10. Given that $\boxed{a^2 + b^2 \geqslant 2ab}$, deduce an expression for (i) $a^2 + c^2$ and (ii) $\boxed{c^2 + d^2}$.
Use these results to prove that

$$a^2 + b^2 + c^2 \geqslant ab + bc + ca \text{ for all real values of } a, b \text{ and } c.$$

Should be c^2+b^2

$a^2+c^2=?$	$\Rightarrow a^2+c^2 \geq 2ac$
~~$c^2+d^2=?$~~	~~$\Rightarrow c^2+d^2 \geq 2cd$~~ ← useless
c^2+b^2	$\Rightarrow c^2+b^2 \geq 2cb$
$LHS_s \geq RHS_s \Rightarrow$	$a^2+b^2+a^2+c^2+c^2+b^2 \geq 2ab+2ac+2cb$
	$2a^2+2b^2+2c^2 \geq 2ab+2ac+2cb$
$\div 2$	$a^2+b^2+c^2 \geq ab+bc+ca$

QED.

11. If $p > 0$ and $q > 0$ and $p \neq q$, prove that $\dfrac{p+q}{2} > \sqrt{pq}$.

$\times 2$	$p+q > 2\sqrt{pq}$
Square	$(p+q)^2 > (2\sqrt{pq})^2$
	$p^2+2pq+q^2 > 4pq$
$-4pq$	$p^2-2pq+q^2 > 0$
	$(p-q)^2 > 0$

true

18. Prove that $\sqrt{ab} > \dfrac{2ab}{a+b}$ if a and b are positive and unequal.

$\times (a+b)$	$(a+b)\sqrt{ab} > 2ab$
square	$(a+b)^2(\sqrt{ab})^2 > (2ab)^2$
	$(a^2+2ab+b^2)\cancel{(ab)} > 4(ab)\cancel{(ab)}$
$-4ab$	$a^2-2ab+b^2 > 0$
	$(a-b)^2 > 0$
	true