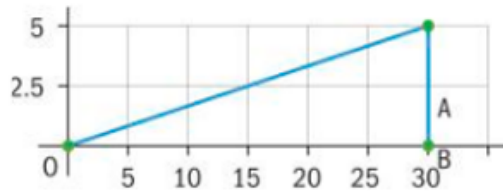


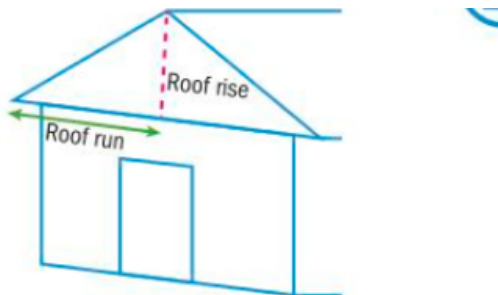
Slope, Gradient, and Unit Rate

Safety regulations for wheelchair ramps mandate that the maximum gradient of the ramps should not exceed 0.08. Calculate the gradient of the triangular ramp $\triangle AOB$ ($[AB] \perp [OB]$) shown below, and determine whether it conforms to the safety regulations.



US roof regulations state that asphalt tiles can only be used for roofs with a maximum gradient of 0.17. The roof shown in the diagram has width 7 m and rise 1.6 m. Find:

- a the roof run
- b the roof gradient.



- c Determine whether the roof satisfies the requirements for using asphalt tiles. Justify your conclusion.

MegaLift plans ski slopes and lift stations along the slopes. Find the height of a ski lift station B(490, h), which is on a slope with gradient 0.35 and which passes through a lower lift ski station A(90, 10). All coordinates are given in metres.

Investigation

Tomi is planning to rent a bicycle for up to a week. He finds two bicycle rental shops *Bikers' Village* and *Bike & Joy*, which rent bicycles per week. *Bikers' Village* charges 10 GBP per week plus 0.5 GBP per km cycled. *Bike & Joy* charges 20 GBP per week plus 0.1 GBP per km cycled.

- 1 Use the information to complete the table below.

Number of km cycled	Rent for a bicycle from <i>Bikers' Village</i> (GBP)	Rent for a bicycle from <i>Bike & Joy</i> (GBP)
10	15	21
15		
20		
25		
30		

Create two models, one for each rental shop where y represents the total rental fee for a period of under a week and x represents the number of kilometers cycled.

- 2 Use technology to draw the lines representing the rent for a bicycle from each store for up to a week. Draw the lines on the same pair of axes, where x is the number of km cycled and y is the rent in GBP.
- 3 Which of the two options is cheaper for 20 km? And which is cheaper for 40 km? For what distance cycled is the rental cost the same?
- 4 Which shop should Tomi rent from? Would his decision depend on the number of kilometres he will ride the bicycle? Explain.

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