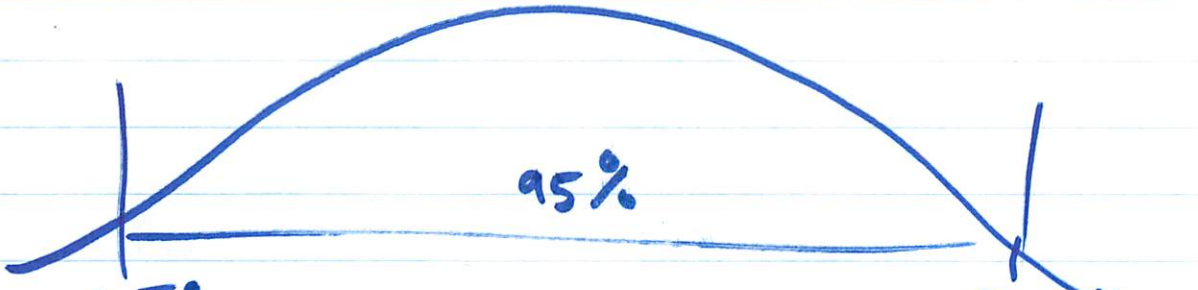
(a.)



prob. 0.025 0.975

z-score (critical value) −1.96 +1.96

$$\pm 1.96 \sqrt{\frac{(0.25)(0.75)}{100}}$$

$$= \pm 1.96 \sqrt{0.001875}$$

$$= (\pm 1.96)(0.04330127)$$

$$= \pm 0.08487049$$

$$\approx \pm 8.5\%$$

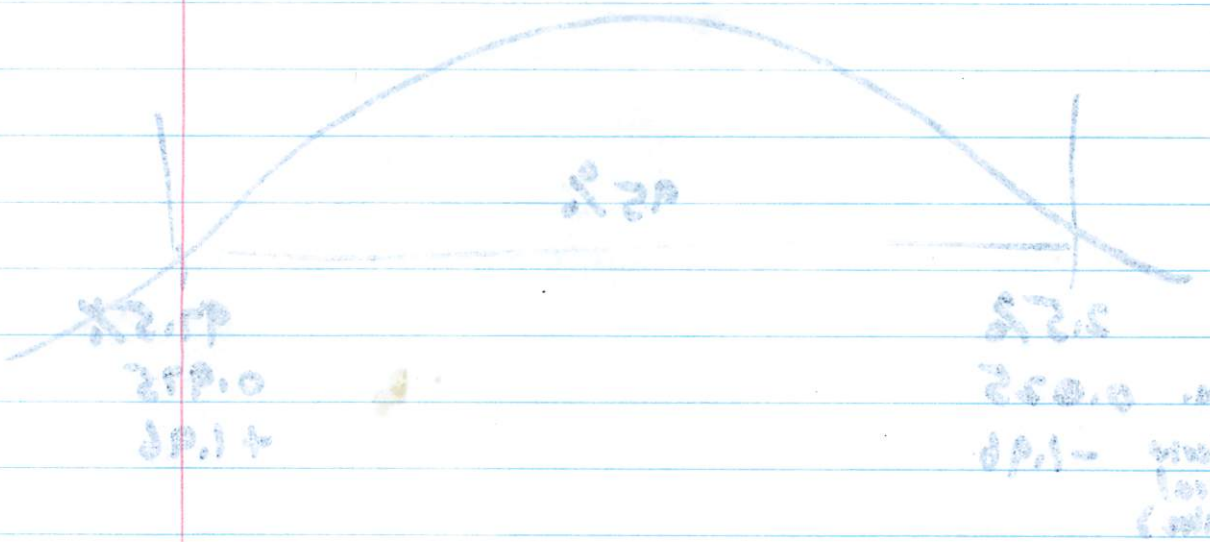
$$25\% - 8.5\% = 16.5\%$$

$$25\% + 8.5\% = 33.5\%$$

Confidence interval:

