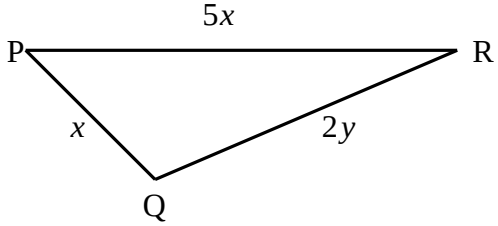
Perth Academy **National 5 Relationships** **Homework 6**

1. Solve each of these quadratic equations by factorisation.

(a) $x^2-4x+3=0$ (b) $6x-x^2=0$ (c) $3x^2-2x=0$
(d) $x^2+x-6=0$ (e) $2x^2-3x+1=0$ (f) $3x^2+2x-1=0$

2. The angles of a triangle are $2x^\circ$, $3x^\circ$ and $4x+9^\circ$.
Find the value of x and hence the size of each angle.

3. In triangle PQR, PQ $= x$ centimetres, PR $= 5x$ centimetres and QR $= 2y$ centimetres.



(a) The perimeter of the triangle is 42 centimetres. Write down an equation in x and y.
(b) PR is 2 centimetres longer than QR. Write down another equation in x and y.
(c) Hence calculate the values of x and y.

4. Simplify:

(a) $\sqrt{75}$ (b) $\sqrt{128}$ (c) $\sqrt{200}$ (d) $\sqrt{44}$

5. Simplify:

(a) $6\sqrt{3}-2\sqrt{3}$ (b) $\sqrt{12}+\sqrt{3}$ (c) $\left(2-\sqrt{3}\right)\left(2+\sqrt{3}\right)$

6. Express with rational denominators:

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{3}{\sqrt{5}}$ (c) $\frac{4}{\sqrt{2}}$ (d) $\frac{4}{\sqrt{3}}$

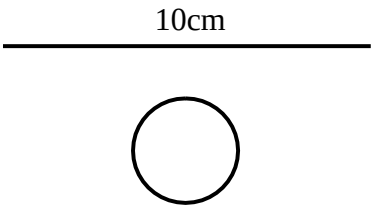
7. Simplify:

(a) $\left(a^3\right)^4$ (b) $\frac{a^2\times a^5}{a\times a^3}$ (c) $\frac{8t^2}{2t^{\frac{1}{2}}}$ (d) $6y^5\div 2y$

8. In a maths exam with N questions, you can score m marks for a correct answer to each of the first q questions and $m+2$ marks for a correct answer to each of the remaining questions.
Find an expression for the maximum possible score.

9. Without a calculator find the largest power of 2 that divides 127^2-1^2.
You should be thinking of a di******** of s******* here.

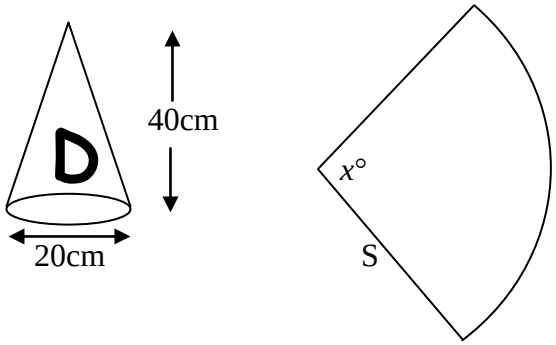
10. A piece of gold wire 10cm long is to be made into a circle.



The circumference of the circle is equal to the length of the wire.

Show that the area of the circle is exactly $\frac{25}{\pi}$ square centimetres.

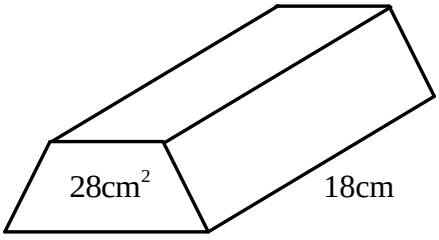
11. Robert has a dunce's hat of diameter 20cm and height 40cm. The hat is made from a sector of card, radius S, as shown.



(a) Find the value of S, the radius of the sector.
(b) Find the circumference of the base of the hat.
(c) Find the area of card required to make the hat.
(d) Find the value of *x*.
(e) Find the volume of the hat.

[For a cone, $V = \frac{1}{3}\pi r^2 h$; *Curved surface area* $= \pi rs$, where *s* is the slant height.]

12. (a) A block of copper 18cm long is prism-shaped, as shown below.



The area of its cross-section is 28 sq cm and its length is 18cm.
Find the volume of the block.

(b) The block is melted down to make a cylindrical cable of diameter 14 millimetres.
Calculate the length of the cable.