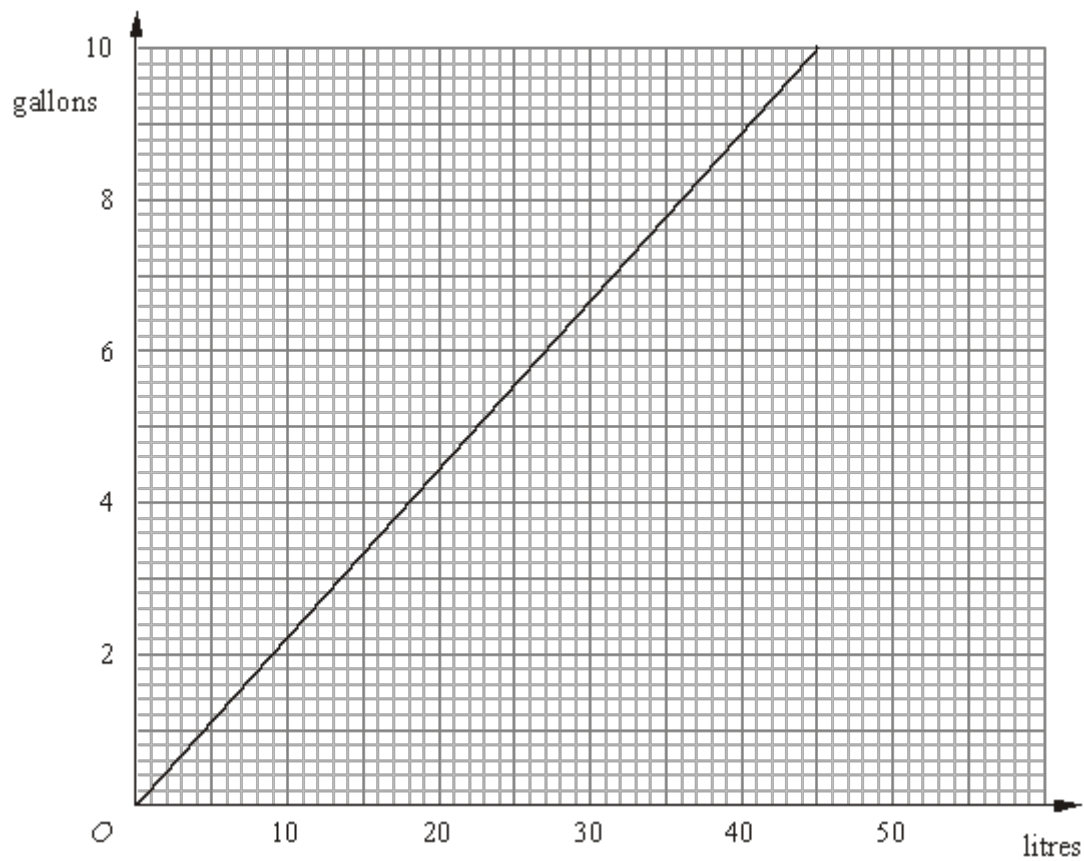**Q1.**   A plane takes 30 seconds to fly a distance of 8 kilometres.

Work out the average speed of the plane, in miles per hour.

.... miles per hour

(Total 3 marks)

Q2.   The graph can be used to convert between gallons and litres.
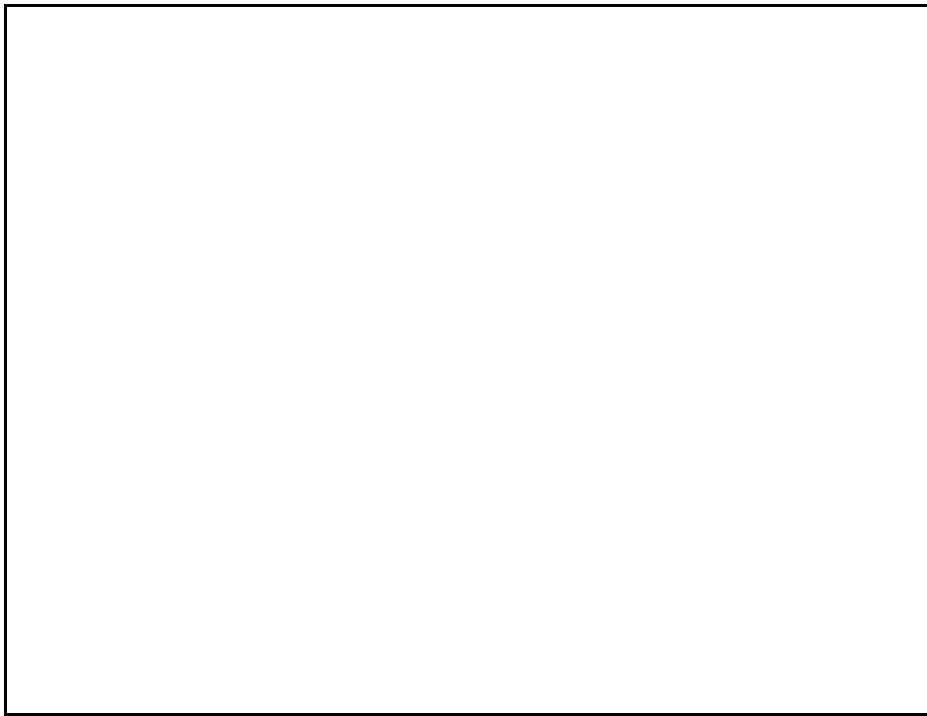
The diagram shows a central heating oil tank.

