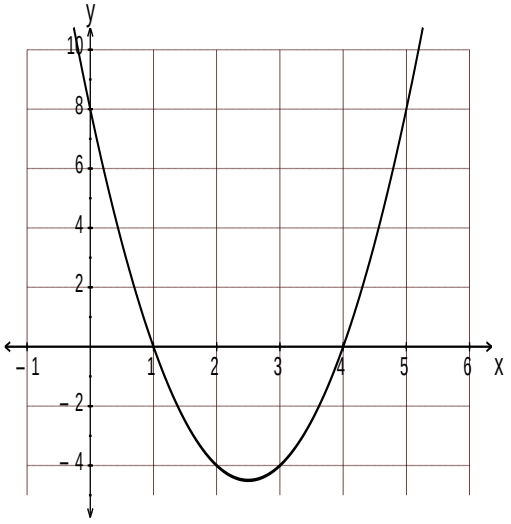
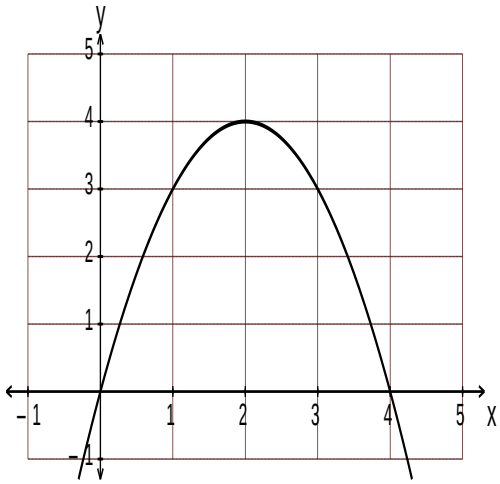
Perth Academy **National 5 Relationships** **Homework 20**

1. Establish the equation of each of these parabolas

(a)



(b)



2. Prove that:

(a) $\sin^3 A + \sin A \cos^2 A = \sin A.$

(b) $\cos A \tan A = \sin A.$

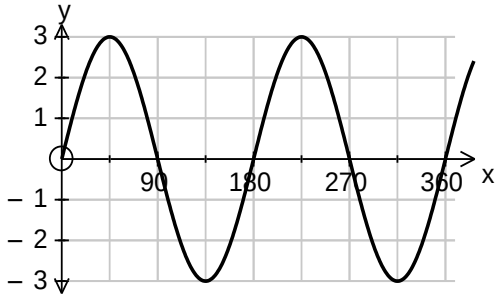
(c) $\dfrac{1-\cos^2 A}{\cos^2 A} = \tan^2 A.$

3. Simplify:

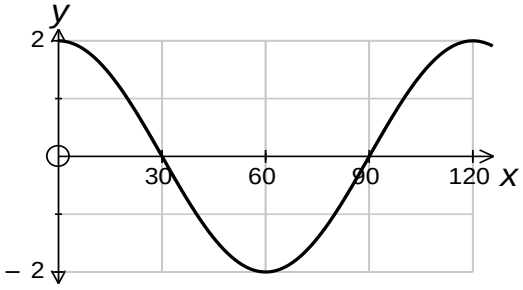
(a) $\dfrac{3}{x} - \dfrac{2}{x^2}$ (b) $\dfrac{1}{2y} - \dfrac{1}{3y}$ (c) $\dfrac{5}{x} - \dfrac{2}{x-2}$

4. Find the equation of each of these Trig graphs:

(a)



(b)

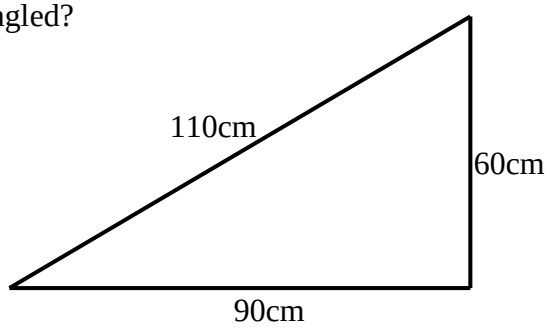


5. (a) $d = \dfrac{k-m}{t}$. Change the subject to k.

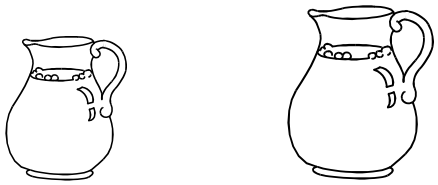
(b) $Q = p^2 + 3T$. Change the subject to T.

(c) (d) $m = \dfrac{3x+2y}{p}$. Change the subject to x.

6. Is the triangle below right-angled?



7. These two jugs are mathematically similar. The first has a diameter of 15cm and the second has a diameter of 20cm.
If the first holds 2.16 litres of liquid, how many litres does the second hold?

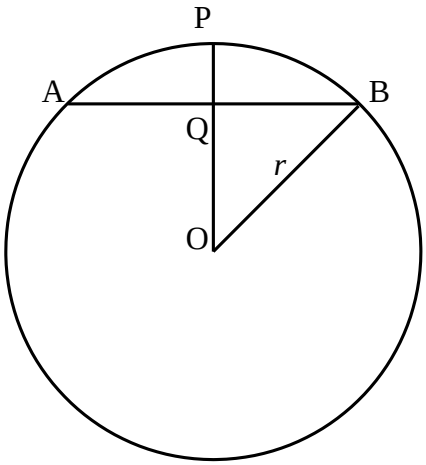


8. There are 4 girls and 14 boys in a class.
A child is chosen at random and is asked to roll a fair die, numbered from 1 to 6.
Which of these is more likely?

A: the child is female
OR
B: the child rolls a 5.

Justify your answer fully.

9. In the circle below, AB has length 12 units and PQ has length 2 units.
O is the centre and the radius has length r units.
Calculate the length of the radius.



10. Two variables x and y are connected by the relationship $y = ax + b$.
Given that both a and b are negative, sketch a possible graph of y against x to illustrate this relationship.