

## Entrance to year 3 sample questions (calculator required)

**Q1.**

(a) (i) Work out the value of  $\frac{4.5 \times 8.43}{\sqrt{7.4 + 2.3}}$

Give your answer to part (i) correct to 3 significant figures.

(b) Find the cube root of 9261

**Q2.**

Green paint can be made by mixing yellow paint and blue paint in the ratio 2 : 3  
Wendy makes 15 litres of green paint.

Work out how many litres of blue paint Wendy uses.

**Q3.**

The table shows some information about the five Great Lakes in North America.

Name	Surface area (m <sup>2</sup> )	Volume of water (m <sup>3</sup> )
Lake Erie	$2.57 \times 10^{10}$	$4.80 \times 10^{11}$
Lake Huron	$6.01 \times 10^{10}$	$3.52 \times 10^{12}$
Lake Michigan	$5.80 \times 10^{10}$	$4.87 \times 10^{12}$
Lake Ontario	$1.91 \times 10^{10}$	$1.64 \times 10^{12}$
Lake Superior	$8.21 \times 10^{10}$	$1.22 \times 10^{13}$

(a) Work out the total surface area of the five Great Lakes.  
Give your answer in standard form.

Loch Ness is the largest lake in Scotland.  
The lake has a volume of water of  $7.45 \times 10^9$  m<sup>3</sup>

The volume of water in Lake Superior is  $k$  times the volume of water in Loch Ness.

(b) Work out the value of  $k$ .  
Give your answer correct to 3 significant figures.

**Q4.**

Wendy travelled on the Eurostar train from St Pancras station to the Gare du Nord station.  
The Eurostar train travelled a distance of 495 km.  
The journey time was 2 hours 15 minutes.  
Work out the average speed of the Eurostar train in kilometres per hour.

**Q5.**

The population of a country increased by 2% to 9.792 million. What was the population before the increase?

## Algebra

**Q1.**

$$f = 5p - 4v$$

Work out the value of  $p$  when  $f = -22$  and  $v = -5$

**Q2.**

Solve the simultaneous equations

$$3x + y = 13$$

$$x - 2y = 9$$

**Q3.**

a) Make  $r$  the subject of the formula  $A = 4\pi r^2$  where  $r$  is positive.

b) Make  $x$  the subject of  $2t = 5(3 - 2x)$

c) Make  $x$  the subject of  $\frac{x^2 - 5}{2t} = 7$

**Q4.**

(a) Factorise fully  $18e^{3f} + 45e^{2f^4}$

(b) Solve  $x^2 - 5x + 6 = 0$

**Q5.**

$W$  is directly proportional to  $F$ . If  $W = 45$  when  $F = 3$ , find the following.

a)  $W$  when  $F = 5$

b)  $F$  when  $W = 90$

**Q6.**

If  $A$  is proportional to  $r^2$  and  $A = 20$  when  $r = 2$ , find the value of  $A$  when  $r = 5$ .

**Q7.**

Solve  $x^2 + 12x + 3 = 0$ , giving your answers correct to 1 decimal place.

## Geometry

Q1.

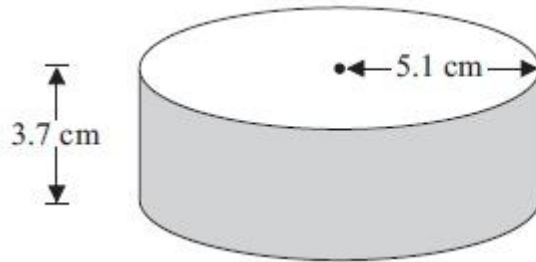


Diagram NOT  
accurately drawn

A solid cylinder has a radius of 5.1 cm and a height of 3.7 cm.  
Work out the **total** surface area of the cylinder.

Give your answer correct to 3 significant figures.

Q2.

