Winter Olympics **Answers**

1. The Winter Olympics began in 1924, when Team GB's fastest four-man bobsleigh time was 88 seconds. Ninety years later, Team GB's fastest time was 55 seconds. Calculate the percentage decrease in their fastest time.

   88 – 55 = 33 **or** $\frac{55}{88}$ **= 0.625 = 62.5%**

   $\frac{33}{88}$ **× 100 = 37.5%** **100 – 62.5 = 37.5%**

2. A competitor completed the 1000m speed skating track in 1 minute 26 seconds. Calculate his average speed in m/s, giving your answer correct to 1 decimal place.

   Speed = distance ÷ time

   Speed = 1000 ÷ 86

   = 11.6m/s (to 1d.p.)

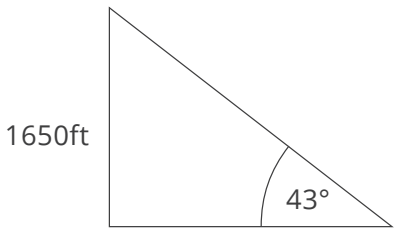
3. In the snowboard half-pipe event, competitors perform tricks whilst in the air above the half-pipe. When completing a full jump, the snowboarder's height in metres (y) at t seconds is given by $y = 5t - t^2 + 10$. Calculate the snowboarder's height after 1.5 seconds.

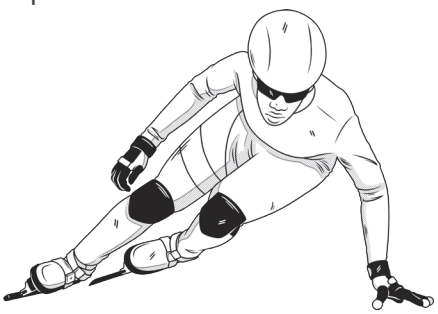
   $y = 5 \times 1.5 - 1.5^2 + 10$

   $y = 15.25$m

4. The biathlon combines cross-country skiing with rifle shooting.

   a. The start of the ski slope is 1650ft above the end of the slope. The competitors descend the slope at an angle of 43° with the horizontal. Calculate the length of the slope. Give your answer correct to one decimal place.





   1650 ÷ sin(43) = 2419.4ft

   b. A biathlete carries a small-bore rifle which weighs 3.5 kilograms, measured to 1 decimal place. Using inequalities, describe the error interval.

   3.45kg ≤ x < 3.55kg

   Where x is the weight of the rifle.

5. The elevation of the starting point of each of the alpine skiing events are given as follows:

   2045m, 1755m, 1160m, 1947m, 1755m, 1592m, 1580m, 1370m, 1365m, 1100m, 1160m

   a. Calculate the median elevation.

      The median is the middle number when they are in order.

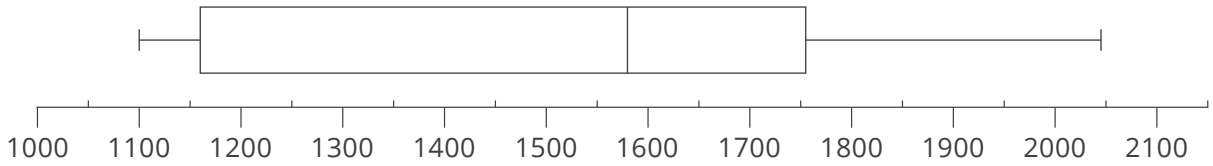
      1100, 1160, 1160, 1365, 1370, 1580, 1592, 1755, 1755, 1947, 2045

      median = 1580m

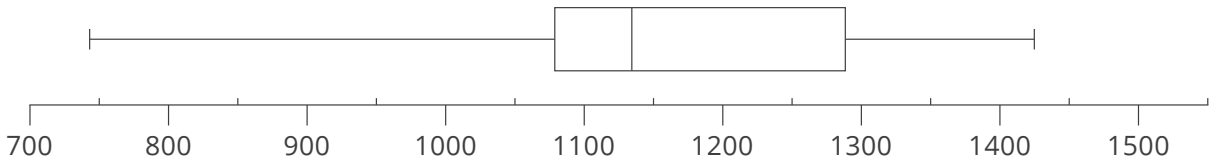
   b. Construct a box and whisker plot showing the distribution of elevations for this event.

      smallest = 1100 **median = 1580** **largest = 2045**

      LQ = 1160 **UQ = 1755**



   c. Information about the starting point elevations for the cross-country skiing events are shown in the box and whisker plot below. Compare the data for the alpine skiing events and the cross-country skiing events.



      The median for the cross-country skiing event is lower which means the average elevation is lower than in the alpine skiing event. The interquartile range for the alpine skiing event is larger which means the elevations are less consistent/more spread out than the cross-country skiing event.

6. A speed skating ice rink is a circle with a diameter of 61m. Calculate the area of the ice rink, giving your answer correct to 3 significant figures.

   Area = $\pi \times 30.5^2$

   Area = 2920m^2

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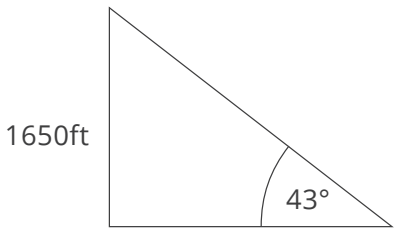

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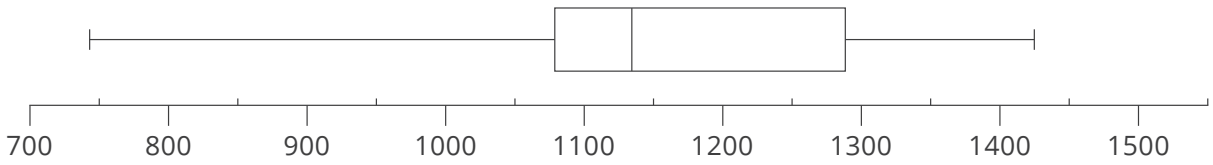

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