In [1]:

```
#12.1
library(vctrs)
library(tidyverse)
head(mpg)
mpg %>% ggplot()
```

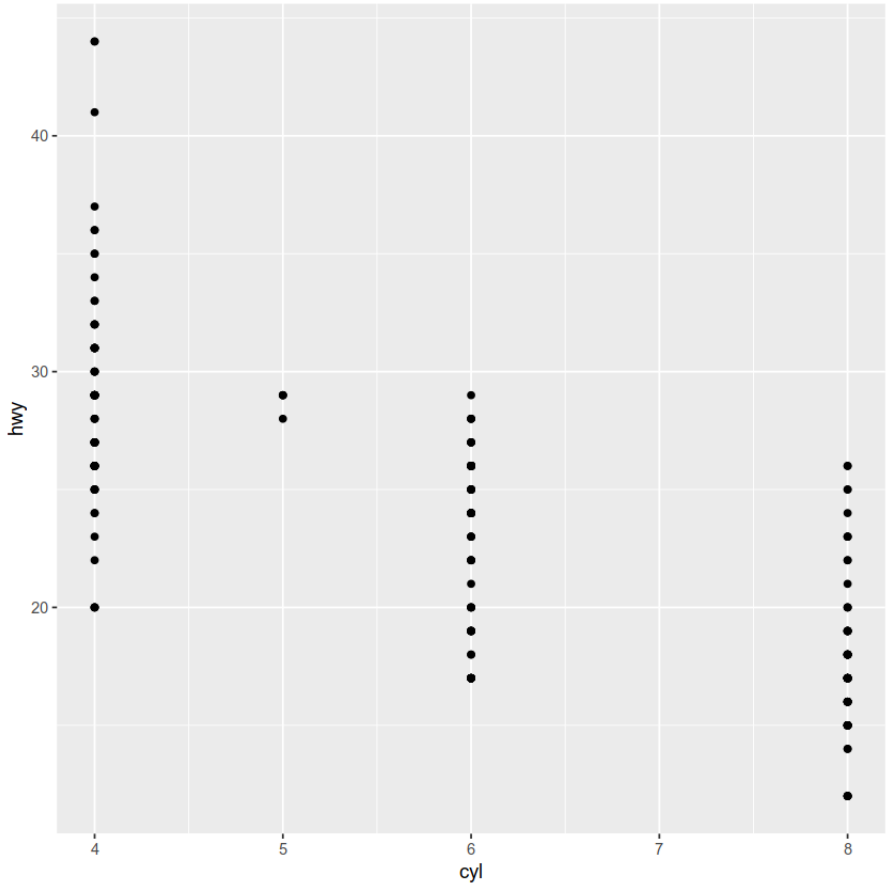
```
── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0
──
✔ dplyr     1.1.3     ✔ readr     2.1.4
✔ forcats   1.0.0     ✔ stringr   1.5.0
✔ ggplot2   3.4.4     ✔ tibble    3.2.1
✔ lubridate 1.9.3     ✔ tidyr     1.3.0
✔ purrr     1.0.2
── Conflicts ────────────────────────────────────────── tidyverse_conflicts()
──
✖ dplyr::data_frame() masks tibble::data_frame(), vctrs::data_frame()
✖ dplyr::filter()     masks stats::filter()
✖ dplyr::lag()        masks stats::lag()
ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all co
nflicts to become errors
```

A tibble: 6 × 11

manufacturer	model	displ	year	cyl	trans	drv	cty	hwy	fl	class
<chr>	<chr>	<dbl>	<int>	<int>	<chr>	<chr>	<int>	<int>	<chr>	<chr>
audi	a4	1.8	1999	4	auto(l5)	f	18	29	p	compact
audi	a4	1.8	1999	4	manual(m5)	f	21	29	p	compact
audi	a4	2.0	2008	4	manual(m6)	f	20	31	p	compact
audi	a4	2.0	2008	4	auto(av)	f	21	30	p	compact
audi	a4	2.8	1999	6	auto(l5)	f	16	26	p	compact
audi	a4	2.8	1999	6	manual(m5)	f	18	26	p	compact

In [2]:

```
#12.2
mpg %>%
    ggplot(aes(x=cyl, y=hwy))+
        geom_point()
```



In [ ]:
```
#12.3
scatterplot;
typically does not display cateogircal variables.
```