16.5% ~ 33.5%

(a)



$$\pm 1.96 \sqrt{\frac{(0.35)(0.75)}{100}}$$

$$= \pm 1.96 \sqrt{0.001969}$$

$$= (\pm 1.96)(0.044385)$$

$$= \pm 0.087$$

$$\approx \pm 8.7\%$$

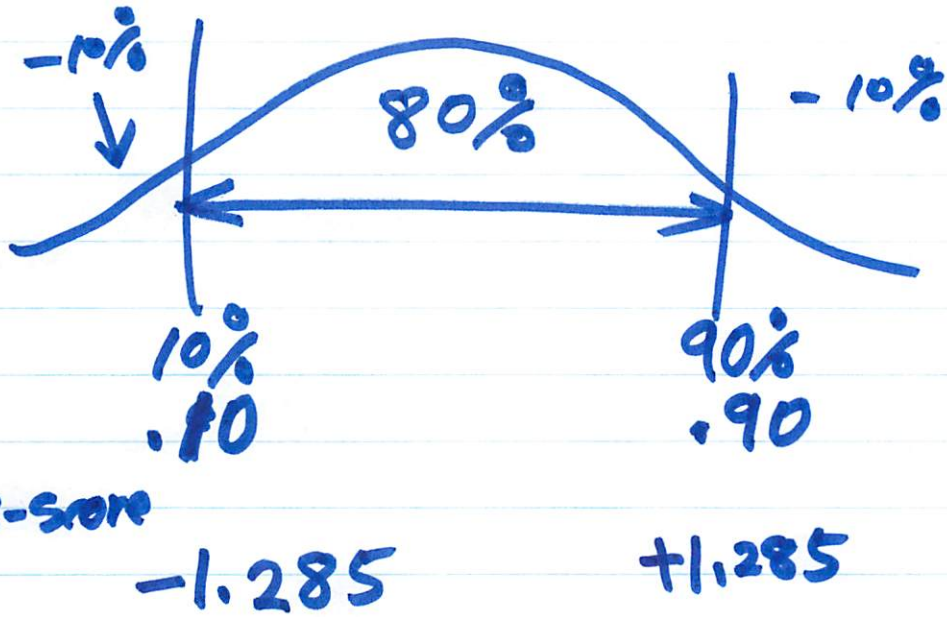
$$35\% - 8.7\% = 26.3\%$$

$$35\% + 8.7\% = 43.7\%$$

Confidence interval:

$$26.3\% \sim 43.7\%$$

1b)



$$\pm 1.285 \sqrt{\frac{(.25)(.75)}{80}}$$

$$\approx \pm 1.285 \sqrt{0.00234375}$$

$$\approx (\pm 1.285)(0.048412292)$$

$$\approx \pm 0.062209795$$

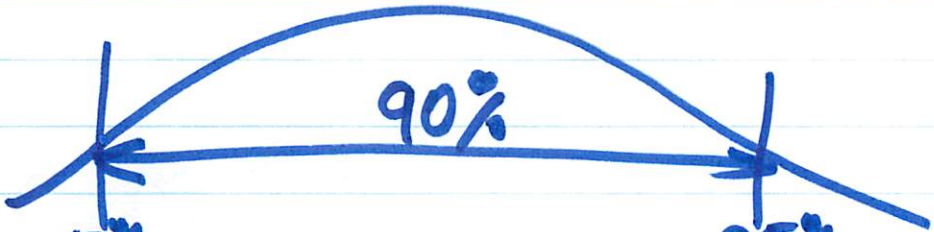
$$\approx \pm 6.2\%$$

Confidence interval: $18.8\% \sim 31.2\%$

$25 - 6.2 \approx 18.8$

$25 + 6.2 \approx 31.2$

2)



critical value (z-score)

-1.645 $+1.645$

$$\pm 1.645 \sqrt{\frac{(.375)(.625)}{64}}$$

$$\approx \pm 1.645 \sqrt{0.00366210 9}$$

$$\approx \pm 1.645 (0.060515362)$$

$$\approx \pm 0.0995 4777$$

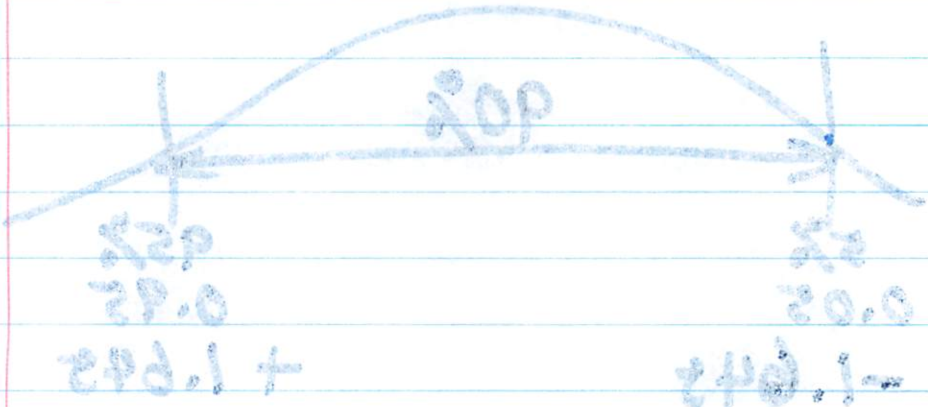
$$\approx \pm 10\%$$

Confidence Interval : 27.5% ~ 47.5%

$37.5\% - 10\% \approx 27.5\%$

$37.5\% + 10\% \approx 47.5\%$

2)



