The world record times in seconds for the women's 100m sprint from 1970 onwards are given below

Year (x)	**72**	**76**	**76**	**77**	**83**	**83**	**84**	**88**
Time (y)	11.07	11.04	11.01	10.88	10.81	10.79	10.76	10.49

Use your calculator to write down

a) $\bar{x}$, the mean year
b) $\bar{y}$, the mean time
c) r, Pearson's product-moment correlation coefficient

The equation of the regression line y on x is y = ax + b

d) Find the values of a and b for these data
e) Show that M($\bar{x}$,$\bar{y}$) lies on this line
f) Use the regression line to estimate the world record time in 2024

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a) $\bar{x}$ = 79.875 = 79.9 to 3 s.f.

b) $\bar{y} = 10.85625$ = 10.9 to 3 s.f.

c) R = - 0.946

d) y = -0.0334x + 13.5

e) y = -0.0334x + 13.5

y = -0.0334x79.875+13.527

y = 10.9

Note that if we use values given to 3 s.f. in the calculation, we get y = 10.8

f) We might think that we could use x = 124 to make this prediction. However, we cannot reliably make a prediction outside of the interval of values given (extrapolation).
Therefore, we cannot reliably make a prediction for 2024