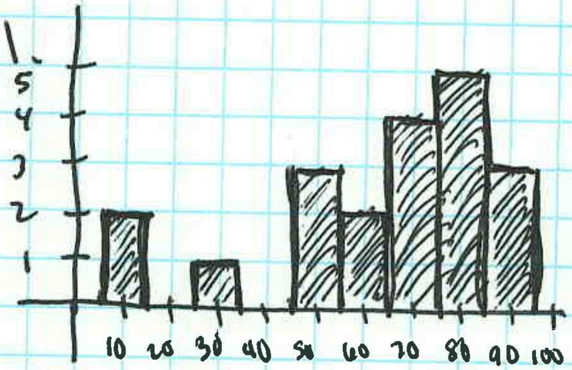
Ch 11 Review

1.

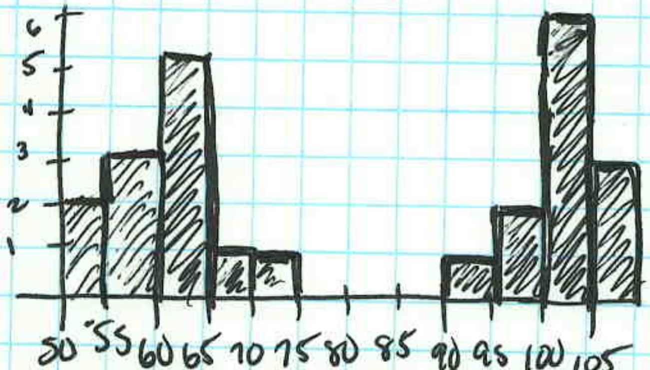


Skewed left (negative)

Use 5# sum due to skewed shape.

min	7	50% of
Q_1	50.5	the cities
Med	67	are between
Q_3	82.5	50.5 and
Max	90	82.5 miles.

2.



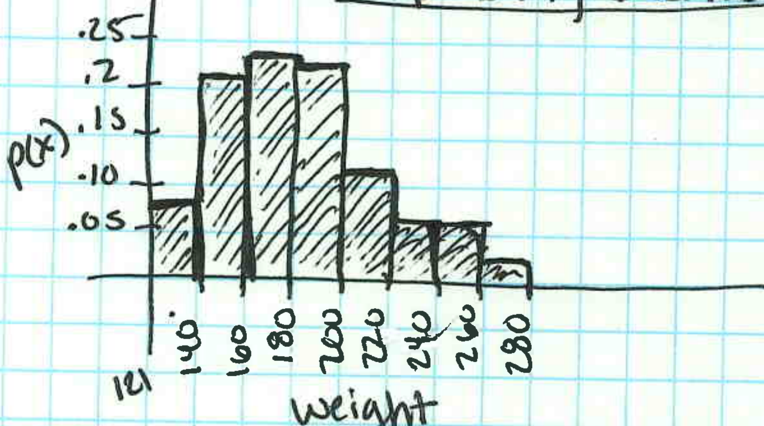
This is a bimodal distribution.

The data is separated into 2 groups → \$50-\$75, and \$90-\$105.

3.

		P(x)
121-140	46	.0782
141-160	120	.2041
161-180	135	.2296
181-200	130	.2211
201-220	70	.1190
221-240	40	.0680
241-260	34	.0578
261-280	13	.0221
	588	

Probability Distribution



4. mean score

Rate X	1	2	3
P(X)	0.19	0.22	0.59
X·P(x)	.19	.44	1.77

$\Sigma = 2.4$

$\mu = \Sigma(X \cdot P(x))$

$\mu = 2.4$

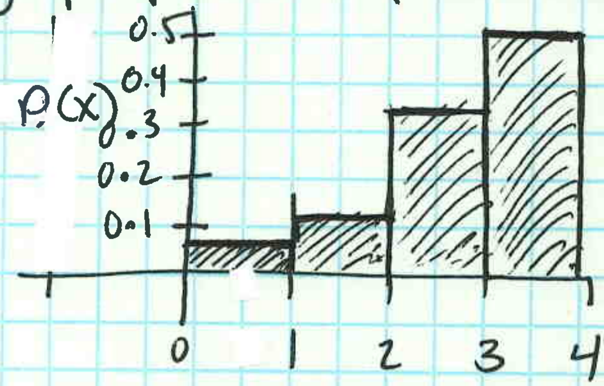
On average, employees were rated at 2.4.

