

$$8. \quad n=30 \quad p=0.25$$

$$a) \quad P(\text{EXACTLY } 8)$$

$$P(X=8)$$

$$\text{binompdf}(n, p, a)$$

$$\text{binompdf}(30, 0.25, 8)$$

$$= 0.1593$$

$$b) \quad P(\text{LESS THAN } 17)$$

$$P(X=0, 1, \dots, 16)$$

$$P(X \leq 16)$$

$$\text{binomcdf}(n, p, a)$$

$$\text{binomcdf}(30, 0.25, 16)$$

$$= 0.9998$$

$$c) \quad P(\text{AT MOST } 12)$$

$$P(X=0, 1, \dots, 12)$$

$$P(X \leq 12)$$

$$\text{binomcdf}(n, p, a)$$

$$\text{binomcdf}(30, 0.25, 12)$$

$$= 0.0291$$

$$d) \quad P(\text{MORE THAN } 20)$$

$$P(X=21, 22, 23, \dots, 30)$$

$$P(X \geq 21)$$

$$1 - \text{binomcdf}(n, p, a-1)$$

$$1 - \text{binomcdf}(30, 0.25, 21-1)$$

$$1 - \text{binomcdf}(30, 0.25, 20)$$

$$2.818 \times 10^{-7}$$

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$$0.0000002818$$

$$e) \quad P(\text{AT LEAST } 25)$$

$$P(25, 26, \dots, 30)$$

$$P(X \geq 25)$$

$$1 - \text{binomcdf}(n, p, a-1)$$

$$1 - \text{binomcdf}(30, 0.25, 25-1)$$

$$1 - \text{binomcdf}(30, 0.25, 24)$$

$$3.206 \times 10^{-11}$$

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$$0.000000000003206$$

$$f) \quad P(\text{BETWEEN } 10 \text{ AND } 20, \text{ INCLUSIVE})$$

$$P(X=10, 11, \dots, 20)$$

$$P(10 \leq X \leq 20)$$

$$\text{binomcdf}(n, p, b) - \text{binomcdf}(n, p, a-1)$$

$$\text{binomcdf}(30, 0.25, 20) - \text{binomcdf}(30, 0.25, 10-1)$$

$$\text{binomcdf}(30, 0.25, 20) - \text{binomcdf}(30, 0.25, 9)$$

$$= 0.1966$$