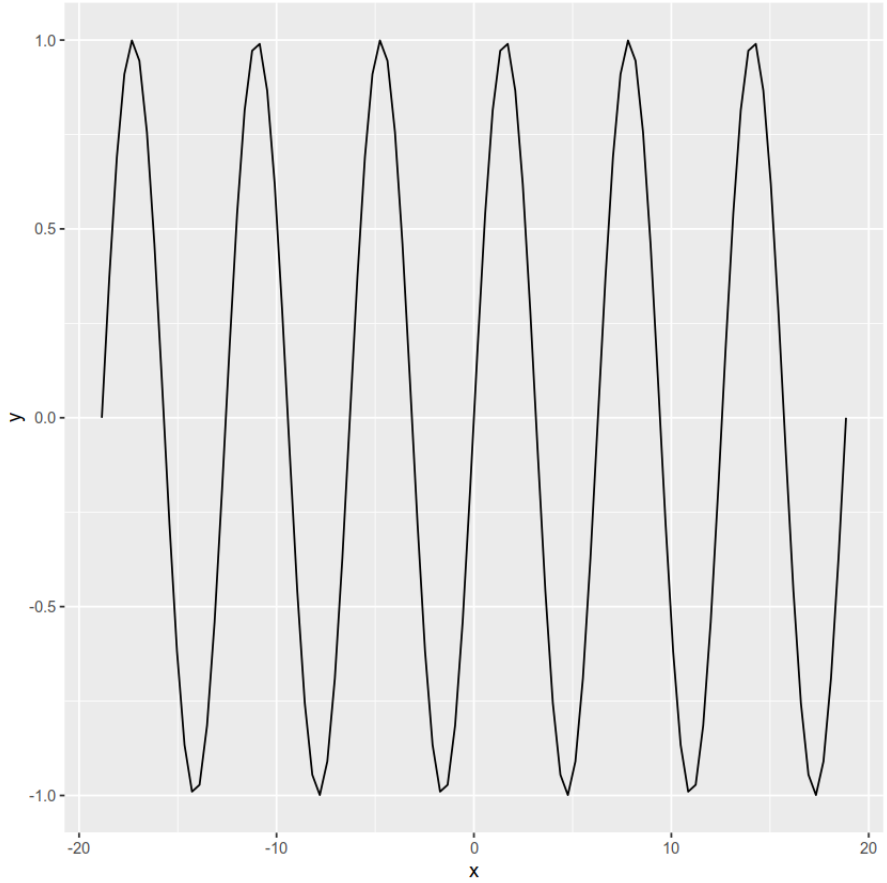
In [4]:
```
#12.4
x<-seq(-6*pi, 6*pi, length.out=100)
y<-sin(x)
dat<-data.frame(x=x,y=y)
head(dat)
```

A data.frame: 6 × 2

	x	y
	<dbl>	<dbl>
1	-18.84956	7.347881e-16
2	-18.46876	3.716625e-01
3	-18.08796	6.900790e-01
4	-17.70716	9.096320e-01
5	-17.32636	9.988673e-01
6	-16.94556	9.450008e-01

In [5]:

```
ggplot(data=dat,
       mapping=aes(x=x,y=y))+
        geom_line()
```

