

Exam 1 Form 1 Summer 2000

1.	Slept	slept ²	Errors	Errors ²
	8	64	1	1
	6	36	4	16
	4	16	8	64
	10	100	0	0
	5	25	5	25

$$M = \sum x / n$$

a. $M =$

$$33/5$$

$$\boxed{6.6}$$

$$18/5$$

$$\boxed{3.6}$$

$$s^2 = \frac{\sum x^2}{n} - M^2$$

$$\text{Hrs Slept: } s^2 = 241/5 - 6.6^2$$

$$= 48.2 - 43.56$$

$$s^2 = 4.64$$

$$s = \boxed{2.15}$$

$$\text{Errors Made: } s^2 = 106/5 - 3.6^2$$

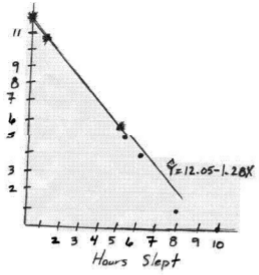
$$21.2 - 12.96$$

$$s^2 = 8.24$$

$$s = \boxed{2.87}$$

b.

Errors Made



c.

Slept X	Slept ² X ²	Errors Y	Errors ² Y ²	(Slept)(Errors) XY
8	64	1	1	8
6	36	4	16	24
4	16	8	64	32
10	100	0	0	0
<u>5</u>	<u>25</u>	<u>5</u>	<u>25</u>	<u>25</u>
33	241	18	106	89

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}}$$

$$= \frac{5(89) - (33)(18)}{\sqrt{(5(241) - (33)^2)(5(106) - (18)^2)}}$$

$$= \frac{445 - 594}{\sqrt{(1205 - 1089)(530 - 324)}}$$

$$= \frac{149}{\sqrt{(116)(206)}}$$

$$= \frac{149}{154.58}$$

$$= -0.96$$

$$\begin{aligned}
 d. 1) b_y &= r_{xy} (s_y / s_x) \\
 &= (-.96)(2.87 / 2.15) \\
 &= \boxed{-1.28}
 \end{aligned}$$

$$\begin{aligned}
 2) a_y &= M_y - b_y M_x \\
 &= 3.6 - (-1.28)(6.6) \\
 &= 3.6 + 8.448 \\
 &= \boxed{12.05}
 \end{aligned}$$

$$\begin{aligned}
 3) Y' &= a_y + b_y X \\
 Y' &= 12.05 - 1.28X
 \end{aligned}$$

4) See scatterplot

X	Y'
0	2.65
1	10.77
5	5.65

$$\begin{aligned}
 e. \text{ Total variance in errors} &= (s_y)^2 \\
 &= (2.87)^2 \\
 &= \boxed{8.24}
 \end{aligned}$$

$$\begin{aligned}
 \text{Explained variance} &= r^2 (s_y^2) \\
 &= (-.96)^2 (8.24) \\
 &= \boxed{7.59}
 \end{aligned}$$

$$\begin{aligned}
 \text{Unexplained variance} &= (1 - r^2) (s_y^2) \\
 &= (1 - (.96)^2) (8.24) \\
 &= \boxed{.65}
 \end{aligned}$$

$$f. Y' = a_y + b_y X$$

$$12.05 - 1.28(3)$$

$$\boxed{8.21}$$

$$g. Z = \frac{X - M}{S}$$

$$\frac{4 - 3.6}{2.87}$$

$$\boxed{.14}$$

$$2. P(\text{red card}) P(\text{three})$$

$$= \left(\frac{26}{52}\right) \left(\frac{4}{52}\right)$$

$$\left(\frac{1}{2}\right) \left(\frac{1}{13}\right)$$

$$\frac{1}{26}$$

$$\boxed{.038}$$