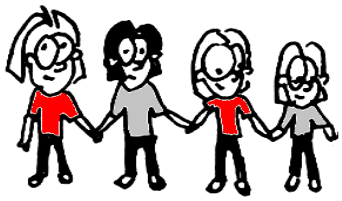
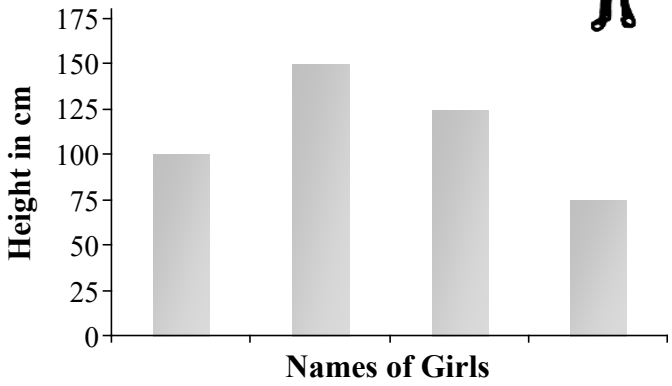
PLAYING WITH FUNCTIONS IN GRADES 8 AND 9

Example 1



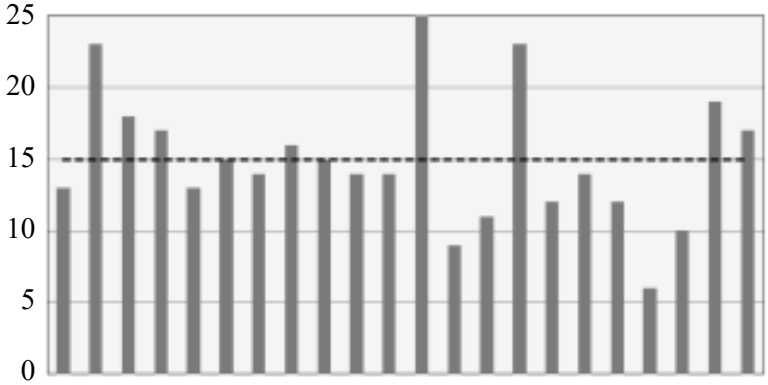
The graph shows the heights of four girls.



The names are missing from the graph. Debbie is the tallest. Amy is the shortest. Dawn is taller than Sarah. How tall is Sarah?

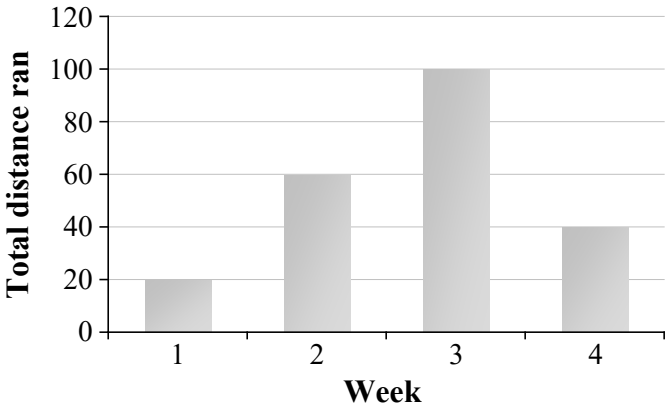
Example 2

A class of 22 pupils wrote a Mathematics test. Their results are shown in the chart below. The dotted line in the chart represents the class average. What is the sum of all the marks obtained by these pupils?



Example 3

Boris has been training for four weeks. Each week he records the total distance he ran that week in a bar graph. How far must he run in the fifth week for his average distance per week to be 60 km?

