# National 5 H Paper 2 (Based on Credit 2010)

1. It is estimated that an iceberg weighs 84 000 tonnes.

   As the iceberg moves into warmer water, its weight decreases by 25% each day.

   What will the iceberg weigh after 3 days in the warmer water?

   Give your answer **correct to three significant figures**.

   **4**

2. Expand fully and simplify $x(x-1)^2$.

   **2**

3. A machine is used to put drawing pins into boxes.

   A sample of 8 boxes is taken and the number of drawing pins in each is counted.

   The results are shown below:

   | 102 | 102 | 101 | 98 | 99 | 101 | 103 | 102 |

   (a) Calculate the mean and standard deviation of this sample.

   **2**

   (b) A sample of 8 boxes is taken from another machine.

   This sample has a mean of 103 and a standard deviation of 2·1.

   Write down two valid comparisons between the samples.

   **3**

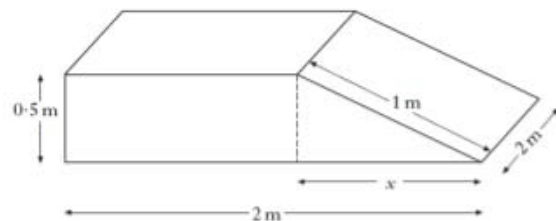4. Use the quadratic formula to solve the equation,

   $$3x^2 + 5x - 7 = 0.$$

   Give your answers correct to **1 decimal place**.

   **4**

5. A concrete ramp is to be built.

   The ramp is in the shape of a cuboid and a triangular prism with dimensions as shown.

   

   (a) Calculate the value of $x$.

   **2**

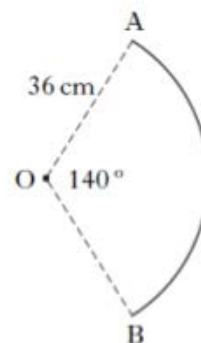   (b) Calculate the volume of concrete required to build the ramp.

   **3**

6. A circle, centre O, has radius 36 centimetres.
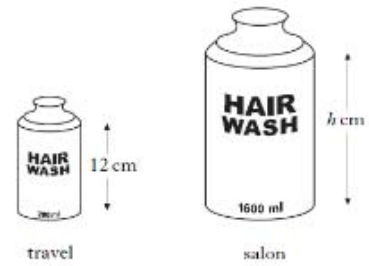
   Part of this circle is shown.

   Angle AOB = 140°.

   Calculate the length of arc AB.

   

   **3**

7. Shampoo is available in travel size and salon size bottles.

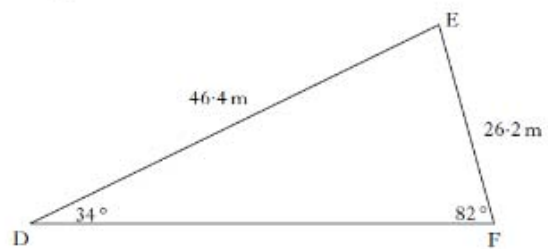   The bottles are mathematically similar.

   

   The travel size contains 200 millilitres and is 12 centimetres in height.

   The salon size contains 1600 millilitres.

   Calculate the height of the salon size bottle.

   **3**

8. As part of their training, footballers run around a triangular circuit DEF.

   - ∠EDF = 34°

   - ∠DFE = 82°

   - DE = 46·4 metres

   - EF = 26·2 metres

   

   How many **complete** circuits must they run to cover **at least** 1000 metres?

   **4**

9. The ratio of sugar to fruit in a particular jam is 5 : 4.
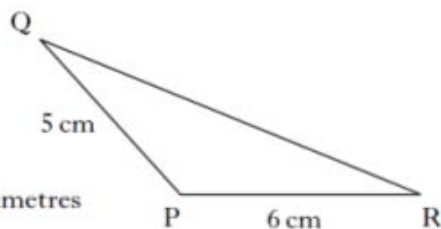
   It is decided to:

   - **decrease** the sugar content by 20%

   - **increase** the fruit content by 20%.

   **4**

   Calculate the new ratio of sugar to fruit.

   **Give your answer in its simplest form.**
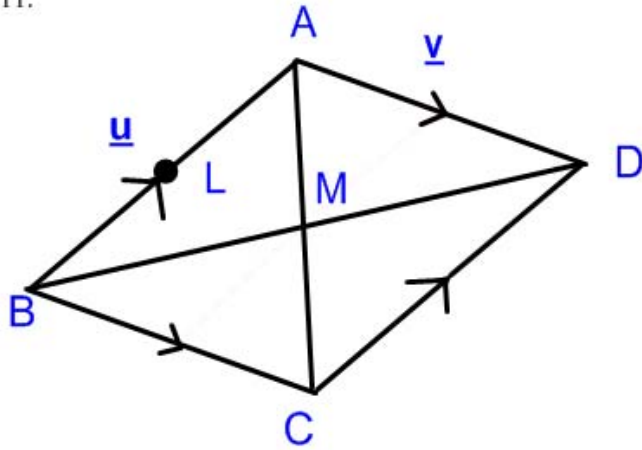
10. In triangle PQR:

   - PQ = 5 centimetres

   - PR = 6 centimetres

   - area of triangle PQR = 12 square centimetres

   - angle QPR is **obtuse**.

   **4**

   

   Calculate the size of angle QPR.

11.



ABCD is a parallelogram.
M is the point where the diagonals meet.
L is a point halfway from A to B

$$\overrightarrow{BA} = \underline{u}$$

$$\overrightarrow{AD} = \underline{v}$$

Express in terms of $\underline{u}$ and $\underline{v}$

(i) $\overrightarrow{BD}$

(ii) $\overrightarrow{BM}$

(iii) $\overrightarrow{BL}$

(iv) $\overrightarrow{LM}$

4

12. A right-angled triangle has dimensions, in centimetres, as shown.
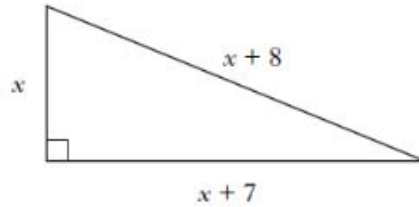


5

**Calculate** the value of $x$.

13. The depth of water, $D$ metres, in a harbour is given by the formula

$$D = 3 + 1 \cdot 75 \sin 30 h^\circ$$

where $h$ is the number of hours after midnight.

(a) Calculate the depth of water at 5 am.

2

(b) Calculate the maximum difference in depth of the water in the harbour.

2

**Do not use a trial and improvement method.**

14. Find the equation of the line parallel to the line $8y - 4x - 3 = 0$ which passes through the point $(2, -1)$.

15. State the nature of the eroots of the equation $4x^2 - 12x + 9 = 0$.