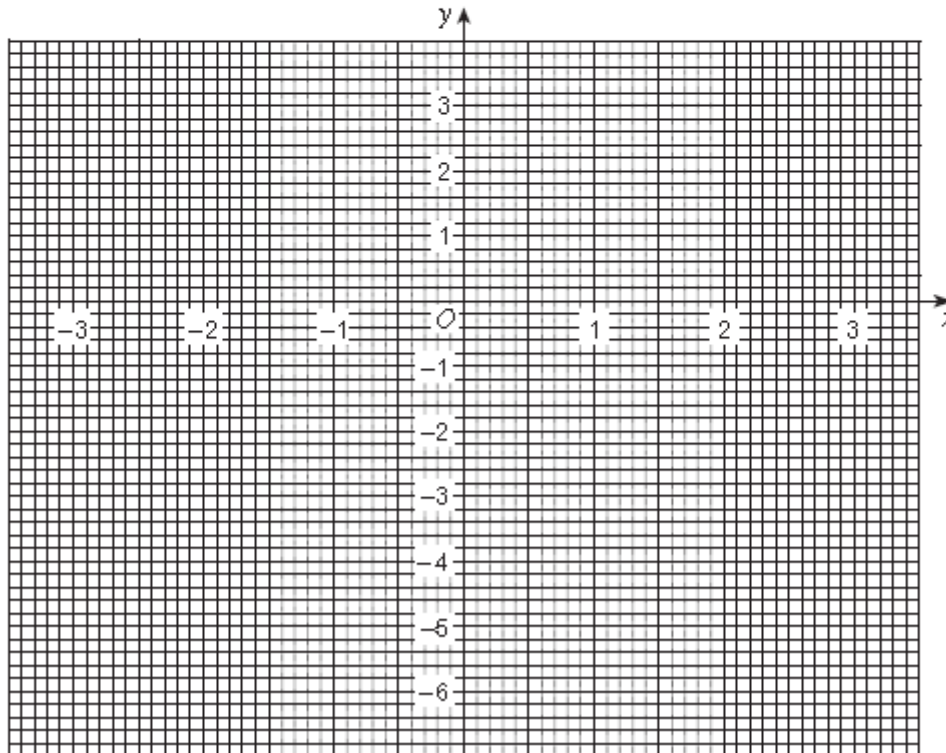


1 (a) Complete the table of values for  $y = 3 - x^2$  [2 marks]

$x$	-3	-2	-1	0	1	2	3
$y$		-1	2		2		-6

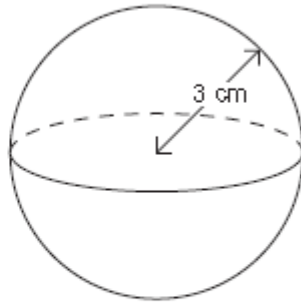
(b) Draw the graph of  $y = 3 - x^2$  for values of  $x$  from -3 to 3 [2 marks]



(c) Use the graph to work out the values of  $x$  when  $y = -1.5$  [2 marks]

2

The diagram shows a sphere made of wood.

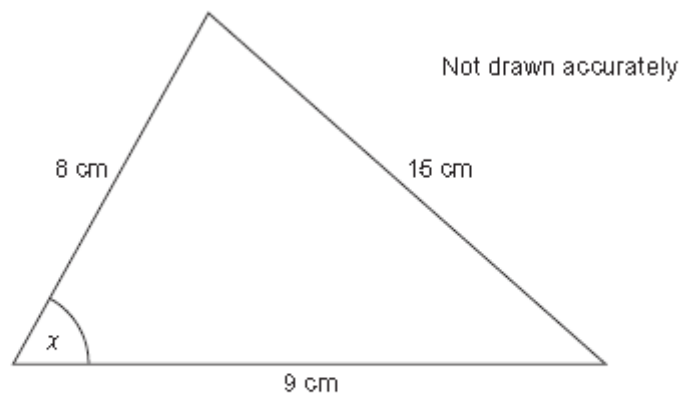


The radius of the sphere is 3 cm  
The mass of the sphere is 86 grams.

Work out the density of the wood.

**[3 marks]**

3



- (a) Which equation is correct for the triangle?  
Circle your answer.