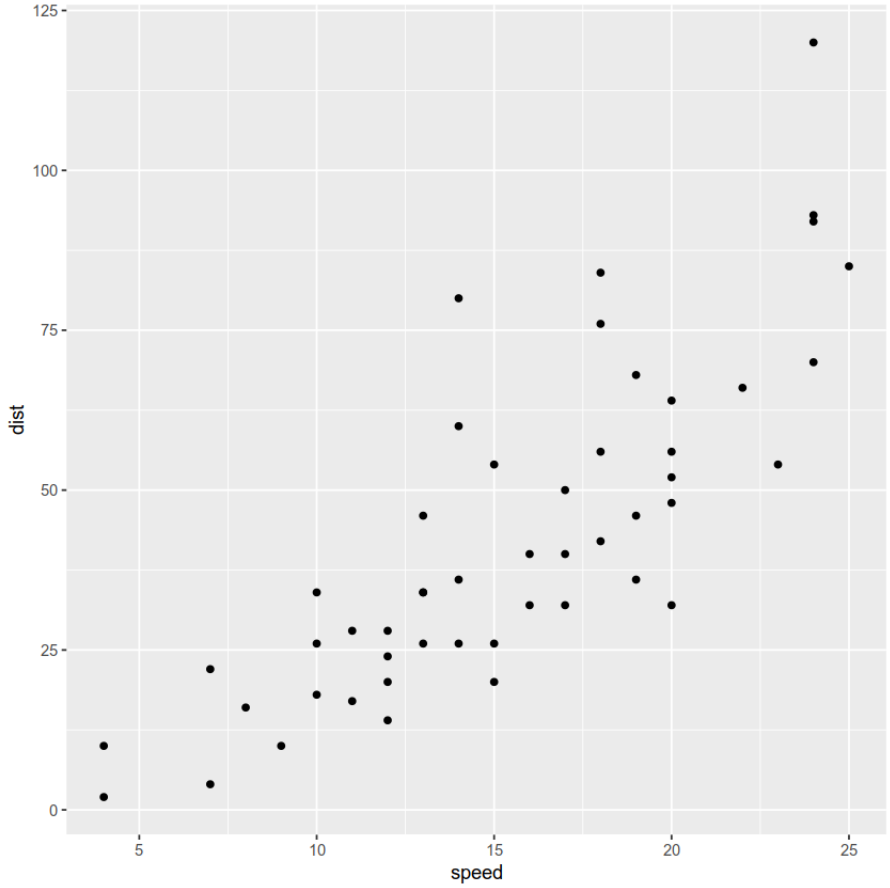


In [9]:

```
#12.5
head(cars)
cars %>%
    ggplot(aes(x=speed, y=dist))+
    geom_point()
```