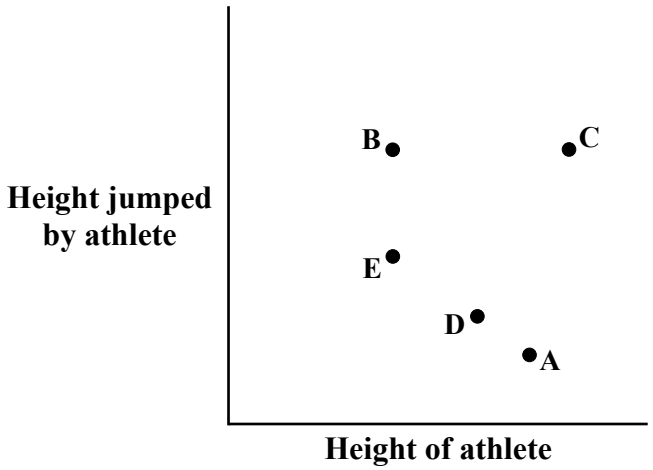


Example 4

The heights of athletes A, B, C, D and E versus their heights jumped are shown on the graph.

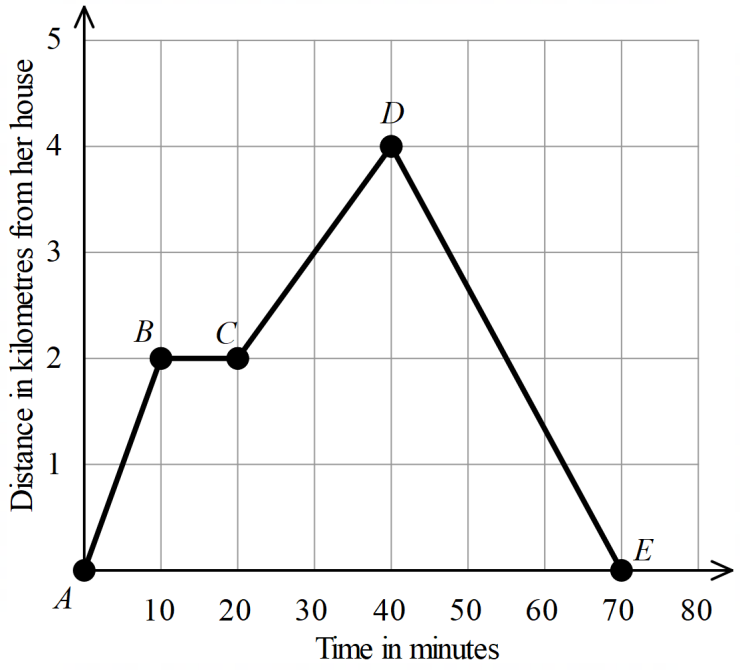
Each athlete's score is determined by the formula: $\frac{\text{height jumped by athlete}}{\text{height of athlete}}$

Which athlete has the highest score?



Example 5

Thandi takes a break from studying and goes for a cycle from her house.
The graph shows the distance she cycles in kilometres.



5.1 What happened between B and C?

5.2 Was she cycling faster from A to B, or from C to D?
Give a reason for your answer.

5.3 In which direction is she cycling from D to E?

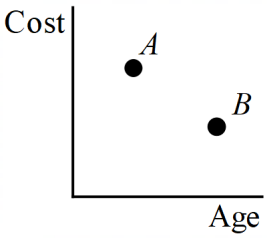
5.4 How many kilometres did she cycle in total?

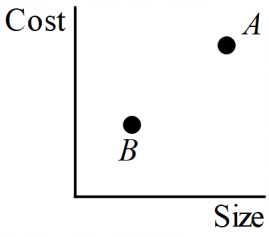
5.5 Determine her speed from D to E.

5.6 Determine, correct to two decimal places, her average speed for the entire trip.

Example 6

Two graphs are given, relating the cost, size and age of two cars, A and B.





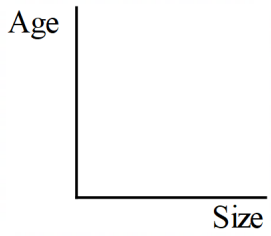
6.1 Answer true or false to the following questions:

6.1.1 The older car costs more.

6.1.2 The bigger car costs more.

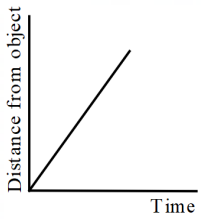
6.1.3 The older car is bigger.

