$\frac{}{12}$:

2. If $x$ is a number between 4 and 8 and $y$ is a number between 20 and 40, what are the smallest and largest possible values of $\frac{y}{x}$?

[1]Some of the problems here come from T. Gagen, Uni. of Syd. and from E. Szekeres , Macquarie Uni.



$+ b^2) = c^2 + 4h^2$:

eorem.

nowing only the lengths of the three medians $h, k$
or nd a better way.)

are externally tangent at the point $P$. A straight
ively at $A$ and $B$. Show that the tangents to the

e last three digits) of $1! + 2! + 3! + \cdots + 99!$.

and the bottom by $A_1; B_1; C_1; D_1$

deduce that these points form the vertices of a regular hexagon.

5. A quadrilateral in which a circle can be drawn which touches each of the four faces is called a circumscribable quadrilateral If $r$ is the radius of the circle and $s$ is half the perimeter of the quadrilateral, prove that the area of the quadrilateral is $rs$.

6. What is the smaller angle between the hands of the clock at 12:25pm?

Senior Questions

1. Solve the equation $\cot^{1} x \quad \cot^{1}(x + 2) =$