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7.3 One-tailed tests

1) $H_0: p = 0.4$ $\alpha = 0.02$
 $H_1: p < 0.4$

$$X \sim B(20, p)$$

$$X \sim B(20, 0.4)$$

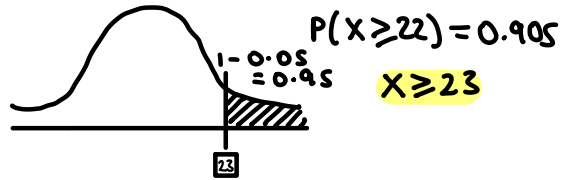
$$P(X \leq 3) = 0.0160 > 0.02$$

reject H_0 , accept H_1

4) a) $H_0: p = 0.6$

$$H_1: p > 0.6$$

b) $X \sim B(30, 0.6)$ $\alpha = 0.05$



2) $H_0: p = 0.45$ $\alpha = 0.01$
 $H_1: p > 0.45$

$$X \sim B(25, p)$$

$$X \sim B(25, 0.45)$$

$$P(X \geq 17) = 1 - P(X \leq 16)$$

$$1 - 0.9826 = 0.0174 > 0.01$$

accept H_0 , reject H_1

c) 2S is inside the critical region

reject H_0 accept H_1

There is sufficient evidence to support the manufacturer's claim.

5) $H_0: p = 0.1$ $\alpha = 0.05$

$$H_1: p < 0.1$$

$$X \sim B(50, 0.1)$$

$$P(X \leq 1) = 0.0338 < 0.05$$

reject H_0 , accept H_1

There is sufficient evidence to support that the new clay has reduced the likelihood of the pot fracturing.

3) a) $X \sim B(n, 0.9)$

b) $H_0: p = 0.9$ $\alpha = 0.05$

$$H_1: p < 0.9$$

$$X \sim B(40, 0.9)$$

$$P(X \leq 33) = 0.0995 > 0.05$$

accept H_0 , reject H_1

6) Briony has calculated $P(X=7)$ rather than $P(X \geq 7)$.

$$P(X \geq 7) = 1 - P(X \leq 6)$$

$$= 1 - 0.9894 = 0.0106 > 0.01$$

accept H_0 , reject H_1

$$7) a) X \sim B(15, 0.05)$$

$$P(X \geq 1) = 1 - P(X \leq 0)$$

$$1 - 0.4633 = 0.5367$$

$$b) H_0: p = 0.05 \quad \alpha = 0.05$$

$$H_1: p > 0.05$$

$$X \sim B(26, 0.05)$$

$$P(X \geq 4) = 1 - P(X \leq 3)$$

$$1 - 0.96125 = 0.0388 < 0.05$$

reject H_0 , accept H_1

There is sufficient evidence to support that the salesman has increased his likelihood of making a sale.



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