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Chapter 6 Problem Solving Set B:

Bronze:

a) $Y \sim B(35, 0.64)$ → Fixed probability of success
↓ no. of trials

b) Using calculator: Binomial CD function:

i) $P(Y \leq 17) = \underline{0.0443}$

ii) $P(5 \leq Y \leq 20) = P(Y \leq 20) - P(Y \leq 4)$
$= 0.2491 - (1.66 \times 10^{-10})$
$= \underline{0.2491}$

Silver:

a) Using trial and error:
$X \sim B(30, 0.15)$

$P(X < 2) = P(X \leq 1)$
$= 0.048 < 0.05$
↳ Therefore the largest value of $\underline{k = 2}$

b) Using trial and error:
$X \sim B(30, 0.15)$

$P(X > 9) = 1 - P(X \leq 9)$
$= 1 - 0.9903$
$= 9.7 \times 10^{-3} \rightarrow 0.0097 < 0.01$
↳ Therefore the smallest value of r is 9

c) $P(2 \leq X \leq 9) = P(X \leq 9) - P(X \leq 1)$
$= 0.9903 - 0.048$
$= \underline{0.9423}$

Gold:

a) First use distribution:
$X \sim B(25, 0.65)$

At least is: $1 - P(X \leq 14)$
$= 1 - 0.2288$
$= 0.7712$

Then use distribution
$Y \sim B(10, 0.7712)$

$P(Y = 7) = \underline{0.2332}$
↓ using calculator (Binomial PD)

b) Fewer than 5: $P(X \leq 4)$
$= \underline{0.0127}$
↓ using calculator (Binomial CD)