9.2.4

```
> binom.test(28,580)

95 percent confidence interval:
 0.03231524 0.06901883
```

We are 95% confident that the true proportion of all mice with white bellies is between 0.03 and 0.07.

9.2.5(a,b)

```
> binom.test(69,339)

        Exact binomial test

95 percent confidence interval:
 0.1619586 0.2503869
```

We are 95% confident that the true proportion of all infants having an adverse reaction is between 0.16 and 0.25.

9.4.1

The hypothesized probabilities are p0=(12/16,3/16,1/16)= (0.75,0.1875,0.0625); note that these add up to one. The null hypothesis is H0: Pr{white}=0.75, Pr{yellow}=0.1875, and Pr{green}=0.0625.

```
> chisq.test(c(155,40,10),p=c(12/16,3/16,1/16))

        Chi-squared test for given probabilities

data:  c(155, 40, 10)
X-squared = 0.6911, df = 2, p-value = 0.7078
```

We accept H0 at the 5% level because p=0.7 > 0.05 = alpha. The data are consistent with the 12:3:1 ratio for white/yellow/green.

9.4.3

We want to reject the null hypothesis that the bee does not prefer either pattern, i.e. H0: either pattern is equally likely, i.e. H0: Pr{pattern 1}=0.5. Alternative is Ha: Pr{pattern 1}>0.5.

```
> binom.test(20,25,alternative="greater")

number of successes = 20, number of trials = 25, p-value = 0.002039
alternative hypothesis: true probability of success is greater than 0.5
```

We reject the null H0 in favor of Ha at the 5% level. There is statistically significant evidence that bees prefer the sucrose flower pattern.

9.4.4

There are two ways to think about this and perform the test in R,

```
> chisq.test(c(216,932-216),p=c(2/7,5/7))

        Chi-squared test for given probabilities

data:  c(216, 932 - 216)
X-squared = 13.2944, df = 1, p-value = 0.0002662

> binom.test(216,932,p=2/7)

        Exact binomial test

data:  216 and 932
number of successes = 216, number of trials = 932, p-value = 0.0002146
alternative hypothesis: true probability of success is not equal to
0.2857143
```

Either way, the p-value is about 0.0002 and we reject H0: births are evenly distributed across the work-week and weekend at the 5% level.