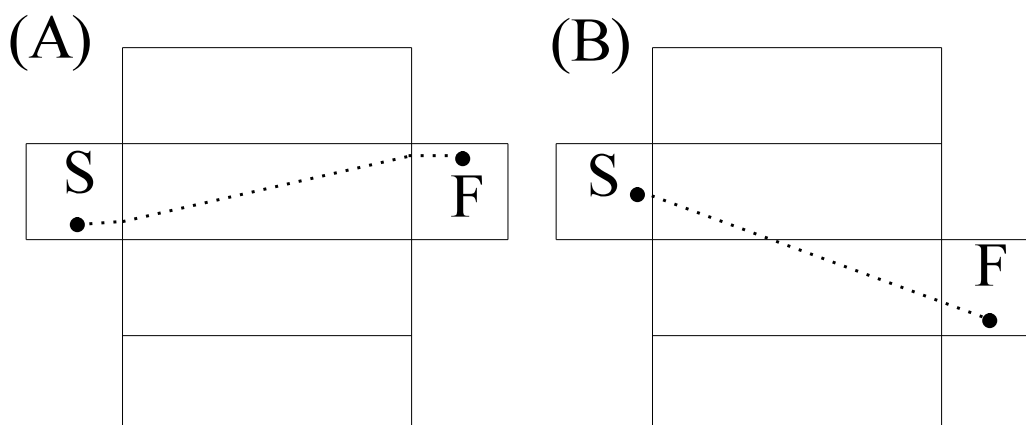
ASSESSMENT TASK

SPIDER WALKS



A spider and a fly are at opposite ends of a 20 cm by 20 cm by 60 cm box. The spider is at point S, 1 cm from the bottom of the box midway between the vertical edges, and the fly is at point F, 1 cm from the top of the box also midway between the vertical edges. These are the same conditions as were set on the investigation.

Two possible paths for the spider to walk to the fly are shown on the nets below.



1. Calculate the shortest distance between the spider and the fly for each path given, showing all relevant measurements on the nets.

4. Find the shortest path you can if the box was **x cm** long, 20cm high and 20cm wide. Show the net and your calculations here.
5. Find the shortest path you can if the box was 80cm long, 20cm high and **30cm** wide. Show the net and your calculations here.