**[1 mark]**

$$\cos x = \frac{15^2 - 8^2 - 9^2}{2 \times 8 \times 9}$$

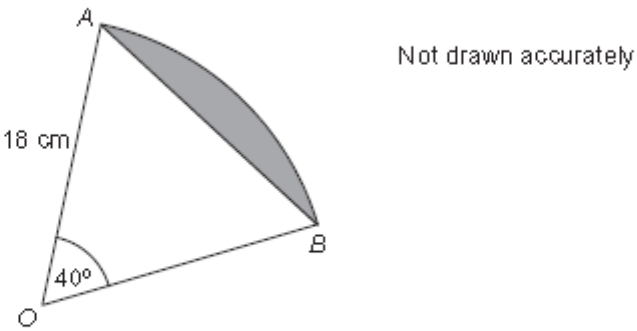
$$\cos x = \frac{8^2 + 9^2 - 15^2}{15 \times 8 \times 9}$$

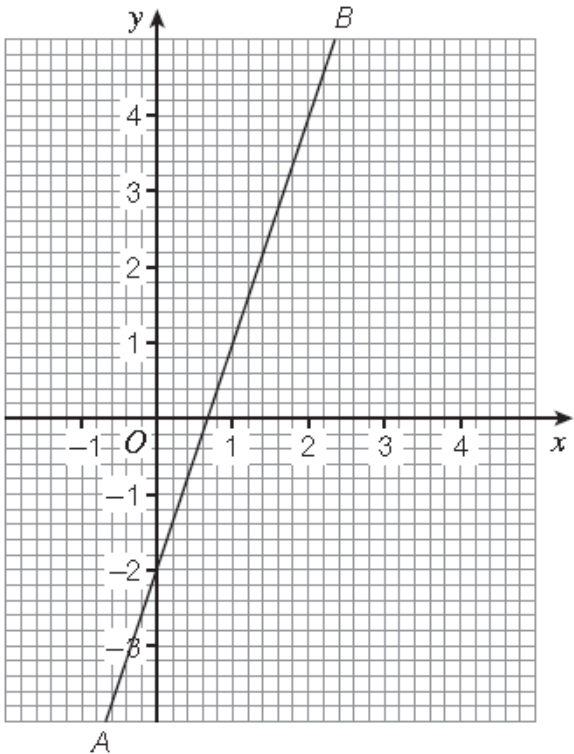
$$\cos x = \frac{8^2 + 9^2 - 15^2}{2 \times 8 \times 9}$$

$$\cos x = \frac{15^2 - 8^2 + 9^2}{15 \times 8 \times 9}$$

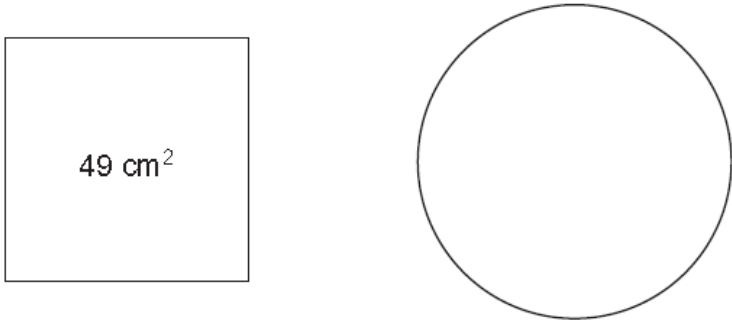
- (b) Use your calculator to work out the value of  $x$  in your equation.

**[1 mark]**

4	<p>The diagram shows a sector of a circle, centre <math>O</math>, radius 18 cm</p>  <p>Not drawn accurately</p> <p>Work out the area of the shaded segment.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
5	<p><math>N = 2a + b</math></p> <p><math>a</math> is a two-digit square number.</p> <p><math>b</math> is a two-digit cube number.</p> <p>What is the <b>smallest</b> possible value of <math>N</math>?</p> <p style="text-align: right;"><b>[3 marks]</b></p>
6	<p>(a) Solve <math>3(x - 2) = 21</math></p> <p style="text-align: right;"><b>[3 marks]</b></p>
	<p>(b) Solve <math>8x - 7 &gt; 6x + 12</math></p> <p style="text-align: right;"><b>[3 marks]</b></p>
7	<p>(a) Here is a linear sequence.</p> <p style="text-align: center;">21      23      25      27      ....</p> <p>Circle the expression for the <math>n</math>th term of the sequence.</p> <p style="text-align: right;"><b>[1 mark]</b></p> <p style="text-align: center;"><math>23 - 2n</math>      <math>19n + 2</math>      <math>21 - 2n</math>      <math>2n + 19</math></p> <p>(b) A different sequence starts</p> <p style="text-align: center;"><math>a</math>      <math>2a - 3</math>      ....</p> <p>The term-to-term rule for this sequence is</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">multiply by 2 and subtract 3</div> <p>The fourth term of this sequence is 35</p> <p>Work out the value of <math>a</math>.</p> <p style="text-align: right;"><b>[3 marks]</b></p>

