Question Number	Scheme	Marks
6(a)	A sampling distribution is **all** the **values** of a **statistic** and the associated **probabilities** **or** the **probability distribution** of the **statistic**.	B1
		(1)
(b)	P(small(40)) = 0.5, P(medium(80)) = 0.3, P(large(150)) = 0.2	B1
	Range (R) 0, 40, 70, 110	B1
	$\left[\mathrm{P}(R=0)=\right]"0.5"^3+"0.3"^3+"0.2"^3=0.16$	M1
	(40,40,80) (40,80,80) (80,80,150) (80,150,150) (40,40,150) (40,80,150) (40,150,150)	B1
	$\left[\mathrm{P}(R=40)=\right]3\times("0.5"\times"0.3"^2)+3\times("0.5"^2\times"0.3")$	M1
	$\left[\mathrm{P}(R=70)=\right]3\times("0.3"^2\times"0.2")+3\times("0.3"\times"0.2"^2)=0.09$	M1
	$\left[\mathrm{P}(R=110)=\right]3\times("0.5"^2\times"0.2")+3\times("0.5"+"0.2"^2)+6\times("0.5"\times"0.3"\times"0.2")=0.39$	M1
	R: 0, 40, 70, 110 r: 0.16, 0.36, 0.09, 0.39	A1cao
		(7)
(c)	$(1-"0.09")^n<0.2$ or $("0.91")^n<0.2$	M1
	$[n>]17.065...$	M1
	$n=18$	A1
		(3)
	Notes	**Total 11**

6(a)	**B1**	A correct explanation with the words in bold. Allow equivalent words eg outcomes for values
(b)	**B1**	Correct probabilities – may be seen in an equation or implied by a correct probability for $R = 0$ or for 2 correct probabilities from those for $R=40$, $R=70$, $R=110$
	B1	All four ranges correct with no extra.
	M1	Correct method for finding P($R = 0$)
	B1	All the correct combinations for $R = 40$, 70 and 110. $R= 0$ combinations are not required but no incorrect combinations must be seen (may use bag size rather than numbers in bag) May be implied by a correct probability for P($R = 40$), P($R = 70$) and P($R = 110$) or by correct working seen for each of the 7 combinations (no need for the number of ways of arranging ie $3\times$ or $6\times$) eg $(40,40,80)=0.5^2\times0.3$
	M1	Correct method for one of the probabilities for P($R = 40$), P($R = 70$), P($R = 110$)
	M1	Correct method for a second probability for P($R = 40$), P($R = 70$), P($R = 110$) or the 4 probabilities add up to 1.
	A1	Correct answer only. Allow answers as a fraction. Need not be in a table but probabilities must be attached to the correct range
(c)	**M1**	Setting up a correct inequality using their 0.09 Allow written as an equation.
	M1	For 17.1 or better allow $\frac{\log 0.2}{\log"0.91"}$ or $\log_{"0.91"}0.2$ oe If inequality/equation is incorrect but of the form $(p)^n<0.2$ $(p)^n=0.2$ where $0<p<1$ this mark can be awarded if working is shown
	A1	18 do not accept $n > 18$ or $n < 18$ if final answer

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