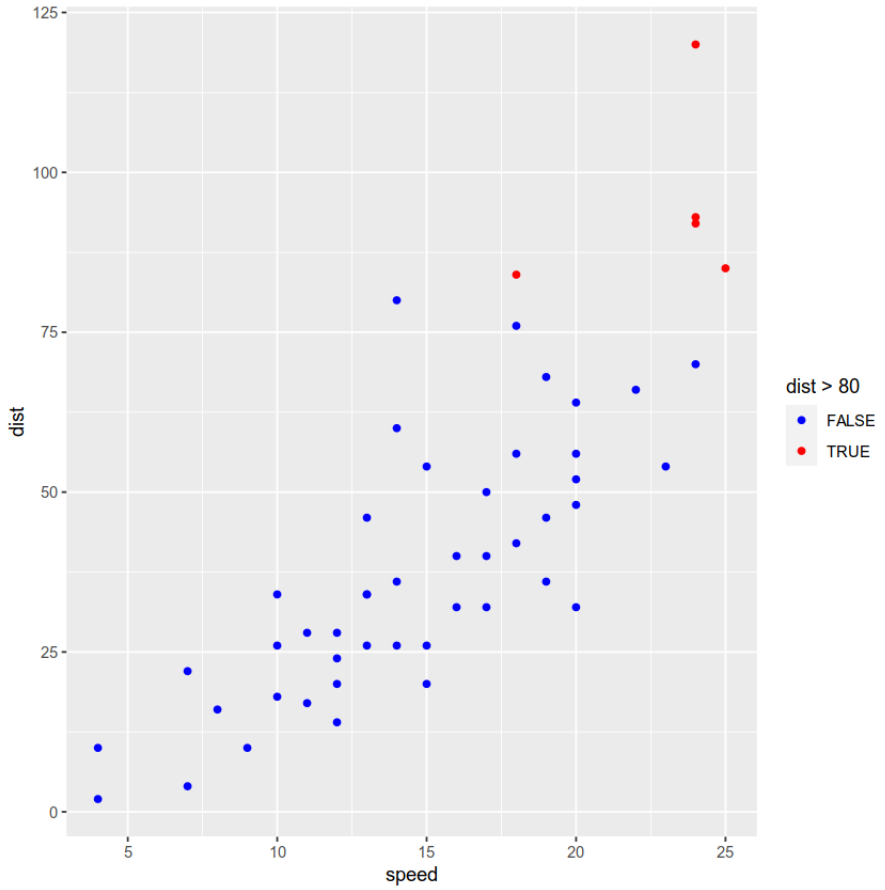
A data.frame: 6 × 2

	speed	dist
	<dbl>	<dbl>
1	4	2
2	4	10
3	7	4
4	7	22
5	8	16
6	9	10



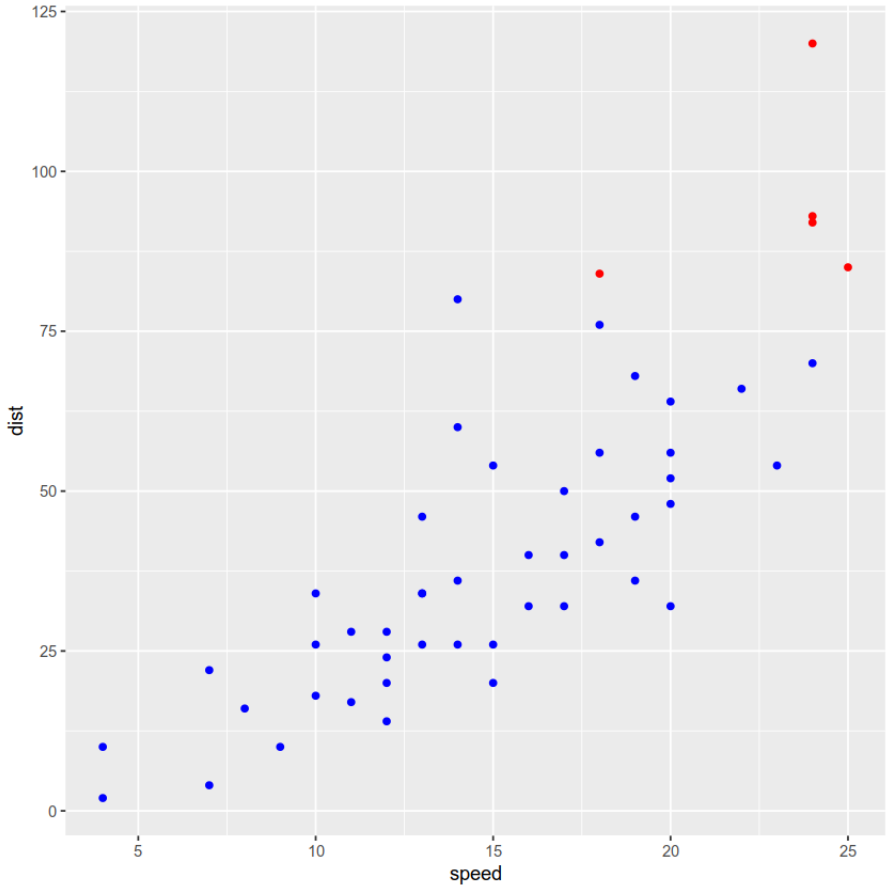
In [11]:

```
#12.7
cars %>%
    ggplot(aes(x=speed, y=dist))+
    geom_point(mapping=aes(color=dist>80))+
    scale_color_manual(values=c("blue","red"))
```



In [13]:

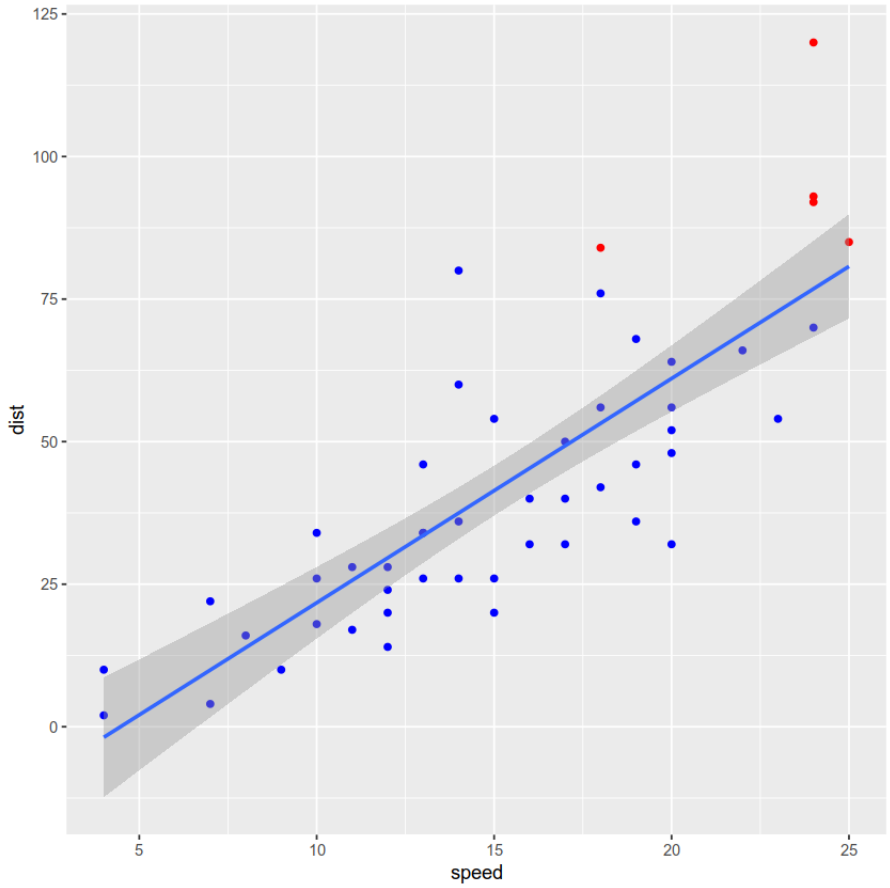
```
cars %>%
    ggplot(aes(x=speed, y=dist))+
    geom_point(color=ifelse(cars$dist>80,'red','blue'))
```



