

Help

```
apropos()
?
??
example()
```

Basic Calculations

Basic calculation works like a calculator.

```
# basic ops: + - * / ^ ( )
log(); exp(); sqrt()
log10(); abs(); choose()
```

Formula Interface

The following syntax (often with some parts omitted) is used for graphical summaries, numerical summaries, and inference procedures.

```
goal(y ~ x | z, data=...,
     groups=...)
```

For plots:

- **y**: is y-axis variable
- **x**: is x-axis variable
- **z**: conditioning variable (separate panels)
- **groups**: conditioning variable (overlaid graphs)

For other things:

'**y ~ x | z**' can usually be read '**y** is modeled by (or depends on) **x** differently for each **z**'.

See the sampler for examples.

Numerical Summaries

These functions have a formula interface to match plotting.

```
favstats() # mosaic
tally() # mosaic
mean() # mosaic augmented
median() # mosaic augmented
sd() # mosaic augmented
var() # mosaic augmented
diffmean() # mosaic
```

```
quantile() # mosaic augmented
prop() # mosaic
perc() # mosaic
rank()
IQR() # mosaic augmented
min(); max() # mosaic augmented
```

Graphics (mostly lattice)

```
bwplot()
xyplot()
histogram() # mosaic augmented
densityplot()
freqpolygon() # mosaic
qqmath()
makeFun() # mosaic
plotFun() # mosaic
```

```
ladd() # mosaic
dotPlot() # mosaic
bargraph() # mosaic
xqqmath() # mosaic
```

```
mplot(data=HELPrct, 'scatter')
mplot(data=HELPrct, 'boxplot')
mplot(data=HELPrct, 'histogram')
```

Randomization/Simulation

```
rflip() # mosaic
do() # mosaic
sample() # mosaic augmented
resample() # with replacement
shuffle() # mosaic
rbinom()
rnorm() # etc, if needed
```

Distributions

```
pbinom(); pnorm();
xpnorm() # mosaic augmented
pchisq(); pt()
qbinom(); qnorm();
qchisq(); qt()
plotDist() # mosaic
```

Inference

```
t.test() # mosaic augmented
binom.test() # mosaic augmented
prop.test() # mosaic augmented
xchisq.test() # mosaic augmented
fisher.test()
pval() # mosaic
model <- lm() # linear models
summary(model)
coef(model)
confint(model) # mosaic augmented
anova(model)
makeFun(model) # mosaic
resid(model); fitted(model)
mplot(model) # mosaic
```

```
mplot(TukeyHSD(model))
model <- glm() # logistic reg.
```

Data

```
read.file() # mosaic
nrow(); ncol(); dim()
summary()
str()
names()
head(); tail()
with()
factor()
```

```
ntiles() # mosaic
cut()
c()
cbind(); rbind()
colnames()
rownames()
relevel()
reorder()
```

```
rep()
seq()
sort()
rank()
```

Data Transformation

```
select() # dplyr
mutate() # dplyr
filter() # dplyr
arrange() # dplyr
summarise() # dplyr
group_by() # dplyr
left_join() # dplyr
inner_join() # dplyr
merge()
```

```
rflip(6)
```

```
Flipping 6 coins [ Prob(Heads) = 0.5 ] ...
```

```
T H T H H T
```

```
Number of Heads: 3 [Proportion Heads: 0.5]
```

```
do(2) * rflip(6)
```

```
  n heads tails  prop
1 6     4     2 0.6667
2 6     3     3 0.5000
```

```
coins <- do(1000) * rflip(6)
tally(~heads, data = coins)
```

```
 0  1  2  3  4  5  6
10 85 241 311 250 82 21
```

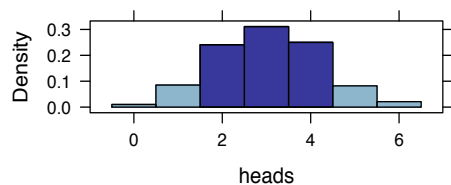
```
tally(~heads, data = coins, format = "perc")
```

```
 0  1  2  3  4  5  6
1.0 8.5 24.1 31.1 25.0 8.2 2.1
```

```
tally(~(heads >= 5 | heads <= 1), data = coins)
```

```
TRUE FALSE
198  802
```

```
histogram(~heads, data = coins, width = 1,
  groups = (heads >= 5 | heads <= 1))
```



```
tally(~sex + substance, data = HELPrct)
```

```
      substance
sex    alcohol cocaine heroin
female   36      41     30
male   141     111     94
```

```
mean(age ~ sex, data = HELPrct)
```

```
female  male
36.25  35.47
```

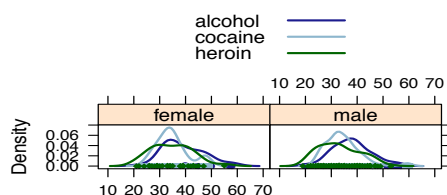
```
diffmean(age ~ sex, data = HELPrct)
```

```
diffmean
-0.7841
```

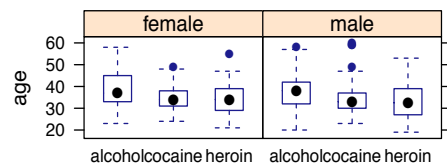
```
favstats(age ~ sex, data = HELPrct)
```

```
  .group min Q1 median  Q3 max mean
1 female  21 31   35 40.5 58 36.25
2  male  19 30   35 40.0 60 35.47
   sd  n missing
1 7.585 107     0
2 7.750 346     0
```

```
densityplot(~age | sex, groups = substance,
  data = HELPrct, auto.key = TRUE)
```



```
bwplot(age ~ substance | sex, data = HELPrct)
```



```
pval(binom.test(~sex, data = HELPrct))
```

```
p.value
1.932e-30
```

```
confint(t.test(~age, data = HELPrct))
```

```
mean of x      lower      upper      level
35.65         34.94         36.37         0.95
```

```
model <- lm(weight ~ height + gender,
  data=Heightweight)
```

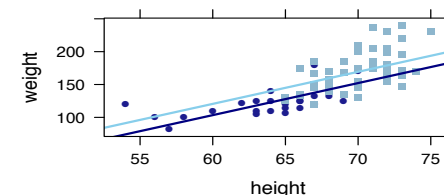
```
wt <- makeFun(model)
wt( height=72, gender="male")
```

```
1
179.1
```

```
xyplot(weight ~ height, groups=gender,
  data=Heightweight)
```

```
plotFun(wt(h,gender="male") ~ h,
  add=TRUE, col="skyblue")
```

```
plotFun(wt(h,gender="female") ~ h,
  add=TRUE, col="navy")
```



```
plotDist("chisq", df = 4)
```