5.

Rating X	0	1	2	3	Σ
Freq	5	9	28	42	84
P(x)	.060	.1071	.3333	.5	

$\frac{\text{Freq}}{84}$

graph probability distribution



mean, variance, std. dev.

$\mu = \sum X \cdot P(x)$

$(0 \cdot .060) + (1 \cdot .1071) + (2 \cdot .3333) + (3 \cdot .5) =$
$0 + .1071 + .6667 + 1.5 = \underline{2.2738 = \mu}$

X	$(x-\mu)$	$(x-\mu)^2$	$(x-\mu)^2 P(x)$
0	−2.2738	5.1702	0.3102
1	−1.2738	1.6226	0.1738
2	−.2738	.0750	0.4083
3	+.7262	.5274	0.2637

$\sigma^2 = \sum (x-\mu)^2 P(x) = \boxed{1.156}$

$\boxed{\sigma = 1.075}$

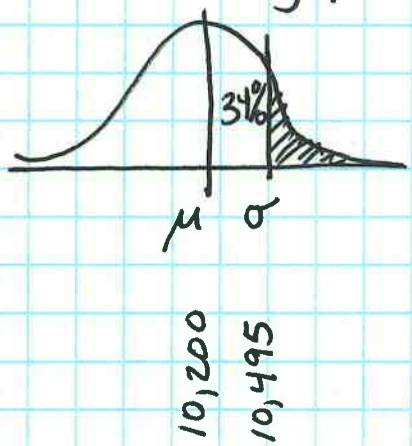
6.

	Rainy	dry
	−80,000	+540,000
x	.24	.76
	\$ −19,200 +	\$ 410,400

= \$391,200 expected profit for any given year.

7. 40 peaks, normal dist, $\mu = 10{,}200$ ft $\sigma = 295$ ft

how many peaks are over 10,495 ft tall



$50\% - 34\% = 16\%$

$40 \cdot .16 = 6.4$

6 peaks are over 10,495 ft.

8. Find Z, if $X = 36$, $\mu = 40$, $\sigma = 6$

$$z = \frac{36-40}{6} = \frac{-4}{6} = \boxed{\frac{-2}{3}}$$

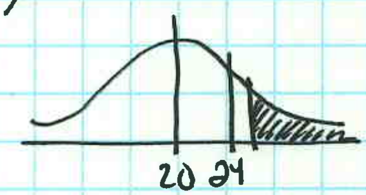
9. Find X if $z = 1.5$, $\mu = 1.3$, $\sigma = 0.6$

$$1.5 = \frac{X-1.3}{.6} \qquad .9 = X - 1.3$$

$$\boxed{X = 2.2}$$

10. Phone calls - 60 days, $\mu = 20$ calls $\sigma = 4$

find days $>$ 25 calls



$$z = \frac{25-20}{4} = \frac{5}{4} = \underline{1.25}$$

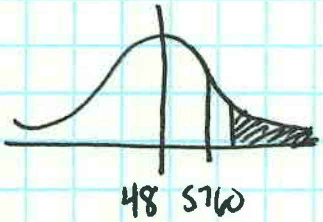
normcdf(1.25, 4) = .1056 (10.56%)