In [15]:

```
#12.8
cars %>%
    ggplot(aes(x=speed, y=dist))+
    geom_point(color=ifelse(cars$dist>80,'red','blue'))+
    geom_smooth(method='lm')
```

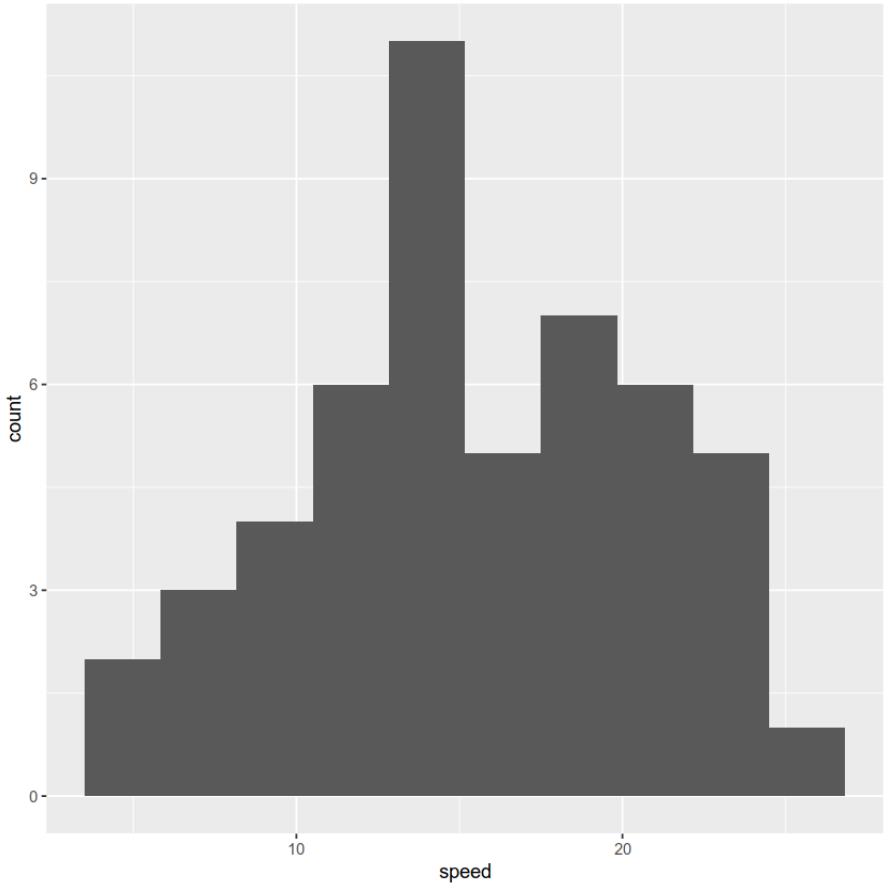
```
`geom_smooth()` using formula = 'y ~ x'
```