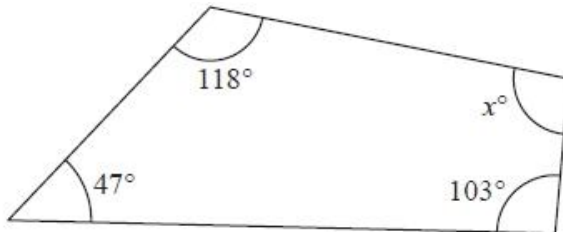


Diagram NOT  
accurately drawn

Work out the value of  $x$ .

Q3.

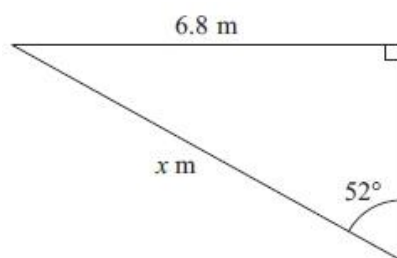


Diagram NOT  
accurately drawn

Calculate the value of  $x$ .

Give your answer correct to 3 significant figures.

**Q4.** Find the value of  $x$  and  $y$  in the following:

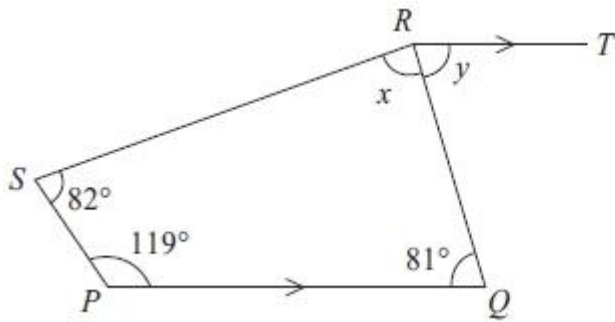


Diagram NOT  
accurately drawn

**Q5.**

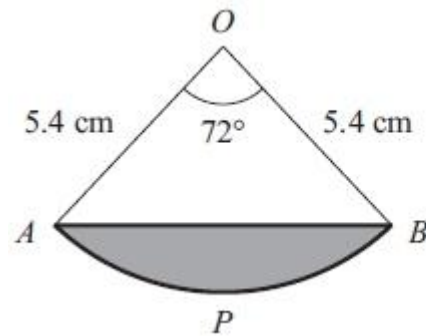


Diagram NOT  
accurately drawn

Calculate the area of the shaded segment  $APB$ .  
Give your answer correct to 3 significant figures.

**Q6.**

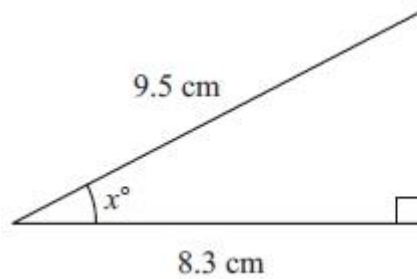


Diagram NOT  
accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

## Graphs

### Q1.

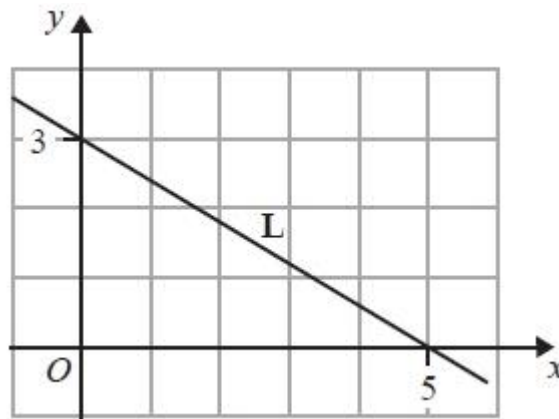
The point  $A$  has coordinates  $(0, 2)$

The point  $B$  has coordinates  $(-4, -1)$

- Find the coordinates of the midpoint of  $AB$ .
- Work out the gradient of the line  $AB$ .
- Find an equation of the line  $AB$ .

### Q2.

The straight line  $L$  is shown on the grid.



Find an equation of  $L$ .

## Data

### Q1.

The average height of a group of 10 boys is 140cm . The average height of a group of 6 girls is 150cm.  
Find the average height of all the boys and girls together.