number of days $= 60 \cdot .1056 = 6.33$

6 day are over 25 calls

11. drive-thru teller $\mu = 48$ per day, $\sigma = 9$, 50 days

\# days w/ > 60



$$z = \frac{60-48}{9}$$

$$= \frac{12}{9} = \frac{4}{3} = 1.333$$

normcdf(1.333, 4) =

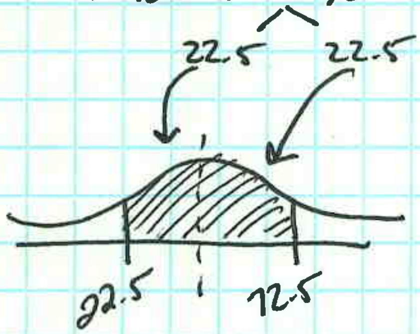
.0912

9%

days > 60 $\;.0912 \cdot 60 = 5.47$

≈ 5 days with more than 60 customers

12. middle 45%

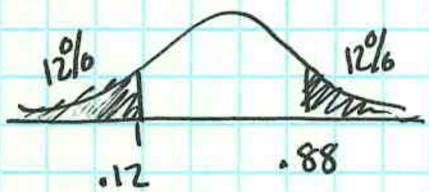


invnorm (.225) = −.7554

invnorm (.725) = + .7554

$-.7554 < z < .7554$

13. outer 24%

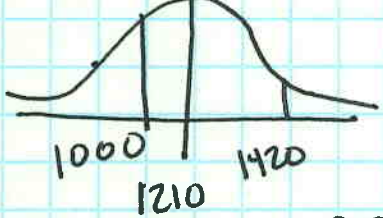


invnorm (.12) = −1.175

invnorm (.88) = +1.175

$z < -1.175 \qquad z > 1.175$

14. cars $\mu = 1210$ $\sigma = 220$ $\quad P(1000 < X < 1420)$



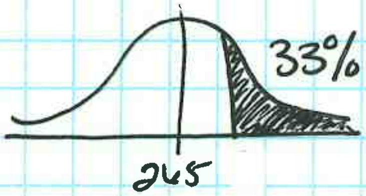
normcdf (1000, 1420, 1210, 220) =

66% chance that there are between 1000 & 1420 cars.

—OR— $z = \frac{1000-1210}{220} = -.9545$ $\quad$ normcdf(−.9545, .9545)

$z = \frac{1420-1210}{220} = .9545$ $\quad$ = 66%

15. bench press $\mu = 265$ $\sigma = 45$ top 33%



invnorm (.67) = .4399 = z

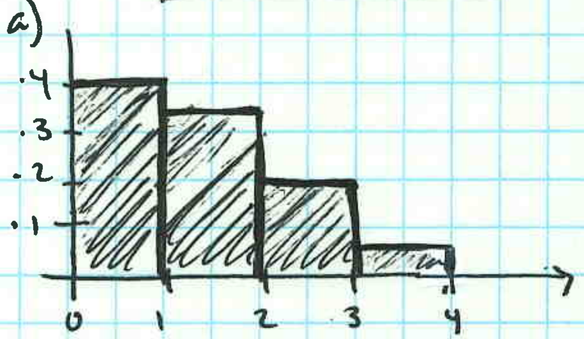
$z = \frac{X-265}{45}$ $.4399 = \frac{X-265}{45}$

$\boxed{X = 284.8 \text{ lbs.}}$

16.

Tests	Freq	P(X)
0	6	0.4
1	5	0.333
2	3	0.2
3	1	0.067

a)



b. $\mu = (0 \cdot .4) + (1 \cdot .333) + (2 \cdot .2) + (3 \cdot .067) =$
$0 + .333 + .4 + 0.201 = \underline{.934}$

most people have 1 test.

c.

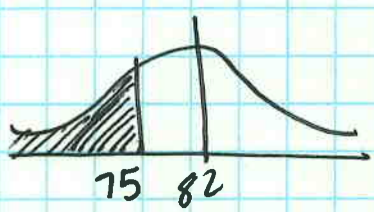
X	$(x-\mu)$	$(x-\mu)^2$	$\cdot$ P(x)
0	-.934	.872	.3488
1	.066	.004	.0013
2	1.066	1.136	.2272
3	2.066	4.27	.284

$\sigma^2 = 0.8633$

$\sigma = 0.929$

17. 20 trips $\mu = 82$ min $\sigma = 7.5$m

layovers < 75 min



$z = \frac{75-82}{7.5} = -.933$

normcdf $(-4, -.933) = .175$ 17.5% of flights had less than 75 minute layovers