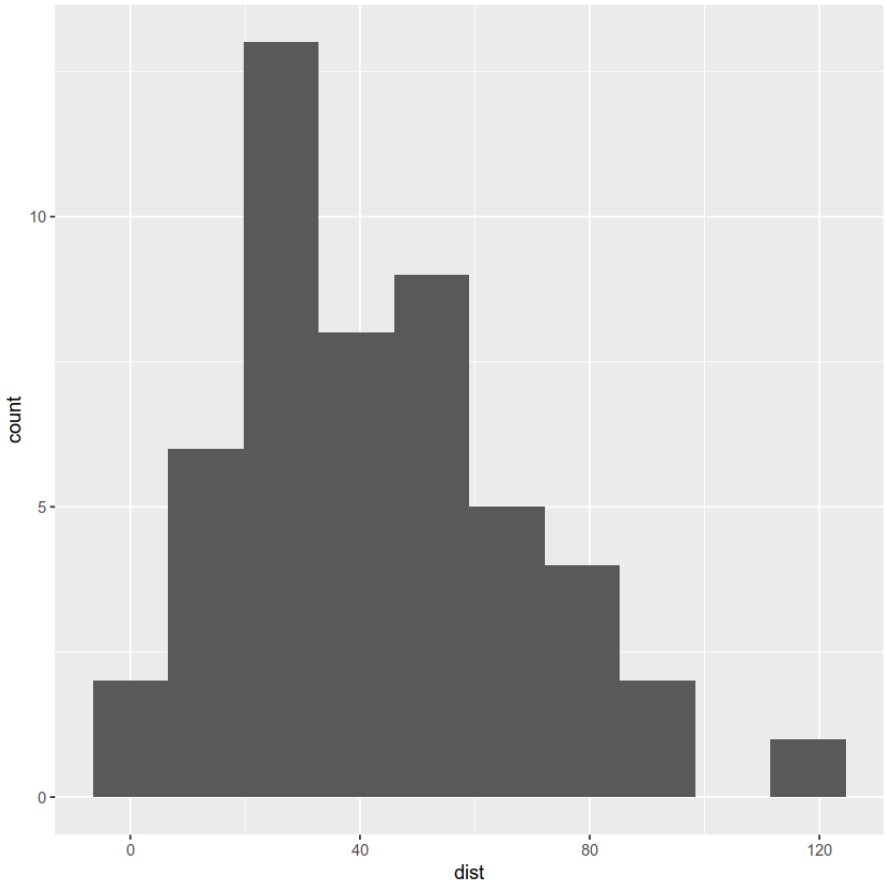


In [18]:

```
#12.9
cars %>%
    ggplot(aes(x=speed))+
    geom_histogram(bins=10)

cars %>%
    ggplot(aes(x=dist))+
    geom_histogram(bins=10)
```