The oil tank is in the shape of a cylinder of length 180 cm and radius 60 cm.

The oil tank contains 200 gallons of oil.

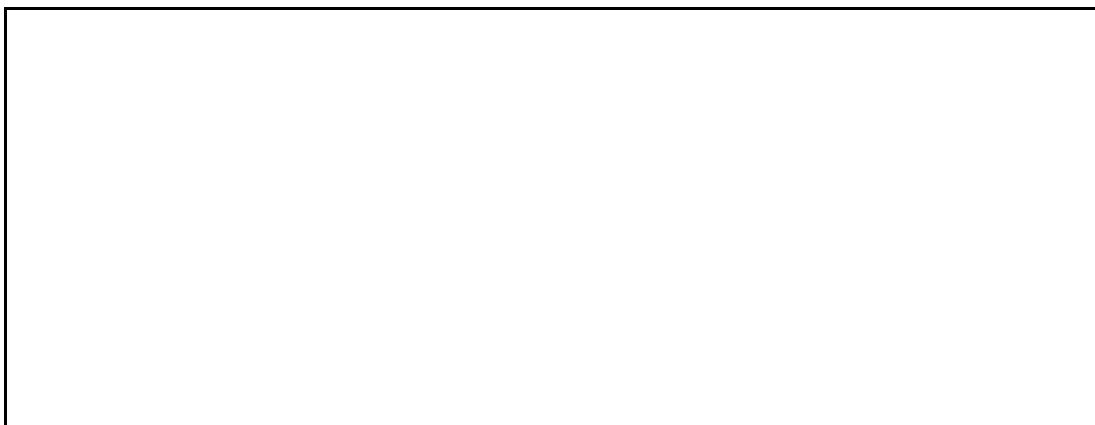(a)   Is the oil tank more or less than $\frac{1}{2}$ full?

....

(5)

The oil has a density of 0.85 g/cm^3.

(b)   Work out, in kg, the mass of the oil in the tank.

.... kg

(3)
(Total 8 marks)

M1.

Working	Answer	Mark	Additional Guidance
8 km per 30 seconds = 16 km per minute = 16 × 60 = 960 km per hour 960 km/hr × 5 ÷ 8 = 600 miles per hour	600	3	**M1** convert to km/h by × 2 × 60 or 960 seen or use of speed = distance ÷ time **M1** convert distance to miles by × 5 ÷ 8 oe or sight of 5 miles **A1** cao
			Total for Question: 3 marks

M2.

		Working	Answer	Mark	Additional Guidance
FE	(a)	1 gallon = 4.54 litres, 200 gallons = 908 litres = 908000 cm³ Vol of tank $60^2 × x \pi × 180$ = 2035752.04..cm³ 908000 < 1017876.02 **OR** Vol of tank $60^2 × \pi × 180$ = 2035752.04..cm³ Half vol of tank = 1017876.02 cm³ = 1017.876…litres 1017.876 ÷ 4.54 = 224 gallons 224 > 200	No	5	Response may convert into gallons, litres, or cm³ Calculations may be performed in different orders **M1** Using formulae to find volume of tank **B1** Converts between litres and cubic centimetres **M1** reads off graph for 1l, 2l , 4l, 5l or 10 litres within tolerance (4.4 – 4.6) **A1** Answer in cm³, litres or gallons **C1** Decision and reason **QWC: Decision should be stated, with appropriate supporting statement**

	(b)	"908000" cm³ × 0.85 g/cm³ = 771800 g	771.8	3	**M1** "908000" × 0.85
					M1(dep) 771800 ÷ 1000
					A1 770 – 772
					Total for Question: 8 marks

##

Many candidates knew that there was a relationship between speed, distance and time with the formula triangle diagram often seen although sometimes with speed or time at the top of the triangle. The most common error was either multiplying 30 by 8 or dividing 30 by 8.

Over half the candidates failed to score on this question even though it was seldom left blank. A third of the candidates did score 1 mark generally for successfully calculating 960 km/h but then progressed no further. The conversion from kilometres to miles was not well known. Many who wrote 5 miles = 8 km or 1 mile = 1.6 km often did not know how to apply this knowledge. Just under 10% of the candidates reached an answer of 600 miles per hour. In this type of question candidates should be encouraged to use common sense and to check that their answer is of a reasonable size for the vehicle being considered.