6.2 Show the position of A and B on the axes given.

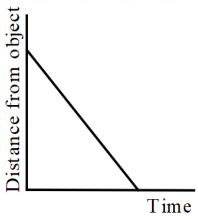


Example 7

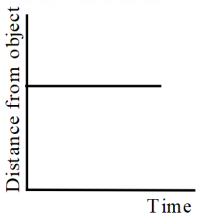
A number of distance vs time graphs are given below. Choose the graph that matches the description the best. In each case the "object" is underlined.



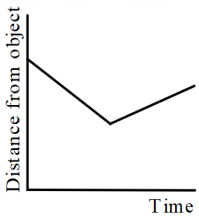
A



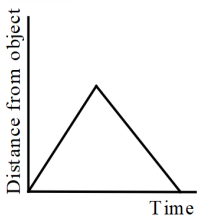
B



C



D



E

7.1 A person walks to <u>school</u> at a constant pace.

7.2 A person walks from school towards <u>home</u>, then realises they forgot something at school, so they headed back.

7.3 A person stands still watching a bird in a <u>tree</u> for a very long time.

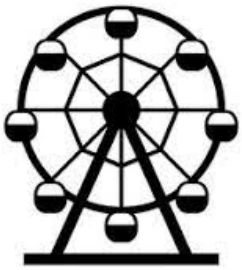
7.4 A person walks home from the <u>shops</u> at a constant pace.

7.5 A child ran away from the <u>swings</u> and then ran back to them.

Example 8

You are in an elevator that stops at every floor of a tall building. Draw a distance vs time graph to show your height above the ground.

Example 9



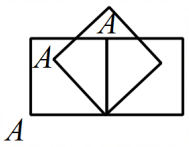
You climb into the bottom car on a Ferris wheel. The wheel turns five full revolutions and then it stops so you can get out. Draw a distance vs time graph to describe your height above the ground while you are in the car.

Example 10

A drawing pin is stuck into the rim of a bicycle tyre. Draw a distance vs time graph of the path followed by the drawing pin.

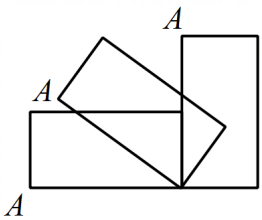
Example 11

A square is "rolled" along the ground for a long time. Draw the path followed by the point A.



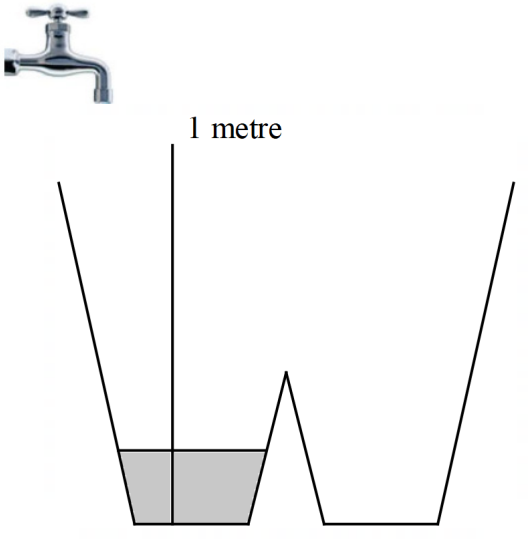
Example 12

A rectangle is "rolled" along the ground. Draw the path followed by point A.



Example 13

There is a small amount of water currently in a W-shaped container shown below. The container is a prism with the W-cross section throughout. A tap is turned on so that the water flows at a constant rate into the left side of the container. Sketch a graph of the height of the water, h, as recorded on the metre stick shown in the left side of the container, as a function of time, t. Clearly label your graph showing all important points.



PLAYING WITH FUNCTIONS IN GRADES 8 AND 9

SOLUTIONS

Example 1

Debbie is the second bar.

