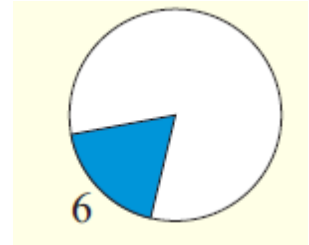


## Scoil Mhuire V- Hons Maths:14/15

### Problem Set 5 – For Monday November 24<sup>th</sup>.

1. \*The circumference of a circle is  $30\pi$  cm. The area of a sector of the circle is  $75\text{ cm}^2$ . Find, in radians, the angle in this sector.

2.\* In the shaded sector in the diagram, the arc is 6 cm long, and the angle of the sector is 0.75 radians. Find the area of the sector.



3. Find the values of  $x$  for which  $3\tan x = \sqrt{3}$ , where  $0^\circ \leq x \leq 360^\circ$ .

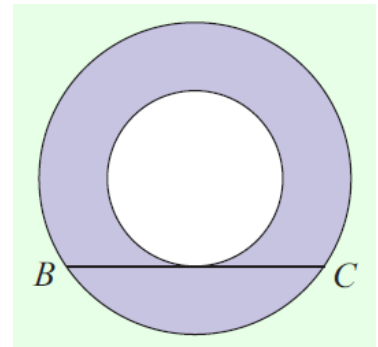
4. \*The area of an equilateral triangle is  $4\sqrt{3}\text{ cm}^2$ . Find the length of a side of the triangle.

5. \*The diagram shows two concentric circles. A tangent to the inner circle cuts the outer circle at  $B$  and  $C$ , where  $|BC| = 2x$ .

(i) Express the area of the shaded region in terms of  $x$ .

(ii) In the case where the radius of the outer circle is  $2x$ , show that the portion of the shaded region that lies

below  $BC$  has area  $\left(\frac{2\pi}{3} - \sqrt{3}\right)x^2$



6. \*Solve, without using a calculator, the following simultaneous equations

$$3x + y + z = 0$$

$$x - y + z = 2$$

$$2x - 3y - z = 9$$

7. \*The cubic equation  $4x^3 + 10x^2 - 7x - 3 = 0$  has one integer root and two irrational roots. Find all roots and express the irrational roots in simplest surd form.

#### **Answers:**

1.  $2/3$  radians    2.  $24\text{ cm}^2$     3.  $30^\circ, 210^\circ$     4. Length of side = 4cm

5. (i)  $\pi x^2$     6.  $x = 1, y = -2, z = -1$     7.  $\left[ x = -3, x = \frac{1 + \sqrt{5}}{4} \text{ and } x = \frac{1 - \sqrt{5}}{4} \right]$