8	<p>Solve the simultaneous equations</p> $2x - 3y = 24$ $6x + 2y = -5$ <p>Do <b>not</b> use trial and improvement. You <b>must</b> show your working.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
9	<p>Work out <math>2\frac{3}{4} \times 1\frac{7}{9}</math></p> <p>Give your answer as a mixed number.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
10	<p>The equations of five straight lines are shown below. The line <math>y = 5x + 3</math> is parallel to two of the lines.</p> <p>Circle the equations of these <b>two</b> lines.</p> <p style="text-align: right;"><b>[2 marks]</b></p> <p><math>3y = 15x - 3</math>    <math>3y = 5x - 3</math>    <math>3y = 5x + 3</math>    <math>y = 5x - 3</math>    <math>y = -5x + 3</math></p>
11	 <p>Work out the equation of line <math>AB</math>.</p> <p style="text-align: right;"><b>[3 marks]</b></p>

12	<p>Put these in order starting with the smallest.</p> $2\sqrt{3} \times \sqrt{2} \qquad \sqrt{\frac{56}{2}} \qquad \frac{10}{\sqrt{5}}$ <p>You <b>must</b> show your working.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
13	<p>(a) Factorise <math>3x^2 - 13x - 10</math></p> <p style="text-align: right;"><b>[2 marks]</b></p>
	<p>(b) Simplify <math>\frac{3x^2 - 15x}{3x^2 - 13x - 10}</math></p> <p style="text-align: right;"><b>[2 marks]</b></p>
14	<p>A microscope slide has <math>2^8</math> bacteria on it. The number of bacteria doubles every hour.</p> <p>After how many hours are there <math>8^4</math> bacteria on the slide?</p> <p style="text-align: right;"><b>[3 marks]</b></p>
15	<p>Rearrange the formula <math>y = \frac{3x + 5}{x}</math></p> <p>to make <math>x</math> the subject.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
16	<p>(a) Write <math>x^2 - 10x + 12</math> in the form <math>(x - a)^2 + b</math></p> <p>where <math>a</math> and <math>b</math> are integers.</p> <p style="text-align: right;"><b>[2 marks]</b></p>
	<p>(b) When <math>(x - 2)^2 + 7</math> has a minimum value, what is the value of <math>x</math>?</p> <p>Circle your answer.</p> <p style="text-align: center;">-2                      2                      7                      11</p> <p style="text-align: right;"><b>[1 mark]</b></p>
17	<p>Work out the value of <math>125^{-\frac{2}{3}}</math></p> <p style="text-align: right;"><b>[3 marks]</b></p>
18	<p><math>(2x + 3y)^2 - (2x - 3y)^2 = 360</math></p> <p>Show that <math>xy</math> is a multiple of 5</p> <p style="text-align: right;"><b>[4 marks]</b></p>

19	<p>A price is <b>decreased</b> by 27%</p> <p>The new price is £1138.80</p> <p>Work out the original price.</p> <p style="text-align: right;"><b>[3 marks]</b></p>
20	<p><b>(a)</b> The probability of winning a game is <math>6.4 \times 10^{-3}</math></p> <p>Write this probability as a fraction in its simplest form.</p> <p style="text-align: right;"><b>[2 marks]</b></p>
	<p><b>(b)</b> The probability of winning a different game is <math>1.5 \times 10^{-2}</math></p> <p>The game is played twice.</p> <p>Work out the probability of winning this game both times.</p> <p>Give your answer in standard form.</p> <p style="text-align: right;"><b>[2 marks]</b></p>
21	<p>There are 7 white socks and 4 black socks in a drawer.</p> <p>Two socks are taken out at random without replacement.</p> <p>Work out the probability that the two socks are the <b>same</b> colour.</p> <p style="text-align: right;"><b>[4 marks]</b></p>
22	<p>The diagram shows a square and a circle.</p> <p style="text-align: right;">Not drawn accurately</p>  <p>The <b>area</b> of the square is <math>49 \text{ cm}^2</math></p> <p>The <b>perimeter</b> of the square is equal to the <b>circumference</b> of the circle.</p> <p>Work out the radius of the circle.</p> <p>Give your answer to 1 decimal place.</p>
23	<p>Solve <math>5x^2 + 3x - 4 = 0</math></p> <p>Give your answers to 2 decimal places.</p> <p style="text-align: right;"><b>[3 marks]</b></p>