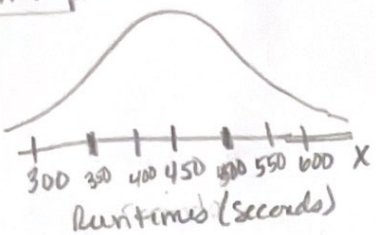
7.1-7.4 1-mile Run Times

① a)

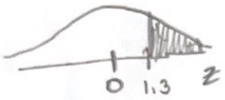


(b) + The proportion of 1-miles runs completed in less than 475 seconds is 0.6915.

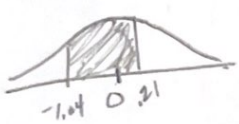
+ The probability of randomly selecting a 1-mile run that takes less than 475 seconds is 0.6915.

② a) 

L.A.: 0.9115 → $P(z < 1.35) = \underline{0.9115}$

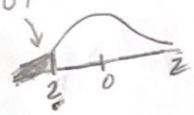
b) 

L.A: 0.9032 → $P(z > 1.3) = 1 - 0.932 = \underline{0.0968}$

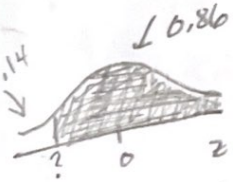
c) 

L.A $(z = -1.04) = 0.1492$ → $P(-1.04 < z < 0.21) = 0.5793 - 0.1492$

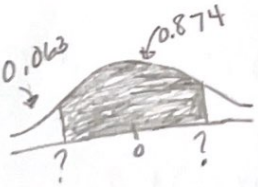
L.A $(z = 0.21) = 0.5793$ $P(-1.04 < z < 0.21) = \underline{0.4301}$

③ 0.09 a) 

Closest L.A = 0.0901 → $z = \underline{-1.34}$

b) 0.14 ↙ 0.86 

Closest L.A 0.1401 → $z = \underline{-1.18}$

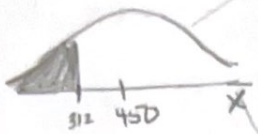
c) 0.063 ↙ 0.874 

$\frac{1 - .874}{2} = .063$ Closest LA: 0.0630 → $z = \underline{-1.54 \text{ & } 1.54}$

KNOW HOW TO USE The Z table For these questions ↑

USE: Z table or T184 for calculator Page 2

(4) $\mu = 450$, $\sigma = 60$, $X < 312$

① 

② By hand: $z = \frac{312-450}{60} = -2.30 \rightarrow L.A = 0.107$

$P(X < 312) = 0.0107$

② By T184 : DISTR → Normalcdf(-1E99, 312, 450, 60) $P(X<312) = 0.0107$

(5) $\mu = 900$, $\sigma = 50$, $775 < X < 990$

① 

② By HAND

$z = \frac{775-900}{50} = -2.50 \rightarrow LA = 0.0062$

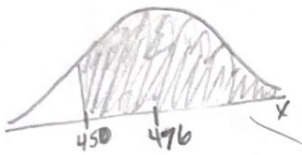
$z = \frac{990-900}{60} = 1.80 \rightarrow LA = 0.9641$

$P(775 < X < 990) = .9641 - .0062 = 0.9579$

② By T184 : DISTR → Normalcdf(775, 990, 900, 50)

$P(775 < X < 990) = 0.9579$

(6) $\mu = 476$, $\sigma = 30$, $X \geq 450$

① 

② By hand

$z = \frac{450-476}{30} = -0.87 \rightarrow LA = 0.1922$

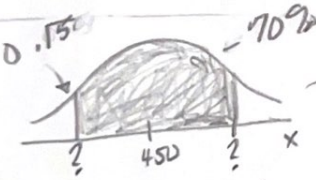
$P(X \geq 450) = 1 - 0.1922 = 0.8078$

② By T184: DISTR → Normal cdf (450, 1E99, 476, 30)

