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Exercise 10.4

x	y	xy	x <sup>2</sup>	y <sup>2</sup>
22	89.6	1899.2	484	6988.96
16	61.4	982.4	256	3969.96
19	72.0	1368	361	5184
21	78.2	1642.2	441	6115.24
24	87.6	2102.4	576	7673.76
26	98.2	2553.2	676	9643.24
$\Sigma x = 128$	$\Sigma y = 481$	$\Sigma xy = 10487.4$	$\Sigma x^2 = 2794$	$\Sigma y^2 = 39575.16$

$$a) SS(x) = 2794 - \frac{(128)^2}{6} = 63.33$$

$$SS(y) = 39575.16 - \frac{(481)^2}{6} = 1014.99$$

$$SP(xy) = 10487.4 - \frac{128 \times 481}{6} = 226.066$$

$$r = \frac{226.066}{\sqrt{63.33 \times 1014.99}} = 0.892$$

$\therefore$  They are positively co-related.

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b) Here  $H_0: \rho = 0$  vs  $H_1: \rho \neq 0$

$$t = \frac{0.892\sqrt{6-2}}{\sqrt{1-(0.892)^2}} = 3.946$$

$$t_{6-2} = t_4 = 2.776$$

$t_0$  is rejected, so significantly increased.

$$c) b = \frac{226.066}{63.33} = 3.569 \quad a = \frac{481}{6} - 3.569 \times \frac{128}{6} = 4.028$$

$$\therefore \text{line } \hat{y} = 4.028 + 3.569x$$

d) if  $x = 14^\circ\text{C}$

if  $x = 30^\circ\text{C}$

$$\hat{y} = 4.028 + 3.569 \times 14 = 201.2653994$$

$$\hat{y} = 4.028 + 3.569 \times 30 = 111.698$$

$$e) s^2 = \frac{1014.99 - 3.569 \times 226.066}{6-2} = 52.04 \quad t = \frac{3.569}{\sqrt{\frac{52.04}{63.33}}}$$

$$t_4 = 2.776$$

$t > t_4$ ,  $H_0$  rejected. regression significant  $= 3.937$