

Disc. Sec 1 (19)

how to measure change: AMS7 disc. sec. 1

year	# annual cancer deaths
1970	331,000
1985	462,000

2 methods

1
12 Apr 17

① absolute:

$$\begin{aligned}
 (Y_{after} - Y_{before}) &= 462,000 \\
 &- 331,000
 \end{aligned}$$

131,000

there were 131,000 more cancer deaths in 1985 than in 1970

② relative:

$$\frac{Y_{after} - Y_{before}}{Y_{before}} = \frac{462,000 - 331,000}{331,000}$$

$$= \frac{\begin{array}{r} \text{3 sig figs} \\ \hline 131 \\ \hline 331 \\ \hline \end{array}}{\begin{array}{r} \text{3 sig figs} \\ \hline 331 \\ \hline \end{array}} = \frac{0.39877039}{0.33} = 0.39877039 \text{ (2)} \leftarrow$$

$$\leftarrow \underline{\underline{2749245}}$$

$$= 39.6\% \leftarrow$$

there were 39.6% more cancer deaths in 1985 than in 1970

one reason for increase: ^{U.S.} population increased from 1970 to 1985

but this by itself can't account for the entire increase because it seems highly likely that the pop. increase in U.S. from 1970 to 1985 was $< 39.6\%$

another part of the story:
 medicine gets better over time at
 correctly identifying the cause of
death; the U.S. might just have
 gotten better at correctly saying
 when the cause of death was
 cancer

better
 measures:

$$\frac{\text{\textcircled{A}} \# \text{ cancer deaths/yr}}{\# \text{ cases reported/yr}}$$

$\text{\textcircled{B}}$ 5-year survival rate: $\frac{\# \text{ alive at year T+5}}{\# \text{ diagnosed at year T}}$

problem 3 studying: litter size in foxes

④

pups
 3
 7
 1
 4
 :
 :
 :

quantitative,
 discrete, ratio
 hist? yes

$n = ?$

1 row

for

more
 informative
 than

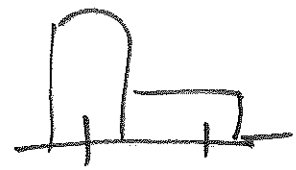
for each litter
~~for~~

no
 yes
 no
 no
 :

yes = 6 or more
 no = 5 or fewer

qualitative,
 nominal,
 dichotomous

hist? no



equally
 informative

0
 1
 0
 0
 :
 :

1 = yes
 0 = no

quantitative

mean

% of fox litters is

but this is sample with **6+** pups
 more convenient for analysis

(b)

phosphate conc.
 0.473 $\mu\text{M}/\text{L}$
 0.591
 1.368
 ;

$n = 60$

1 row for each stream

quant., continuous, ratio

hist. ? \checkmark

(c)

temp. at which ...

21.2 ($^{\circ}\text{C}$)
 20.7
 ;

$n = 44$

1 row for each night

quant., (conc.) cont., interval

(d)

type
 turtle
 snake
 mammal
 snake
 ;

(amph., ..., man.)

1 row for each animal

hist. ?

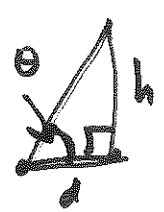
no

qual., nominal, not dich.

1(b)

size of a tree?

67

variable	cost	method
height	a bit more expensive	trig 
diameter at 1.37m above ground	cheap ($2r = d$)	direct meas.
volume	most expensive	$V = \frac{4}{3} \pi r^2 h$