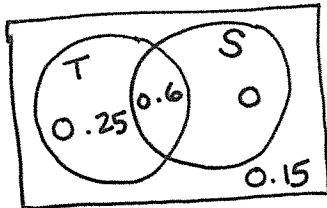


SOLUTIONS
 ASSIGNMENT #2
 MARCH 29, 2017
 201-401-DW
 TEACHER S. RICHER

①

②



0.15 OR 15% DO NOT
 BUY EITHER TEXTBOOK

③

Y	P(Y)	Y P(Y)	Y ² P(Y)
0 \$	0.15	0	0
41 \$	0	0	0
159 \$	0.25	39.75	6320.25
200 \$	0.60	120	24000
Σ		159.75	30320.25

④

$$\mu = \sum Y P(Y)$$

$$= \underline{159.75 \$}$$

⑤

$$\sigma = \sqrt{\sum Y^2 P(Y) - \mu^2}$$

$$= \sqrt{30320.25 - [159.75]^2}$$

$$= \underline{69.28 \$}$$

② BINOMIAL $n=8$ $p=0.3$ $q=0.7$

a) $P(X=0) = \binom{8}{0} (0.3)^0 (0.7)^8 = \boxed{0.058}$

b) $P(X=1) = \binom{8}{1} (0.3)^1 (0.7)^7 = \boxed{0.1977}$

c) $P(X=0) + P(X=1) = \boxed{0.256}$

d) $\mu = np = 8(0.3) = \boxed{2.4}$

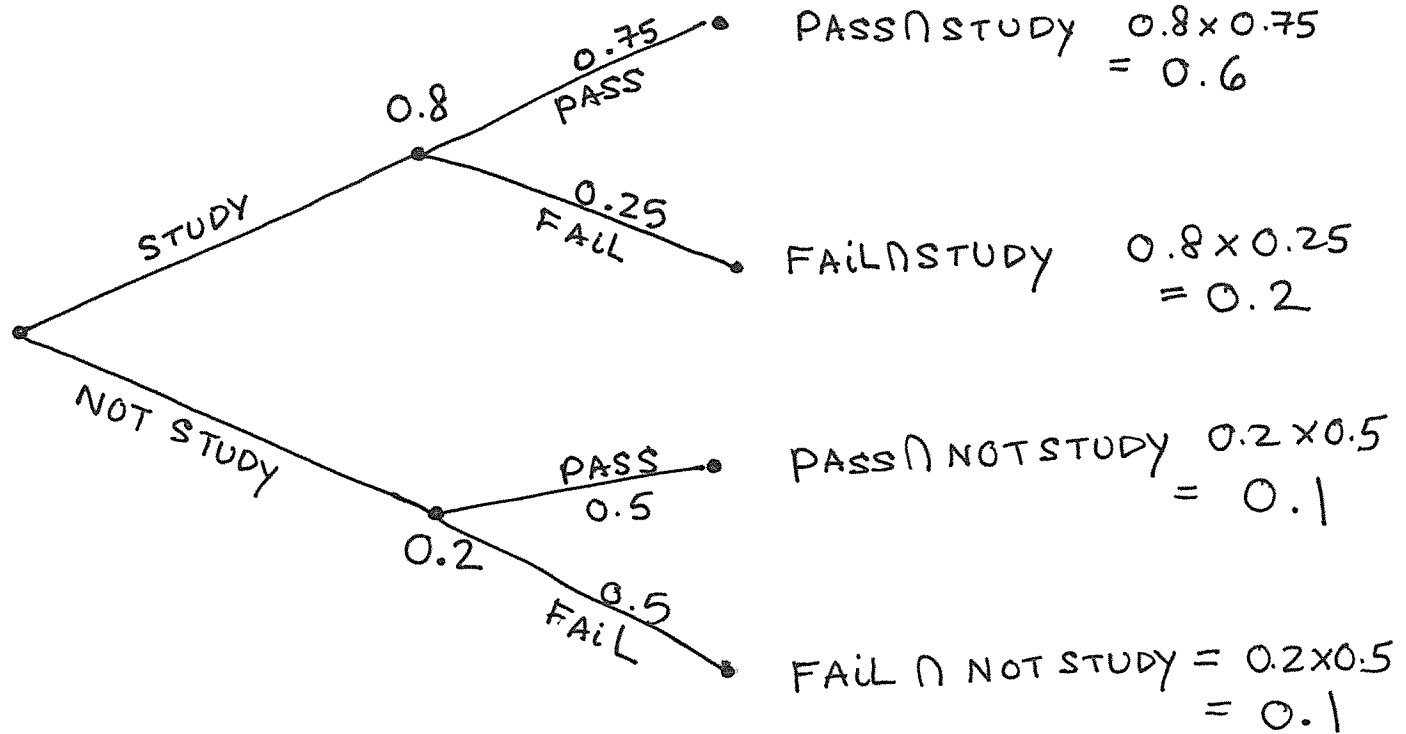
③ $\mu = \sum x P(x)$
 $= \boxed{2.6}$

$$\sigma = \sqrt{\sum x^2 P(x) - \mu^2}$$
$$= \sqrt{8.6 - (2.6)^2}$$
$$= \boxed{1.36}$$

