10. a) Mean ~~or~~ median can be used after arranging the temperature in ascending order. Mean should be ignored if outlier exists.

b) Mean should not be used if outliers exist ~~as~~ as they tend to overshoot the correct value.

c) Mean if no outliers and median can be used.

d) Mode is used to identify the common one.

CONFIDENCE INTERVAL ASSIGNMENT

1. $n = 1000$ 95% CI?

S ~~xx~~ = 180 pounds.

~~x σ 30 pounds~~. $SE =$ 30 pounds. (standard deviation of sample is standard error)

$$\mu_{pop} = S \pm 2\,SE$$

$$= \cancel{180 \pm 2\frac{30}{\sqrt{1000}}} \qquad 180 \pm 2(30)$$

$$= \cancel{180 \pm 1.897} \qquad 120 < \mu_{pop} < 240$$

$$\therefore \cancel{178.013 < \mu_{pop} < 181.897}.$$

2. Standard deviation = 3.6 minutes.

$S = 16.2$ minutes $\qquad$ 92 % CI

$n = 120$ workers

a) $z = (92\%) \Rightarrow 1.75$ (96% area)

$$\mu_{pop} = 16.2 \pm 1.75 \times \frac{3.6}{\sqrt{120}}$$

$$= 16.2 \pm 0.576$$

~~15.73 < μpop < 16.663~~

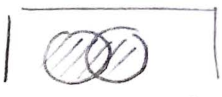
$$= 15.624 < \mu_{pop} < 16.776$$

b) $z \times SE = 15$ seconds $= 0.25$

$$1.75 \times \frac{3.6}{\sqrt{n}} = 0.25$$

$n = 635$ people should be involved.

Exhaustive if the whole set is calculated by pblty.



$P(A \cup B) = 1$

Mutually exclusive, if pblty are independent of each other and appear seporately

$p(A \cap B) = 0$

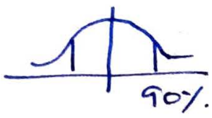
Confidence interval.

3. a) p with 2% margin of error. and 90% confidence.

$Z = 90\%$.

$ME = 2\%$

Margin of error = $Z \times$ Standard error.



Hence find z value for 95%.
(90 + 5 (left-tail))

$z = 1.64$

$$0.02 = 1.64 \times \sqrt{\frac{pq}{n}}$$

assume $p = 0.5$, hence $q = 0.5$

$$0.02 = 1.64 \times \frac{\sqrt{0.5 \times 0.5}}{\sqrt{n}}$$

$$\sqrt{n} = 1.64 \times \frac{0.5}{0.02}$$

$$n = \left(\frac{1.64}{0.04}\right)^2 = 1681$$

b) 1000 consumers, 400 happy.

95% CI.

$$\Rightarrow \frac{400}{1000} \pm z \times \sqrt{\frac{0.4 \times 0.6}{1000}}$$

$$\Rightarrow 0.40 \pm 0.031$$

$$\Rightarrow 0.369, 0.431$$

measurements; 0.95, 1.02, 1.01, 0.98

at 95% Confidence interval.

$\therefore$ calculating mean = 0.99

S.D $\Rightarrow$

$$\text{Variance} = \frac{\Sigma x^2}{n} - \mu^2 \Rightarrow 7.5\times10^{-4}$$

$$S.D = \sqrt{\cancel{1.2}\cancel{3}5} = 0.027$$

$\therefore$ CI $\Rightarrow$

$$\Rightarrow 0.99 \pm \cancel{2} \times \frac{0.027}{\cancel{2}}$$

$$\Rightarrow 0.99 \pm 0.027$$

5. null hypothesis ; mean = 45

Alternate hypothesis, mean $\neq$ 45

$n = 9$

$S.E = 3.5/\sqrt{9}$

degree of freedom = 8

at 5% significance level.

$$\therefore T = \frac{\bar{X} - \mu_0}{s/\sqrt{n}} = \frac{49.2 - 45}{3.5/\sqrt{n}} = 3.6$$

t-score with df 8 and 5% significance level. 2.306.

Since 3.6 > 2.306. There is significant evidence at 5% significance level in-order to complete the maze is changed.

6. S.D = 5 minutes

μ = 42 minutes

95% CI.

$n = 64$

$\Rightarrow \bar{x} \pm z \frac{\sigma}{\sqrt{n}}$

$\Rightarrow 42 \pm 2 \frac{5}{\sqrt{64}}$

$\Rightarrow 42 \pm 1.25$

---

7. Sum of values = -3.50 $\quad \bar{x} = 2$

Sum squared = 19.13.

90% CI

$\mu = \frac{-3.50}{17} = -0.20$

variance $\Rightarrow \frac{19.13}{17} - (-0.20)^2$

$\Rightarrow 1.12 - 0.04$

$\Rightarrow 1.08$

$\therefore$ SD $\Rightarrow 1.03$

$\therefore$ CI $= \bar{x} \pm z \frac{\sigma}{\sqrt{n}}$

$= 2 \pm 1.64 \frac{(1.03)}{\sqrt{17}}$

$= 2 \pm 0409$

8. Variance $= 9\ cm^2$

S.D $= 9$ cm

ME $=$ 1 cm

$$~~1cm~~\quad 1 = 2 \times \frac{9}{\sqrt{n}}$$

$$\sqrt{n} = 18$$

$$\boxed{n \simeq 4.24}$$

---

9. $\bar{X} = 141 \qquad n = 16$

$\sigma_s = 4 \qquad 95\%$ C.I

$$\therefore \quad CI = 141 \pm 2 \frac{\cancel{4}}{\cancel{\sqrt{16}}}$$

$$\boxed{CI = 141 \pm 2}$$

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10. $N = 17{,}096$

3314 classified as bingedrinkers.

$$\therefore \Rightarrow \frac{3314}{17096} \pm 1.64 \sqrt{\frac{pq}{n}}$$

$$= 0.1938 \pm 1.64 \sqrt{\frac{(0.1938)(0.806)}{17096}}$$

$$= 0.1938 \pm 0.0049$$

11. $n = 100$, $\mu = 49$, $S.D = 4.49$

$$C.I = 49 \pm 1.64\left(\frac{4.49}{\sqrt{100}}\right)$$

$$\boxed{C.I = 49 \pm 0.736}$$

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12. $$P = \frac{175}{1200} = 0.145 \quad (\text{are fraudulent})$$

$q = 0.8\cancel{5}4.$ (not fraud).

$$\therefore \Rightarrow 0.145 \pm 2\left(\frac{0.145 \times 0.854}{1200}\right)$$

$$\Rightarrow 0.145 \pm 0.0002 \;//$$

---

13. $n = 59$

$$P = 15/59 = 0.254$$

$$q = 0.746$$

$$0.254 \pm 2\left(\frac{0.254 \times 0.746}{59}\right)$$

$$0.254 \pm 0.0064$$

---

14. 90% $z \Rightarrow 1.64$

Margin of error = 100

$\sigma = 475$

$z \times SE = 100$

$1.64 \times \frac{475}{\sqrt{n}} = 100$

$\boxed{n = 60.68 \approx 61}$

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15. Mean $\Rightarrow 55.3$

Variance $\Rightarrow 227.61$

S.D $\Rightarrow 15.08$

$\therefore$ CI $\Rightarrow 55.3 \pm 2 \frac{15.08}{\sqrt{10}}$

CI $\Rightarrow 55.3 \pm 9.53$
