

- b. Find the smallest value of n such that, $P(X < n) \geq 0.9$, where the random variable X represents the number of these customers who ask for water. (4)

Solutions

Let X be the random variable the number of customers asking for water.	
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1ai.

$X \sim B(10, 0.6)$	M1
$P(X = 6) = (0.6)^6(0.4)^4 \frac{10!}{6!4!}$	M1
$= 0.2508\dots$ $= 0.251$	M1

1aii.

$X \sim B(10, 0.6)$ $P(X < 9) = 1 - P(X = 10) + P(X = 9)$	M1
$= 1 - (0.6)^{10} - (0.6)^9 (0.4)^1 \frac{10!}{9!1!}$	M1
$= 0.9536\dots$ $= 0.954$	M1

1b.

$X \sim B(50, 0.6)$	M1
$Y \sim B(50, 0.4)$ $P(X < n) \geq 0.9$ $P(Y > 50 - n) \geq 0.9$ $P(Y \leq 50 - n) \leq 0.1$	M1
$50 - n \leq 15$ $n \geq 35$	M1
$n = 35$	M1