critical value (z-score)

$$\pm 1.645\sqrt{\frac{(.375)(.625)}{64}}$$

$x \pm 1.645\sqrt{0.003662109}$

$x \pm 1.645(0.060515962)$

$x \pm 0.099548777$

$x \pm 10\%$

Confidence Interval: 27.5% ~ 47.5%

$37.5\% - 10\% \approx 27.5\%$

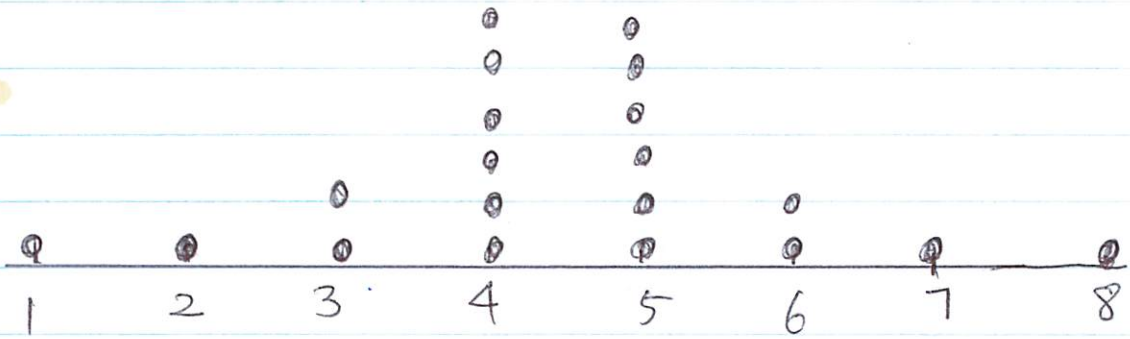
$37.5\% + 10\% \approx 47.5\%$

6) option 1) Use ten random integers,
where 001 — 060 make
061 — 100 missed.

option 2) use ten random integers,
where 00 — 59 make
60 — 99 missed.

option 3) use ten random integer,
where 0 — 5 make
6 — 9 missed

7)



8) $\frac{4}{20} \approx 20\%$

9) It's unlikely that 60% shooter makes 6 or more shots in 20 attemps.

10) $\pm 1.96\sqrt{\frac{(.30)(.70)}{500}}$

$\approx \pm 1.96\sqrt{0.00042}$

$\approx \pm 1.96\,(0.020493902)$

$\approx \pm 0.040$

$\approx \pm 4\%$

$30\% - 4\% = 26\%$

$30\% + 4\% = 34\%$

$26\% \sim 34\%$

11) null hypothesis $H_0 : \mu = 200$

alternate hypothesis $H_a : \mu < 200$

12) $\pm 0.02 = \pm 2.325 \sqrt{\frac{(0.8)(0.2)}{n}}$

$0.02 = (2.325)\sqrt{\frac{(0.8)(0.2)}{n}}$

$\frac{0.02}{2.325} = \sqrt{\frac{(0.8)(0.2)}{n}}$

$(0.00860215)^2 = \left(\sqrt{\frac{(0.8)(0.2)}{n}}\right)^2$

$0.000073997 = \frac{(0.8)(0.2)}{n}$

$\frac{0.000073997n}{0.000073997} = \frac{(0.8)(0.2)}{0.000073997}$

$n = 2162.249821$

$n \approx 2162$

14) a) $\frac{10}{50} = 0.2$ 20%

b) $\frac{30}{40} = .75$ 75%

20% completion rate is way lower than 70% of his completion rate.

15) a) $\sqrt{\frac{p(1-p)}{n}}$

$= \sqrt{\frac{(.3)(.7)}{520}}$

$= \sqrt{0.0004038461}$

≈ 0.02009592

≈ 0.02

15 b) $\pm 1.96 \sqrt{\frac{p(1-p)}{n}}$

$\approx (\pm 1.96)(0.02)$

≈ 0.0392

$\approx 3.92\%$

$30\% - 3.92\% = 26.08\%$

$30\% + 3.92\% = 33.92\%$

$26.08\% \sim 33.92\%$