X	P(X)	x P(X)	x ² P(X)
0	0	0	0
1	0.2	0.2	0.2
3	0.4	1.2	3.6
4	0.3	1.2	4.8
Σ		2.6	8.6

* PLEASE NOTE THAT THERE WAS A MISTAKE IN THE QUESTION. IN A PROBABILITY DISTRIBUTION TABLE THE SUM OF P(X) SHOULD BE = 1, IN THIS ONE $\Sigma P(X) = 0.9$

4

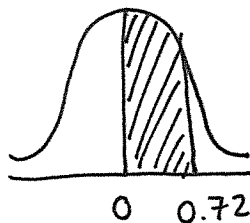


(a) $P(\text{PASSING}) = P(PASS \cap STUDY) + P(PASS \cap NOT STUDY)$
 $= 0.6 + 0.1$
 $= \boxed{0.7}$

(b) $P(\text{STUDY} | \text{PASS}) = \frac{P(\text{STUDY} \cap \text{PASS})}{P(\text{PASS})}$
 $= \frac{0.6}{0.7} = \boxed{0.857}$

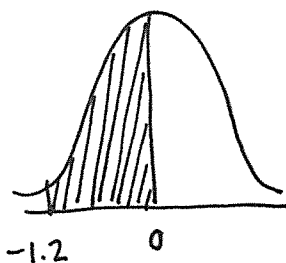
5

(a)

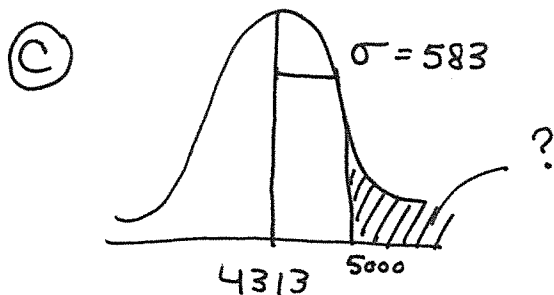


$P(0 < Z < 0.72) = 0.7642 - 0.5$
 $= \boxed{0.2642}$

(b)



$P(-1.2 < Z < 0) = 0.5 - 0.1151$
 $= \boxed{0.3849}$



$$Z_{5000} = 1.18$$

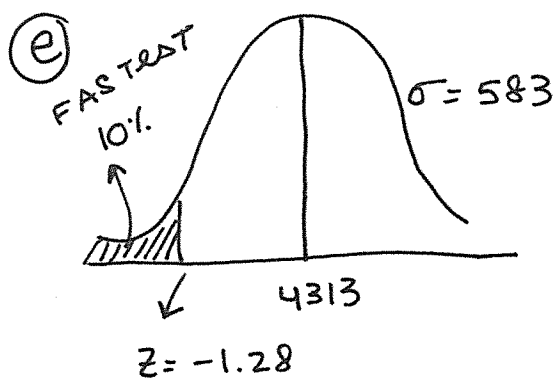
$$1 - P(Z < 1.18) = 1 - 0.8810 \\ = 0.119$$

LEO FINISHED FASTER THAN
11.9% OF people

d)

$$1 - P(Z < 0.53) \\ = 1 - 0.7019 \\ = 0.2981$$

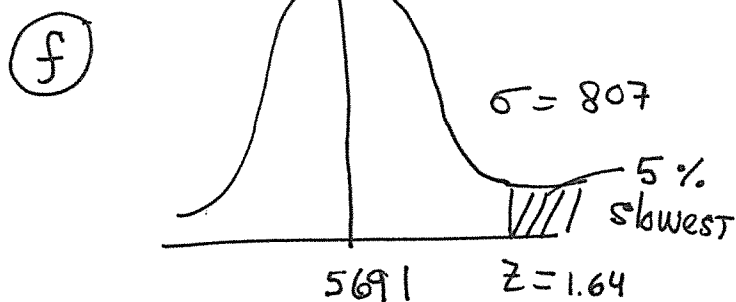
MARY FINISHED FASTER THAN
29.81% OF people



