## 12.2.7

```
> # Exercise 12.2.7
> mass=c(49.3,59.3,68.3,48.1,57.6,78.1,76.1)
> energy=c(1894,2050,2353,1838,1948,2528,2568)
> cor.test(mass,energy)

Pearson's product-moment correlation

data:  mass and energy
t = 11.427, df = 5, p-value = 8.988e-05
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.8749612 0.9973570
sample estimates:
      cor
0.9813868
```

(a) Since p-value=0.00009<0.05=alpha we reject H0: rho=0 at the 5% level.

(b) Observational study. In an experiment the researchers would somehow fix mass.

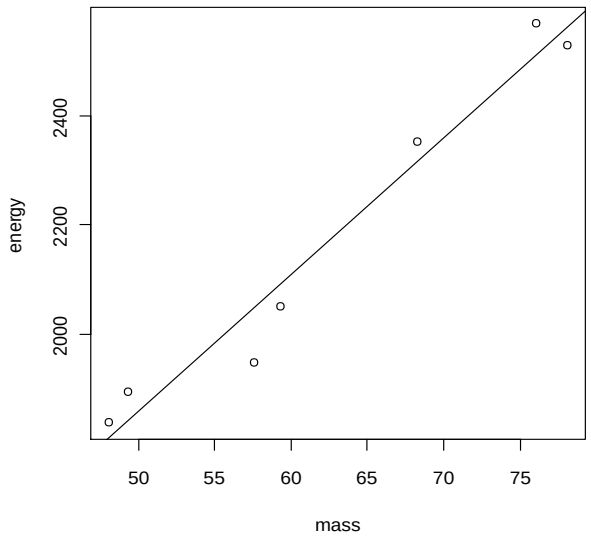
(c) One can only show association between the two variables; energy expenditure might increase, but it is not clear that one causes the other.

## 12.3.5

```
> fit=lm(energy~mass)
> plot(mass,energy)
> abline(fit)
> summary(fit)

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  607.703    138.765   4.379  0.00716 **
mass          25.012      2.189  11.427 8.99e-05 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 64.85 on 5 degrees of freedom
Multiple R-squared: 0.9631,     Adjusted R-squared: 0.9557
```




(a) The fitted line is energy = 607.7 + 25.0 (mass).
(b) The line fits quite well.
(c) For every kg increase in mass, energy typically goes up 25.0 kcal.
(d) s_e is given by R, it's 64.85 kcal.

## 12.4.6

607.7+25(55)= 1983 kcal.

## 12.5.5

```
> confint(fit)
                2.5 %    97.5 %
(Intercept) 250.99778 964.40909
mass         19.38506  30.63818

> confint(fit,level=0.9)
                  5 %      95 %
(Intercept) 328.08614 887.32073
mass         20.60103  29.42221
```

A 95% CI for beta1 is (19.3, 30.6). For every kg increase in mass, energy expenditure typically goes up by as little as 20 kcal to as much as 29 kcal (with 95% confidence).

A 90% CI for beta1 is (20.6, 29.4).