Amy is the fourth bar.

Dawn must be the third bar, and Sarah is the first bar.

Sarah is 100 cm tall.

Example 2

The average is 15 for 22 pupils.

Sum of marks $= 15 \times 22 = 330$

Example 3

Week 1	20 km
Week 2	60 km
Week 3	100 km
Week 4	40 km

For an average of 60 km in 5 weeks, he must run a total of 300 km.

In the 5^{th} week he must run $300 - (20 + 60 + 100 + 40) = 80$ km

Example 4

To get the highest score, the numerator must be as big as possible and the denominator as small as possible. So the height jumped must be big and the height of the athlete small, i.e. athlete B.

Example 5

5.1 She stopped.

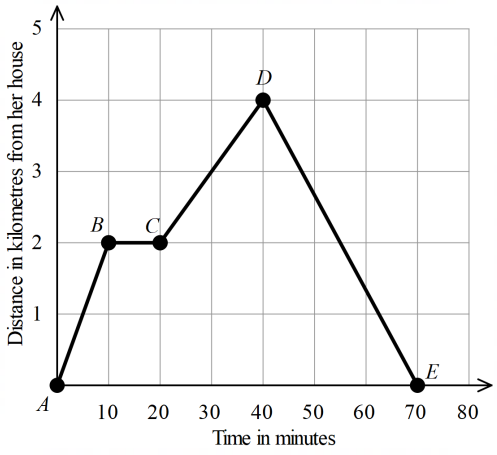
5.2 From A to B, as the graph is steeper.

5.3 Back home.

5.4 8 km.

