Author: Iqra Alam

This step-by-step solution guide has been created by **Iqra Alam** for educational purposes. While we have made every effort to ensure the accuracy of the information presented, it is possible that there may be errors or omissions. We encourage users to critically evaluate and verify the content. BF Maths and the author cannot be held responsible for any errors or inaccuracies in this guide.

If you find any mistakes or have any suggestions for improvements, please contact us at bfmathshello@gmail.com. Your feedback is invaluable in helping us maintain the quality and accuracy of our resources. Please specify *which exercise* and *which question* in the email.

Thank you for using BF Maths for your maths revision!

Chapter 7 Problem Solving Set B

Bronze:

$H_0: p = 0.65$
$H_1: p \neq 0.65$

10% significance level
(5% significance level for each tail)

$X \sim B(15, 0.65)$

$P(X \geq 13) \rightarrow 1 - P(X \leq 12)$
$= 1 - 0.9383$
$= 0.0617 > 0.05$

↳ therefore you should accept the null hypothesis and there isn't enough evidence for the circus owner's beliefs

Silver:

a) $\frac{1}{k} + \frac{2}{k} + \frac{3}{k} + \frac{4}{k} = 1$

$\frac{10}{k} = 1$

$k = 10$

$\therefore P(X = 4) = \frac{4}{10} = \underline{0.4}$

b) $H_0: p = 0.4$
$H_1: p \neq 0.4$

$X \sim B(50, 0.4)$

5% significance level
(2.5% significance level for each tail)

$P(X \geq 28) = 1 - P(X \leq 27)$
$= 1 - 0.98397$
$= 0.016 < 0.025$

↳ this means we reject the null hypothesis so that means there is enough evidence to support Doreen's claim

Gold:

1) $P(X \geq 5)$ should be calculated to check the rate of defects
2) The significance level should be halved as it is a 2-tailed test so the significance level should be 2.5% (0.025)

↳ $P(X \geq 5) = 1 - P(X \leq 4)$

$X \sim B(300, 0.004)$

$= 1 - 0.9924$
$= 7.6003 \times 10^{-3} < 0.25$

↳ reject the null hypothesis, there is evidence that the rate of defects have changed.

BF MATHS