

**Geometric Distribution Questions (with Year 2 Content) (From OCR 4723)**

**Q1, (Jun 2007, Q9)**

ia	$1 / \frac{1}{5}$ $= 5$	M1 A1 2	
b	$(\frac{4}{5})^3 \times \frac{1}{5}$ $= \frac{64}{625}$ or 0.102 (3 sfs)	M1 A1 2	
c	$(\frac{4}{5})^4$  $= \frac{256}{625}$ or a.r.t 0.410 (3 sfs) or 0.41	M1  A1 2	or $1 - (\frac{1}{5} + \frac{4}{5} \times \frac{1}{5} + (\frac{4}{5})^2 \times \frac{1}{5} + (\frac{4}{5})^3 \times \frac{1}{5})$ NOT $1 - (\frac{4}{5})^4$
iii	$P(Y=1) = p, P(Y=3) = q^2p, P(Y=5) = q^4p$		$P(Y=1)+P(Y=3)+P(Y=5) = p + q^2p + q^4p$ $p, p(1-p)^2, p(1-p)^4$ $q^{1-1}, q^{3-1}, q^{5-1}$ or any of these with $1-p$ instead of $q$ "Always $q$ to even power $\times p$ " Either associate each term with relevant prob Or give indication of how terms derived $\geq$ two terms
b	Recog that c.r. $= q^2$ or $(1-p)^2$ $S_\infty = \frac{p}{1-q^2}$ or $\frac{p}{1-(1-p)^2}$ $P(\text{odd}) = \frac{1-q}{1-q^2}$ $= \frac{1-q}{(1-q)(1+q)}$ Must see this step for A1 $(= \frac{1}{1+q}$ AG)	M1  M1  M1  A1 4	or eg $r = q^2p/p$  $(= \frac{p}{2p-p^2}) = \frac{p}{p(2-p)}$ $(= \frac{1}{2-p}) = \frac{1}{2-(1-q)}$

**Q2, (Jan 2010, Q9)**

(i)	$p^2$	B1 1	
(ii)	$(q^2p)^2$ oe =AG	B1 1	
(iii)	$r=q^2$  $a/(1-r)$ used $(S_\infty =) \frac{p^2}{1-q^2}$  $= \frac{p^2}{1-(1-p)^2}$ $p/(2-p)$ AG	B1  M1  A1  M1  A1 5	May be implied  With $a=p^2$ and $r=q^2$ or $q^4$  Attempt to simplify using $p+q=1$ correctly. Dep on $r = q^2$ or $q^4$ $\frac{(1-q)^2}{(1-q)(1+q)}$ or $p^2/p(1+q)$ Correctly obtain given answer showing at least one intermediate step.
<b>Total</b>		<b>[7]</b>	