

Precalc Semester Review Day 3

APPLICATIONS OF LOGS

A farmer purchases a new combine for \$500,000. Its value decreases at 15% per year. When will its value have dropped to \$200,000?

$$N = N_0 (1 \pm r)^t$$

$$\frac{200,000}{500,000} = \frac{500,000 (1 - 0.15)^t}{500,000}$$

$$0.4 = 0.85^t$$

$$\frac{\log(0.4)}{\log(0.85)} = \frac{t \cdot \log(0.85)}{\log(0.85)}$$

$$5.6 = t$$

$$y = -e^{x-4} - 3$$

Right 4 Down 3

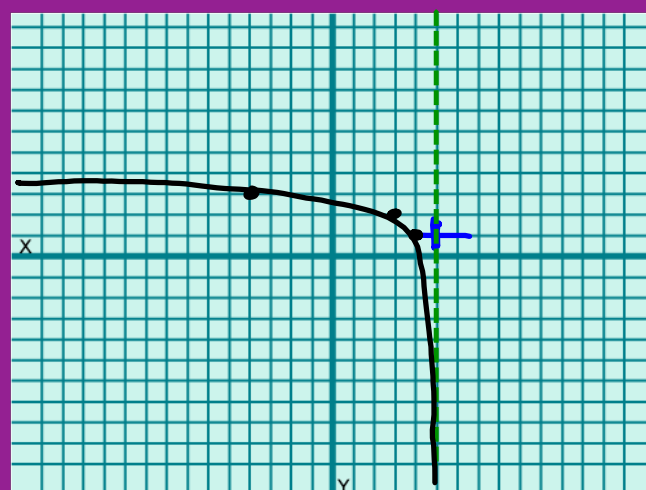
$$2^x$$

$$\begin{array}{r} e^0 \\ 0 \quad 1 \\ 1 \quad 2.7 \\ 2 \quad 7.4 \end{array}$$

$$y = \log_3(5-x) + 1$$

-(x-5)
Right 5 Up 1

x	y
-1	0
-3	1
-9	2



St. Dev.

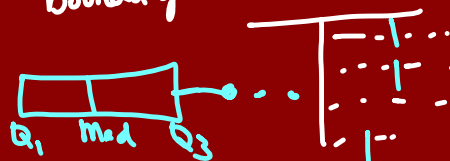
- 1) Find mean.
- 2) Data - mean
- 3) Square difference
- 4) Find mean of squares
- 5) $\sqrt{\quad}$

Outliers

$$IQR \neq 1.5 = \#$$

$$\text{Lower boundary} = Q_1 - \#$$

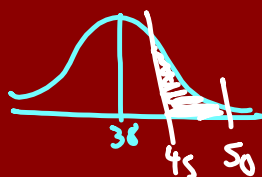
$$\text{Upper boundary} = Q_3 + \#$$

population data - Normal Distribution

(May use
normalcdf &
InvNorm on
calculator)

$$Z = \frac{X - \mu}{\sigma} = \frac{\text{Raw score} - \text{Mean}}{\text{St. Dev.}}$$

The number of text messages sent by 800 teens at Chaparral HS is normally distributed with a mean of 38 + a st. dev of 7. How many teens send between 45 + 50 texts per day?

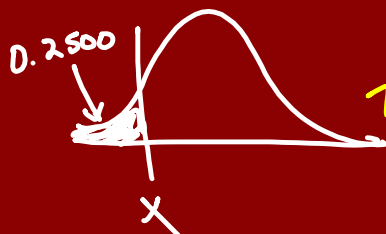


$$Z = \frac{45 - 38}{7} = 1.00 \quad 0.3913 \quad 0.4954$$

$$Z = \frac{50 - 38}{7} = \frac{12}{7} = 1.71 \quad 0.4564 \quad \frac{0.4954 - 0.3913}{0.1151}$$

$$\frac{0.1151}{\times 800} = 92$$

What number of text messages is the cutoff line for the lowest 25%?



$$-0.67 = \frac{X - 38}{7}$$

$$-4.69 = X - 38$$

$$33.31 = X$$

$$\approx 33 \text{ text message}$$

Confidence Intervals - an interval where pop. mean exists with % confid.

$$\sigma_{\bar{x}} = \frac{s}{\sqrt{n}}$$

$$E = Z \cdot \sigma_{\bar{x}}$$

$$\bar{x} \pm E$$

90% conf.



A sample of 64 families in an upper class area of L.A. found the mean amount spent for Christmas gifts per family member was \$8000 with a st. dev of \$1000. Find a 90% conf. interval.

$$\sigma_{\bar{x}} = \frac{s}{\sqrt{n}} = \frac{1000}{\sqrt{64}} = 125$$

based on
% conf.

$$E = Z \cdot \sigma_{\bar{x}} = 1.65 * 125 = 206.25$$



$$8000 \pm \$206.25$$

$$\$7793.75 - \$8206.25$$

$$Z^* = \frac{\mu - \bar{x}}{\sigma_{\bar{x}}}$$

NC students 100 = 28 text message

$$\text{pop.} = \mu = 38 \quad \sigma = 7 \quad p < 0.05$$

Hyp: NC students send less text messages.

$$\mu < 38$$

$$\sigma_{\bar{x}} = \frac{7}{\sqrt{100}} = 0.7$$



$$Z^* = \frac{38 - 28}{0.7}$$

$$Z^* = 14.3$$

$$P = 0.0001$$

NC students send less messages.

PROBABILITY

May use binomialpdf &
binomialcdf on calculator



Combinations

Indiv.

Binomial

Must
select
3

No Repl.

No Order

Dep.

Has Repl.

No Order

Indep

Indep.

2 possible outcomes

$$nC_r ()^2 ()^3$$

Conditional

$$P(A|B) = \frac{P(AB)}{P(B)}$$

— OR —

+

Look out for overlaps

Expected Value = (prob.) (gain/loss)

Event		
Prob		
Gain/ Loss		