1) point estimate for population proportion = sample proportion

$$= \frac{2290}{4000}$$

$$= 0.5725$$

2) point estimate for population mean = sample mean

$$= \frac{5.4 + 1.1 + 0.42 + 0.73 + 0.48 + 1.1}{6}$$

$$= 1.54$$

3) standard error

4) $\hat{p} = 0.2 \qquad n = 3200$

$$se = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{0.2(0.8)}{3200}} = 0.0071$$

5) $\hat{p} = \frac{23}{369} = 0.0623 \qquad n = 369 \qquad se = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{0.0623(1-0.0623)}{369}}$

$$= 0.0126$$

$z = 1.96$ (for 95% confidence)

margin of error (me) = $z(se) = 1.96(0.0126) = 0.0247$.

confidence interval (95%) $= \hat{p} \pm me = 0.0623 \pm 0.0247$

$$= (0.0377, 0.0870)$$

6) $\hat{p} = \frac{12}{346} = 0.0347$ $\quad n = 346 \quad se = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{0.0347(1-0.0347)}{346}}$

$= 0.00984$

$z = 2.33$ (for 98% confidence)

$me = z(se) = 2.33(0.00984) = 0.0229$

Confidence interval (98%) $= \hat{p} \pm me = 0.0347 \pm 0.0229$

$= (0.0118, 0.0576)$

$= (0.012, 0.058)$

7) $me = z(se)$ for a proportion.

z depends on the confidence level (z increses as confidence level increases)

se depends on the sample size (se decreases as sample size increases $se = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$)

therefore I ✗

II ✓

III ✓

IV ✗

∴ II and III will result in a larger me.

8) $df = 19 - 1 = 18$ $\quad (df = n-1)$

90%

$\downarrow$

$18 \longrightarrow \boxed{2.878} \leftarrow t$

9) $df = 25$

95%

$\downarrow$

$25 \longrightarrow \boxed{2.060} \leftarrow t$

10) Confidence level $\downarrow \Rightarrow z\downarrow \Rightarrow me\downarrow$

(D)

11)
- Population standard deviation is usually unknown. (This statement makes no differen
- For a population mean estimation, we need the assumption that the population is normally distributed. (This is also needed for both z and t intervals).
- Sample size being small tells us that we need to use a t interval.

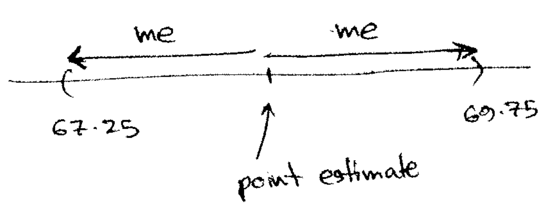
(If sample size is larger, t and z intervals will be equal in which case z interval could be used.)

Therefore (C).

[For a population proportion estimation, we always use z but we need $np \geq 15$ and $n(1-p) \geq 15$].

12) point estimate = sample mean = \$709

13) confidence interval = (67.25, 69.75)



Therefore $me = \frac{(69.75 - 67.25)}{2}$

$= 1.25 \leftarrow$ (B)

[If you were asked to find the point estimate, that would be $\frac{69.75 + 67.25}{2}$].

14) point estimate $= \bar{x} = 68$ $\quad n = 15$ $\quad s = 2.3$

(Here what is given is the sample standard deviation. So we need to find the standard error)

$se = \frac{s}{\sqrt{n}} = \frac{2.3}{\sqrt{15}} = 0.594$

$df = n-1 = 14$. Therefore $t = 1.761$ (for 90% confidence).

$me = t \cdot (se) = 1.761\,(0.594) = 1.046$

confidence Interval $= \bar{x} \pm me$

$= 68 \pm 1.046$

$= (66.954, 69.046)$

15) point estimate = $\bar{x}$ = 1.3 $n = 65$ $s = 1.1$

~~[illegible]~~

$se = \frac{s}{\sqrt{n}} = \frac{1.1}{\sqrt{65}} = 0.136$

$df = n-1 = 64$ Since we cannot find df = 64 in the table, using df = 60, we can get $t = 2$ for 95% confidence lev

$me = t(se) = 2(0.136)$
$= 0.272$.

confidence interval $= \bar{x} \pm me$
$= 1.3 \pm 0.272$
$= (1.028, 1.572)$
$= (1.03, 1.57)$.