$$-1.28 = \frac{X - 4313}{583}$$

$$X = 3567$$

THE 10% FASTEST RUN IN
3567 SECONDS OR LESS

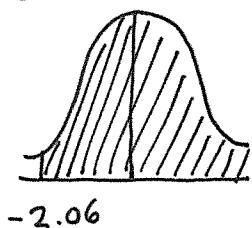


$$1.64 = \frac{X - 5261}{807}$$

$$X = 6585$$

THE 5% SLOWEST RUN
IN 6585 SECONDS OR
MORE

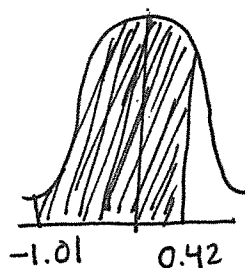
c) $P(Z > -2.06)$



$$= 1 - 0.0197$$

$$= \boxed{0.9803}$$

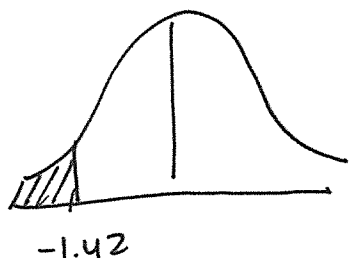
d) $P(-1.01 < Z < 0.42)$



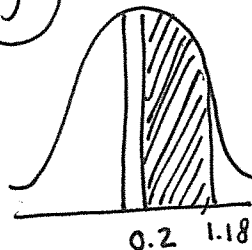
$$= 0.6628 - 0.1562$$

$$= \boxed{0.5066}$$

e) $P(Z < -1.42) = \boxed{0.0778}$



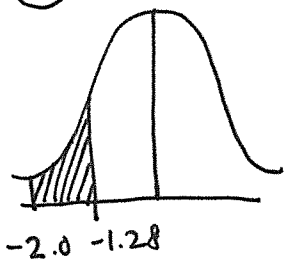
f) $P(0.2 < Z < 1.18)$



$$= 0.8810 - 0.5793$$

$$= \boxed{0.3017}$$

g) $P(-2.0 < Z < -1.28)$



$$= 0.1003 - 0.0228$$

$$= \boxed{0.0775}$$

6) a) $Z_{\text{Leo}} = \frac{5000 - 4313}{583} = 1.18$

$$Z_{\text{Mary}} = \frac{5691 - 5261}{807} = 0.53$$

BOTH Z-SCORES ARE POSITIVE WHICH MEANS BOTH LEO & MARY FINISHED SLOWER THAN AVERAGE

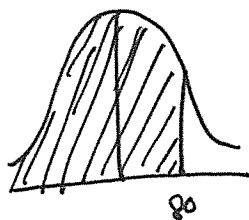
b) MARY DID BETTER THAN LEO BECAUSE SHE IS CLOSER TO THE GROUP AVERAGE, EVEN THOUGH SHE RAN IN A SLOWER TIME THAN LEO.

7

$$\mu = 72.6$$

$$\sigma = 4.78$$

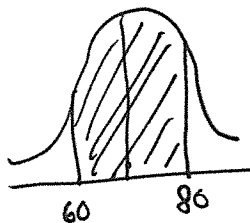
a



$$z = \frac{80 - 72.6}{4.78} = 1.55$$

$$P(Z < 1.55) = \boxed{0.9394}$$

b



$$z_{60} = \frac{60 - 72.6}{4.78} = -2.64$$

$$P(-2.64 < Z < 1.55) = 0.9394 - 0.0041 = \boxed{0.9353}$$

c

$$z = 1.64 \quad (95\%)$$

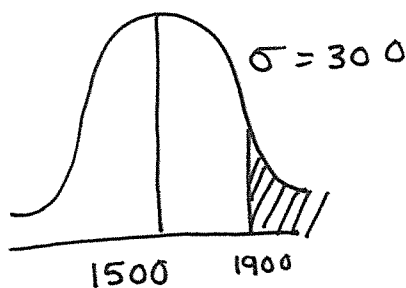
$$1.64 = \frac{x - 72.6}{4.78} = \boxed{80.44}$$

d

$$z = \frac{70 - 72.6}{4.78} = -0.544$$

$$P(Z > -0.544) = 1 - 0.2946 = \boxed{0.7054}$$

8



$$z_{1900} = \frac{1900 - 1500}{300} = 1.33$$

$$P(Z > 1.33) = 1 - 0.9082 = 0.0918$$

$$z_{2100} = \frac{2100 - 1500}{300} = 2$$

$$P(Z > 2) = 1 - 0.9772 = 0.0228$$

$$P(2100 \text{ or more among recognized students}) = \frac{0.0228}{0.0918} = \boxed{24.84\%}$$

9

We will use Normal Approximation
to the Binomial

With $p = 0.2$ (WATCHING EVENING NEWS)

$$q = 0.8$$

$$n = 2500$$

Since $np > 5$ & $nq > 5$ we can
use the Normal Approx

$$\text{With } \mu = np = 500$$

$$\sigma = \sqrt{npq} = 20$$

We want $P(X \leq 450)$

Since we are using Normal Approx. we
must add "0.5"

$$P(X \leq 450.5)$$

$$= P\left(Z \leq \frac{450.5 - 500}{20}\right)$$

$$= P(Z \leq -2.475)$$

$$= \boxed{0.0066}$$