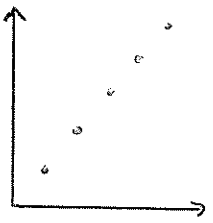
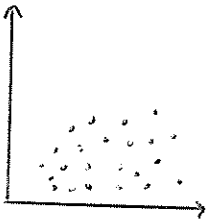
CORRELATION & REGRESSION

1. for each scatterplot, state whether a linear relationship exists and if it does, whether it is positive or negative, and whether it is strong, moderate or weak.

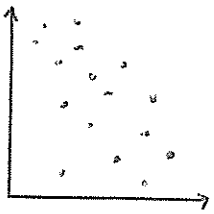
a)



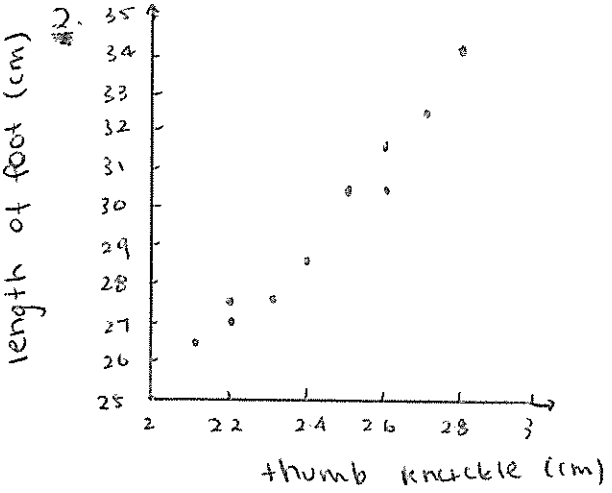
b)



c)



2.



a) describe the pattern of the data.

b) is the association between thumb knuckle and foot length positive or negative?

c) is the association strong, moderate, or weak?

3.

femur (fcm)	60	73	56	50	67	62	72	59
humerus (hcm)	70	78	59	40	70	61	71	58

a) plot the data on a scatterplot.

b) describe the direction and strength of the association between the lengths of two bones.

c) Do you think there is a linear association between femur and humerus lengths in humans? Justify.

4. for each correlation coefficient value, draw a scatterplot that illustrates this correlation.

a) 0.2

b) 0.9

c) -0.7

d) 0.5

e) -0.3

f) 0

5.

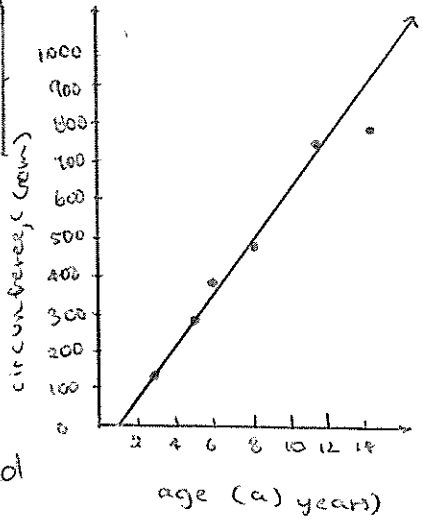
AGE (years)	14	18	15	13	16	16	17	11	13	11	12	14
HEIGHT	162	180	182	163	171	175	187	146	151	134	153	166

a) find the correlation of the data shown.

b) describe the correlation between age and height.

6. The age of a large tree can be predicted by measuring the circumfrence of its trunk. The following data was collected.

AGE, a (years)	3	5	6	8	11	14
CIRCUMFRENCE, C (mm)	155	306	392	502	763	790



a) find the equation of the line of best fit.

b) What is the gradient and what does it represent?

c) Use the graph and equation to find the circumfrence after.

(i) 10 years

(ii) 20 years.

d) find the [redacted]ge of the tree if its circumfrer is 650 mm.

7.

height (cm)	195	184	168	173	178	170	187	180	185	180	175	182	175
weight (kg)	84	74	60	70	72	68	64	72	110	70	60	75	75

a) Graph the data on a scatterplot and draw the line of best fit.

b) Find the equation of the line of best fit.

c) find the weight of a man who has a height of.

