summary statistics for Quiz #2. total of 12 points.

$$\overline{X} = 7.59$$
$$S = 3.83$$
$$Q_1 = 6.25$$
$$Q_2 = 9$$
$$Q_3 = 10.$$

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summary class 7.

conditional probabilities: $P(B|A) = \dfrac{P(B \text{ and } A)}{P(A)}$

Baye's Theorem: $P(A|B) = \dfrac{P(B|A)\,P(A)}{P(B)}$
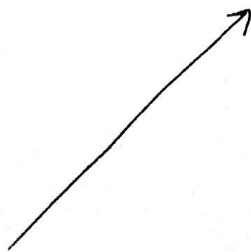
$\dfrac{P(A \text{ and } B)}{P(B)}$

random variables: $X \Big\langle$ discrete $\Big\langle$ discrete finite, discrete countable, continuous.

probability distribution: $P(x)$

$$0 \le P(x) \le 1$$
$$\Sigma\, P(x) = 1$$

parameters:

mean : $\mu = \sum x P(x)$

X	P(x)	X·P(x)
:	:	△
:	:	△
:	:	△
		☐

variance : $\sigma^2 = \sum (x - \mu)^2 P(x) > 0.$

standard deviation : $\sigma = \sqrt{\sigma^2} = \sqrt{\sum (x - \mu)^2 P(x)}$

significantly high value if it is greater $\mu + 2\sigma$
low less $\mu - 2\sigma$

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class 8. slide 4.

$\mu = 1$ $\sigma^2 = 0.5.$

$x = 2$ is observed.

$\mu + 2\sigma = 1 + 2\sqrt{0.5} = 2.4142.$

Because 2 is not greater than $\mu + 2\sigma = 2.4142$ two girls is not a significantly high value.

Let X be a random variable that describes the number of offspring peas that have green pods, from out of 5 offsprings.

a) is the Binomial prob. distribution a good fit?

yes, it make sense

b) P(3)

$$P(X) = \frac{n!}{(n-x)!\,x!}\, p^{x}\,(1-p)^{n-x}.$$

$n = 5$

$p = P(\text{"success"}) = P(\text{green pod}) = 0.75$

$$P(3) = \frac{5!}{(5-3)!\,3!}\ 0.75^{3}\,(1-0.75)^{5-3}$$

$$= \frac{1\cdot2\cdot3\cdot4\cdot5}{1\cdot2\cdot(1\cdot2\cdot3)}\ 0.75^{3}\,(1-0.75)^{2}$$

$$= 10 \cdot 0.75^{3}\,(0.25)^{2}$$

$$= 0.2636$$

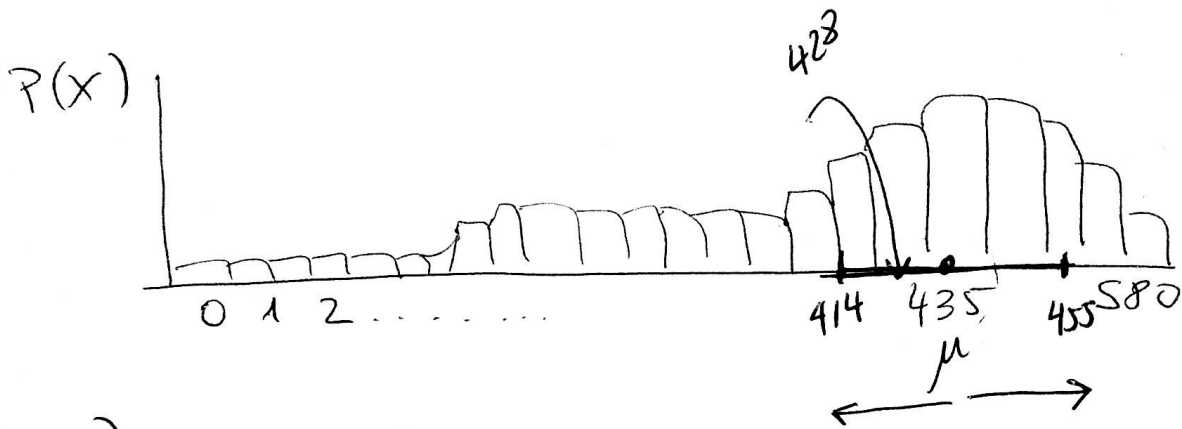$$\left(= \frac{0.309 + 0.205}{2}\right) = 0.257$$

c) $n = 580$
$p = 0.75$

c1) $\mu = n \cdot p = 580 \cdot 0.75 = 435$

$\sigma = \sqrt{np(1-p)} = \sqrt{580 \cdot 0.75 \, (1-0.75)}$

$= \sqrt{580 \cdot 0.75 \cdot 0.25}$

$= 10.4283.$

c2) $X = 428.$

is 428 significantly high?