$P(X \geq 450) = 0.8078$

(7) $\mu = 450$, $\sigma = 50$

$\frac{1-.70}{2} = 0.15$



② By hand closest LA to 0.15 is 0.1492

$z = -1.04$ and 1.04

$X = Z\sigma + \mu = -1.04(50) + 450 = 398$

$X = Z\sigma + \mu = 1.04(50) + 450 = 502$

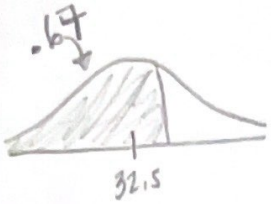
The cutoffs for the middle 70% is 398 seconds & 502 seconds

② BY T184 DISTR → INV NORM(.15, 450, 50) = 398.18

DISTR → INV Norm (1-.15, 450, 50) = 501.82

The middle 70% is cutoff by 398.2 seconds & 501.8 seconds.

(8) $\mu = 32.5$
$\sigma = 0.2$



By hand: Closest LA = .6700 → $z = 0.44$

$x = z\sigma + \mu = 0.44(0.2) + 32.5 = 32.588$

32.59 chips

By TI84: INV Norm (.67, 32.5, .2) = 32.58798...

32.59 chips

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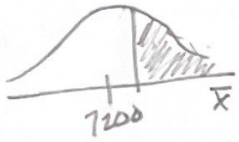
9) decreases and approaches zero.

10) $\sigma/\sqrt{n} = 9.6/\sqrt{64} = 1.2$ units

11) Center $\mu_{\bar{x}} = 2.2$, Spread $\sigma_{\bar{x}} = 6/\sqrt{100} = 0.6$, Shape $n = 100 \geq 30$ ✓

The sampling distribution of the sample mean of the number of violent crimes committed per day is normal with a mean of 2.2 crimes per day & a standard deviation of 0.6 crimes per day.

12) $n = 30$
$\mu_{\bar{x}} = 7200$
$\sigma_{\bar{x}} = 1200/\sqrt{30}$
$\bar{x} > 7500$



By hand: $\sigma/\sqrt{30} = \frac{1200}{\sqrt{30}} = 219.089023$

$z = \frac{7500 - 7200}{219.089023} = 1.37$ LA: .9147

$P(\bar{x} > 7500) = 1 - 0.9147 = 0.0853$

TI 84: DISTR → Normalcdf (7500, 1E99, 7200, $1200/\sqrt{30}$)

$P(\bar{x} > 7500) = 0.855$

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13) $\mu_{\hat{p}} = 0.87$

14) Center $\mu_{\hat{p}} = 0.25$, Spread $\sigma_{\hat{p}} = \sqrt{\frac{.25(1-.25)}{150}} = 0.0353553391$,

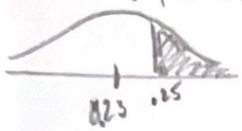
Shape
Simple random sample ✓ ✓
$np = 150(.25) = 37.5 \geq 10$
$n(1-p) = 150(.75) = 112.5 \geq 10$ ✓

$p = .25$
$n = 150$

The sampling distribution of the sample proportion of adults in that city with more than $12000 in credit card debt is normal with a mean of 0.87 and a standard deviation of approx 0.035.

15, $P(\hat{p} \geq .25)$?

By hand



$\mu_{\hat{p}} = 0.23$

$\sigma_{\hat{p}} = \sqrt{\frac{0.23(1-0.23)}{800}} = 0.014878676$

$Z = \frac{.25 - .23}{0.014878676} \approx 1.34$ LA: 0.9099

$P(\hat{p} \geq .25) = 1 - 0.9099 = .0901$

By TI84 DISTR → Normalcdf (.25, 1E99, .23, 0.014878676)

$P(\hat{p} \geq .25) = 0.0894$

Remember to sketch and shade the distributions as part of the answer when appropriate.