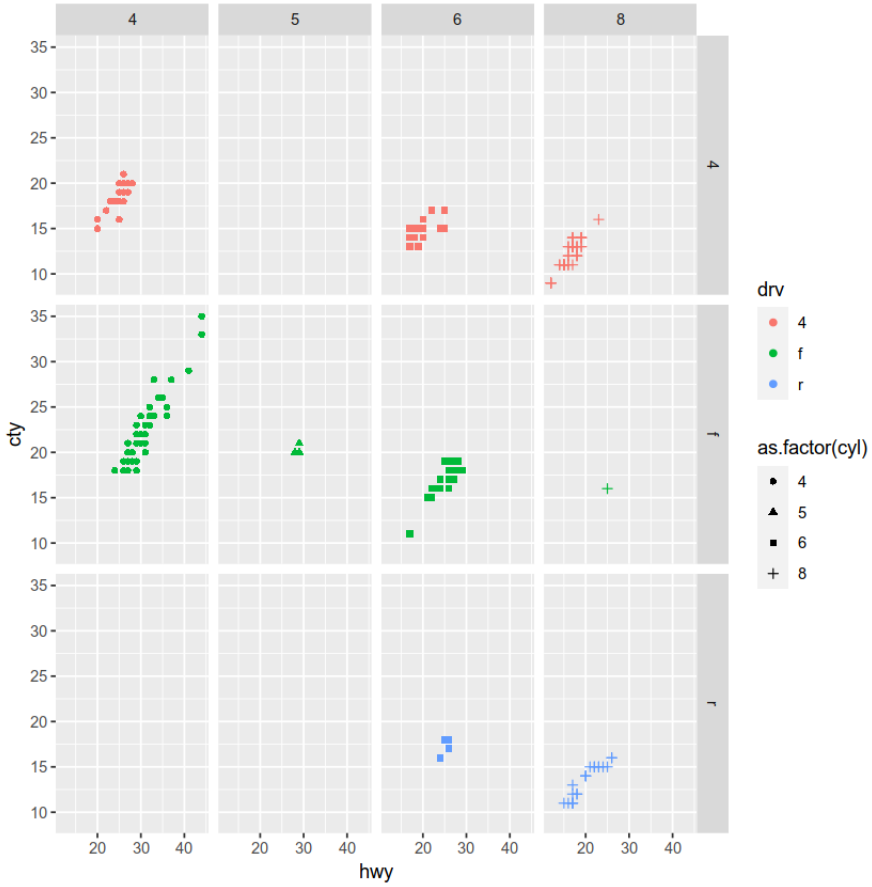

count
9
6
3
0
10
20
speed

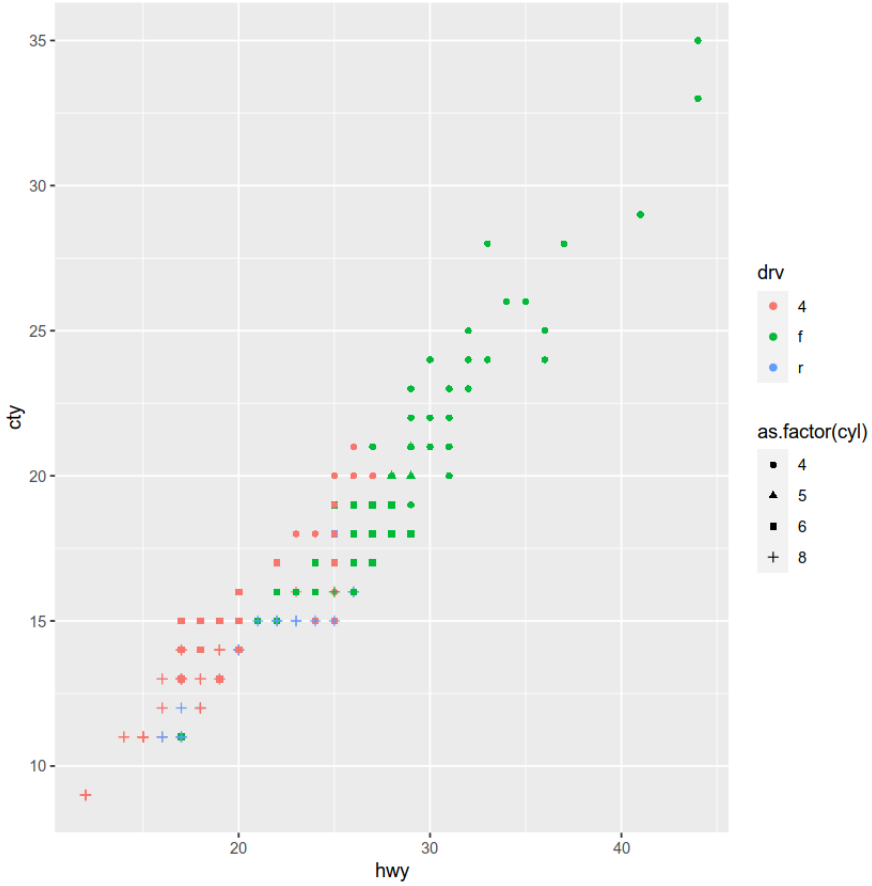

count
10
5
0
0
40
80
120
dist

In [23]:

```
#12.10
mpg %>%
    ggplot()+
    geom_point(aes(x=hwy,y=cty,
                   color=drv,
                     shape=as.factor(cyl)))+
    facet_grid(drv~cyl)

mpg %>%
    ggplot()+
    geom_point(aes(x=hwy,y=cty,
                   color=drv,
                     shape=as.factor(cyl)))
```


4
5
6
8
4
f
r
cty
hwy
drv
4
f
r
as.factor(cyl)
4
5
6
8


cty
hwy
drv
4
f
r
as.factor(cyl)
4
5
6
8

In [26]:

```
#12.11
head(iris)
iris %>%
    ggplot(aes(x=Sepal.Length,y=Sepal.Width,color=Species,shape=Species)+
    geom_point()+
    geom_density2d()+
    ggtitle('IRIS')+
    theme_light()
```

```
Error in parse(text = x, srcfile = src): <text>:9:0: unexpected end of input
7:     ggtitle('IRIS')+
8:     theme_light()
  ^
Traceback:
```