$\mu + 2\sigma = 435 + 2 \cdot 10.4283 = 455.8566.$
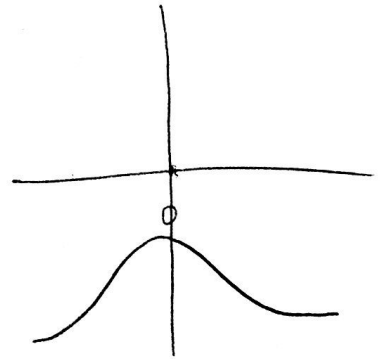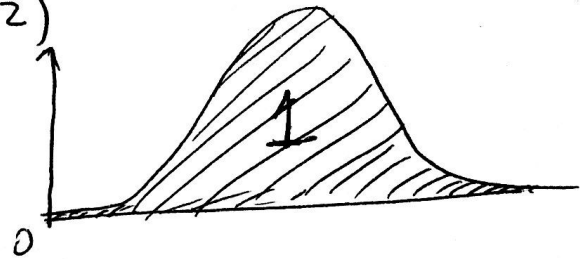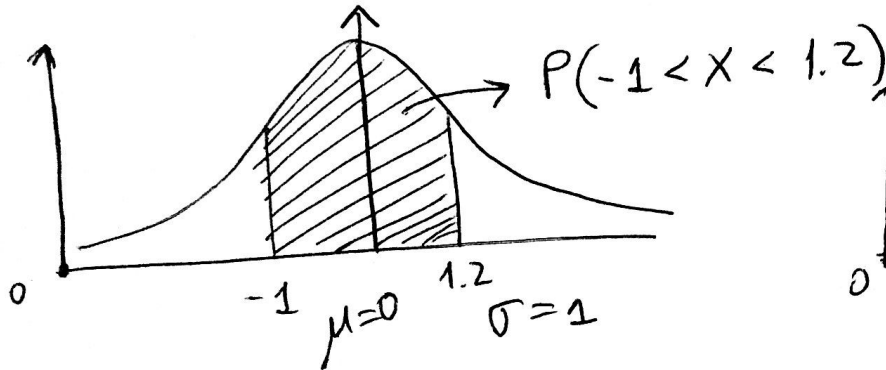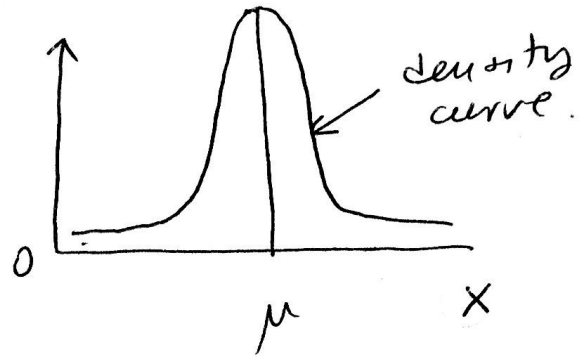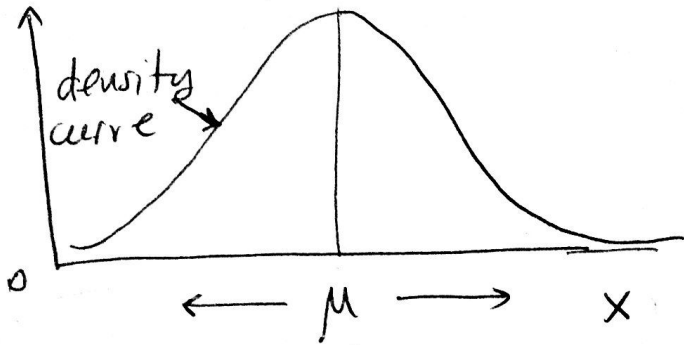
So, 428 is not a significantly high value. So, assuming $p=0.75$ makes sense

if $\mu + 2\sigma = 300.$

$\mu - 2\sigma = 414.1434.$ the value 428
is not significantly low.

Slide 12.

X is a continuous random variable.
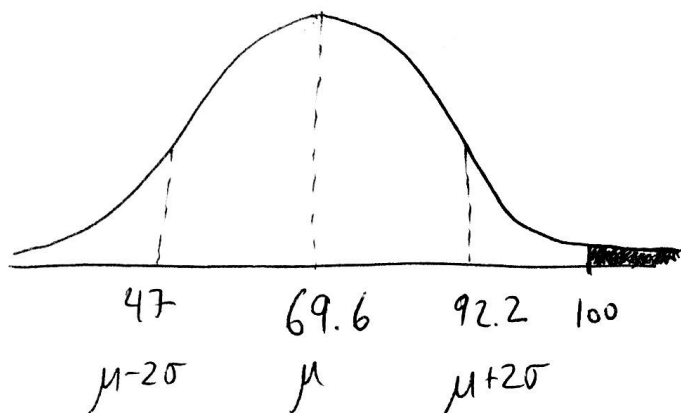X follows the normal probability distribution.

density curve

density curve

$P(-1 < X < 1.2)$

-1 $\mu = 0$ 1.2 $\sigma = 1$

1

let X be the random variable that describes
the pulse rate of adult males.

$\mu = 69.6$ $\qquad \sigma = 11.3$.

$\mu + 2\sigma = 92.2$
$\mu - 2\sigma = 47.$

a)

47 $\qquad$ 69.6 $\qquad$ 92.2 $\qquad$ 100

$\mu - 2\sigma \qquad \mu \qquad \mu + 2\sigma$

b) $P(\underline{\text{pulse rate of adult males}} > 100)$

$\qquad = P(X > 100)$