5.5 speed $= 4 \div \frac{1}{2} = 8$ km/h

5.6 ave speed $= 8 \div \frac{7}{6} = 6{,}86$ km/h



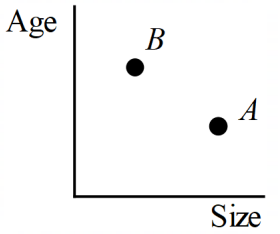
Example 6

6.1.1 False

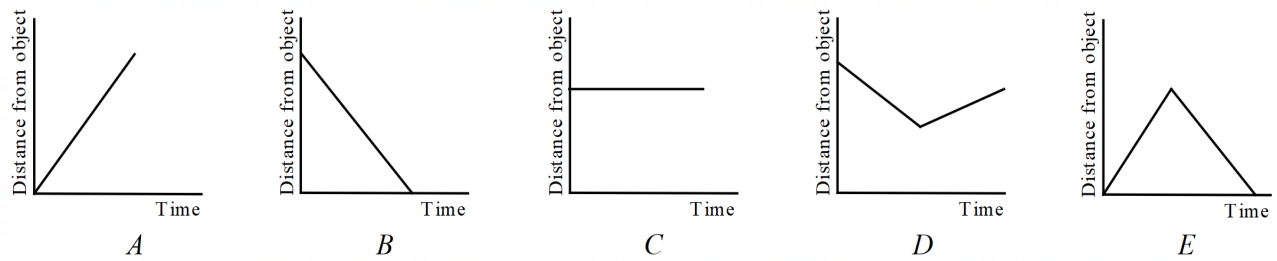
6.1.2 True

6.1.3 False

6.2



Example 7



7.1 B

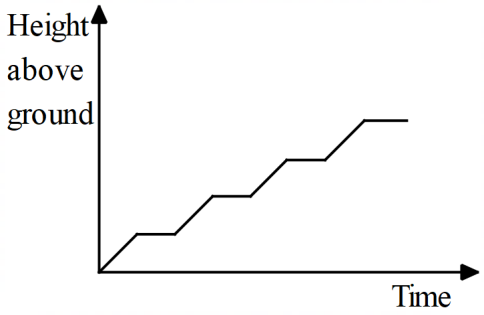
7.2 D

7.3 C

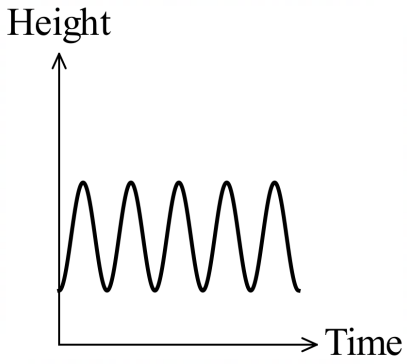
7.4 A

7.5 E

Example 8



Example 9



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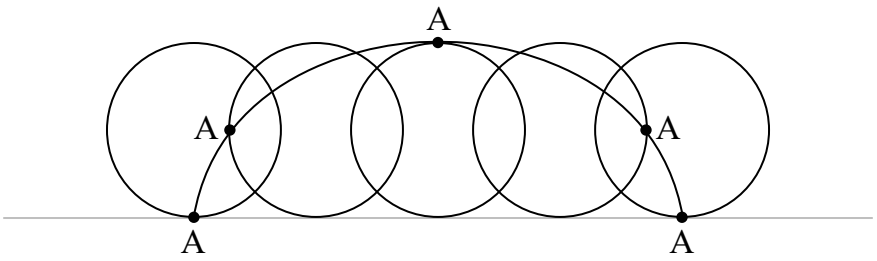
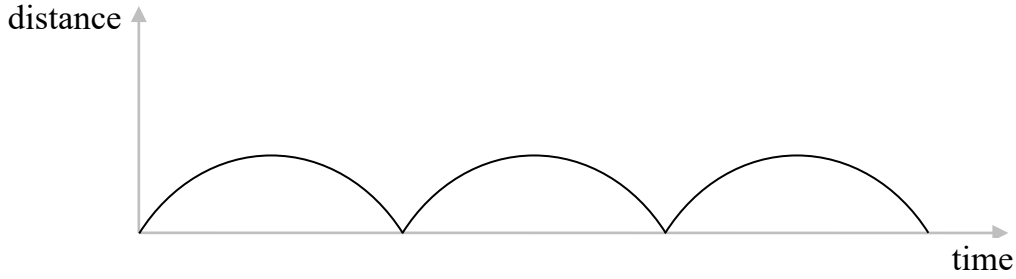
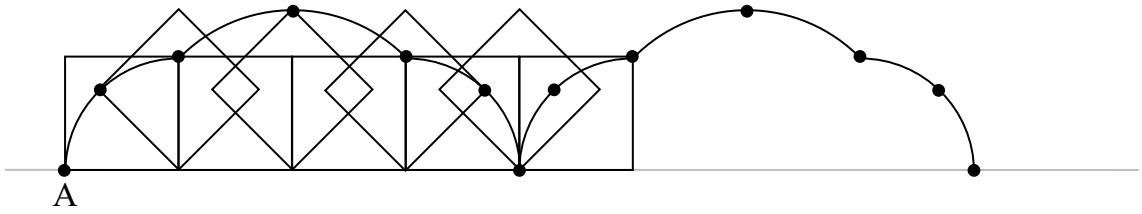
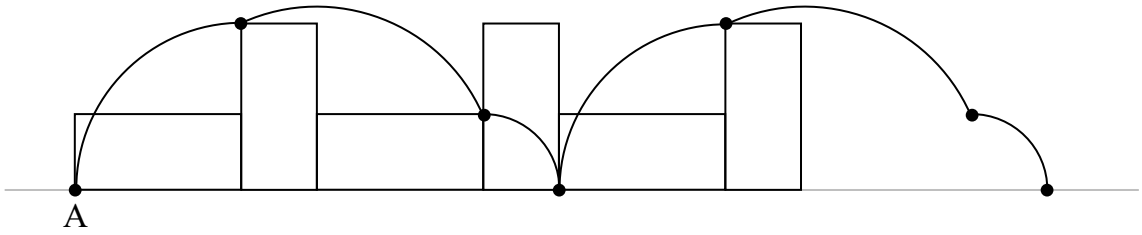




Example 11



Example 12



Example 13