- A sample of 36 data values, x, gave $\Sigma(x 45) = -148$ and $\Sigma(x 45)^2 = 3089$.
 - (i) Find the mean and standard deviation of the 36 values.

- [3]
- (ii) One extra data value of 29 was added to the sample. Find the standard deviation of all 37 values.
 - (i) You should know that when you increase or decrease doservatures or by a given constant say a Hen the mean will go up or down by a'.

: the coded men =
$$\frac{\Sigma(x-45)}{36}$$

but the new mean will be 45 more as we reduced every observation by 45.

:. original mean =
$$-\frac{148}{36} + 45$$

$$= \frac{368}{9} = 40.8$$

Standard dev. = \(\sum_{n}^{\substack} - mean^2 \)
Now adding or subtracting a value from all discretions does not drange the scattering of points about the mean. So the standard deviation would be the same.

So standard denature =
$$\sqrt{\frac{\Sigma(x-45)^2}{N}} - \left[\frac{\Sigma(x-45)}{N}\right]^2$$

= $\sqrt{\frac{3089}{36}} - \left(-\frac{148}{36}\right)^2$
= 8.3008...

(ii) When 29 is added the new mean =
$$\frac{\sum x + 29}{37}$$

Remember $\frac{\sum x}{36} = 40.8 = \frac{(40.8)(36) + 29}{37}$
= 40.4810

: Stand deviation =
$$\sqrt{\frac{\sum x^2 + 29^2}{37}} - 40.4810^2$$

but from (2)
$$\sqrt{\frac{2}{36}} - (40.8)^2 = 8.3008$$

$$\therefore 2x^2 = 36(8.3008^2 + 40.8^2)$$

$$= 62407.5581$$

$$\therefore \text{ shoulder} = \sqrt{\frac{62407.5581 + 29^2}{37} - 40.4810^2}$$

$$= 8.408...$$

$$= 8.41 \quad (3sf)$$

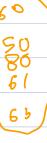
4 (a) Amy measured her pulse rate while resting, *x* beats per minute, at the same time each day on 30 days. The results are summarised below.

$$\Sigma(x - 80) = -147$$
 $\Sigma(x - 80)^2 = 952$

Find the mean and standard deviation of Amy's pulse rate (

[4]

a)



$$2x - 80(30) = -147$$

$$\sqrt{\frac{2(\chi - 80)^2}{30} - (-4 \cdot 9)^2}$$

1	The time taken, <i>t</i> hours, to deliver letters on days. The mean time taken is 2.8 hours. Given the times taken.	ven that $\Sigma(t-2.5)^2$	= 96.1, find the standard deviation of [3]
ı)	$\frac{96.1}{250}$ - $(0.3)^2$	= 0.943	

$$\Delta x = 745$$

$$\mu = 745 = 41.4$$
18

$$0 = \sqrt{\frac{3395}{8} - 4[.4^{2}]}$$

$$= 13-[5]8$$

ii)
$$6 = \frac{3647}{17} - 41^2$$
 $6 = 13.44$
 $3395/-2301$
 31647

mean =
$$\frac{2}{2}\frac{2}{x^2} + \frac{2}{y^2}$$
 $\frac{2}{(x-\alpha)^2}$ $\frac{2}{($

a = 12

$$\frac{1}{29} + a = 8.95$$

$$6 = \frac{2115}{24} - \left(\frac{-73.2}{24}\right)^{2}$$

$$\frac{2(x-50)}{70} + 50 = 63.5$$

$$\frac{2(x-50)^2-(63-5-50)^2=112.36}{70}$$

$$2(x-so)^2 = 20622.7$$

 $\frac{2(x-80)}{N} + 80 = \text{means}$

-[47 +80 = means

11 = modm 11 = 75.

952 $-(75.1-80)^2 = 2.78$