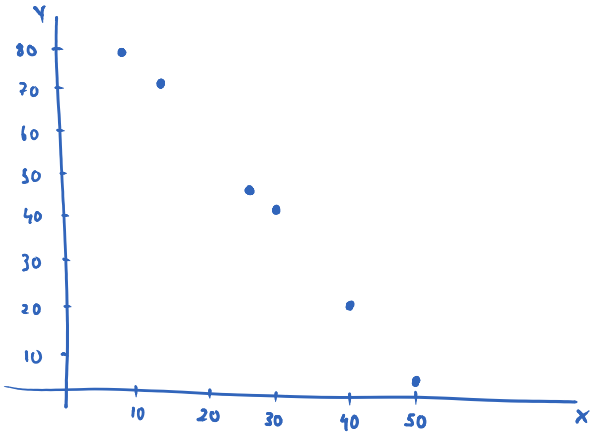
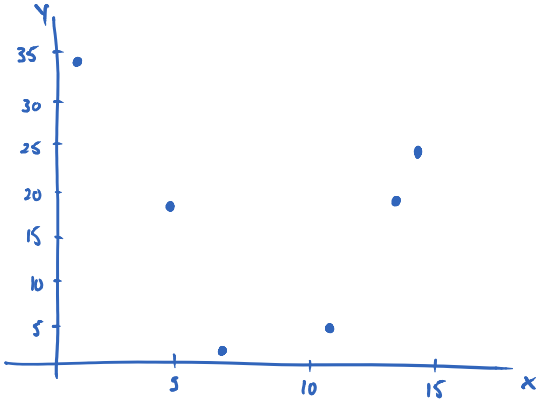
10 Linear Regression

1. a)



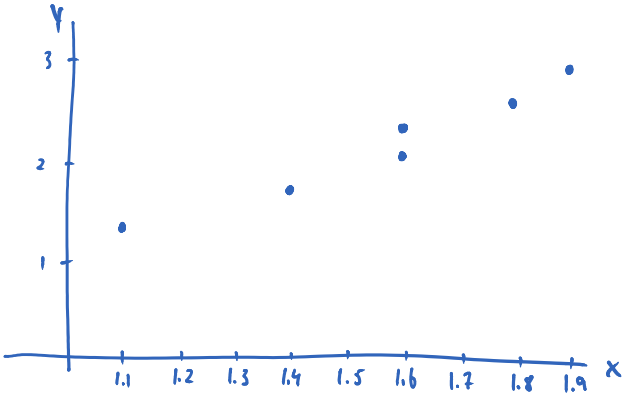
negative linear association

b)



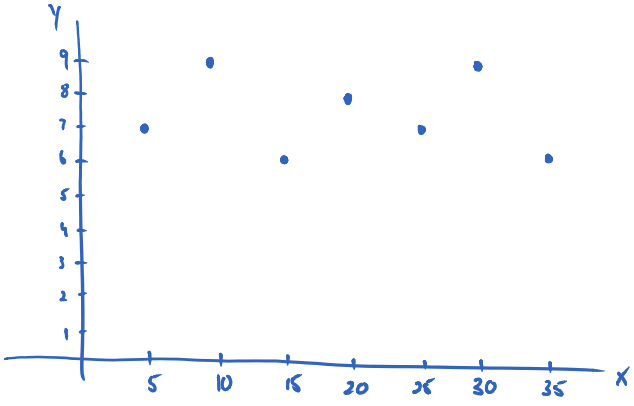
nonlinear association

c)



positive linear association

d)



zero association

2. a) $r = 0.8$
$r^2 = 0.64 = 64\%$

b) $r = -0.9$
$r^2 = 0.81 = 81\%$

3. $0.84 = |r_A| < |r_B| = 0.96$ so Set B has a stronger linear association

4. a) using the calculator: $a = 8.16$
$b = -0.52$
$\hat{y} = 8.16 - 0.52t$

b) $\Delta y = y - \hat{y} = 6.1 - 6.08 = 0.02$

$x = 4.0 \Rightarrow \hat{y} = 8.16 - 0.52(4.0) = 6.08$

c) using the calculator: $r = -0.999$ correlation coefficient
$r^2 = 0.998$ coefficient of determination

d) 99.8%

e) $t = 6 \Rightarrow \hat{y} = 8.16 - 0.52(6) = 5.04$ mg/dL

f) 24 is outside the data set range $1.0 \le t \le 12.0$

g) $y = 5.0 \Rightarrow 5.0 = 8.16 - 0.52t$
$-3.16 = -0.52t$
$t = 6.1$ h

5. a) positive

b) $r^2 = 0.8793$ and $r > 0$

$r = \sqrt{0.8793} = 0.9377$

c) 87.93%

d) slope $= 0.004 = \frac{0.004}{1} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

As the air velocity increases by 1 cm/s, the evaporation coefficient increases on average by 0.004 mm^2/s