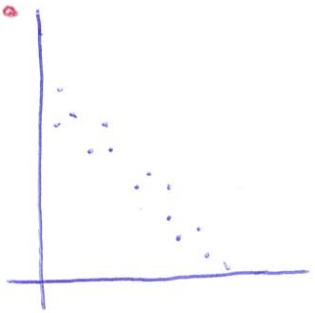
(i) 172 cm (ii) 190 cm

d) find the height of a man who has a weight of.

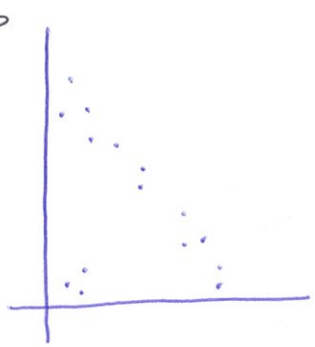
(i) 80 kg (ii) 100 kg

e) what is a limitation of this model?

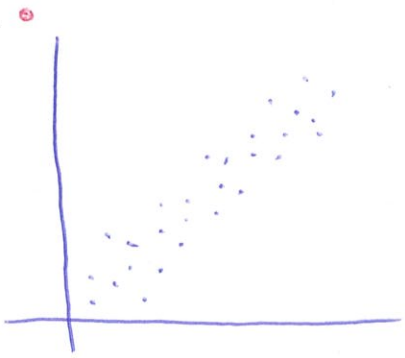
a



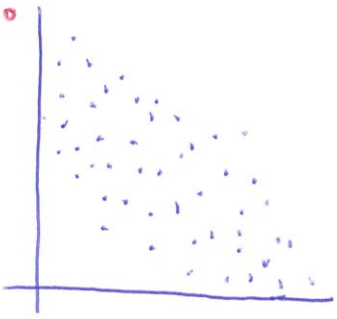
b



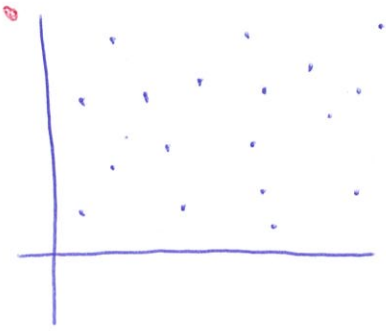
c



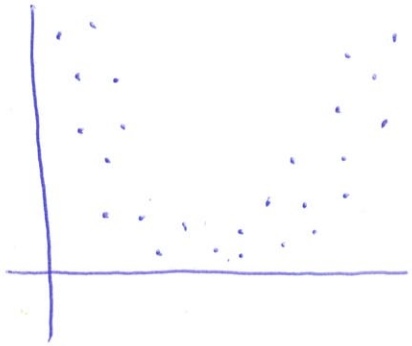
d



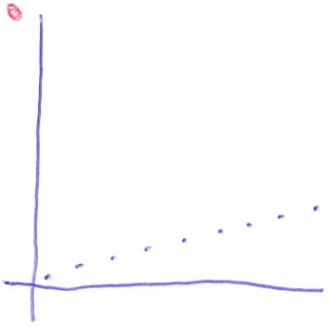
e



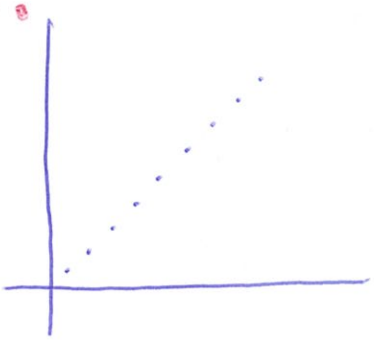
f



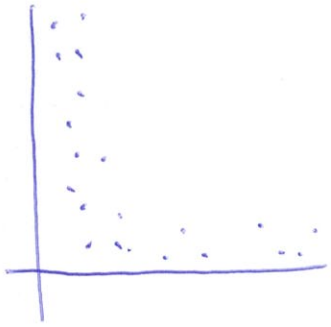
g



h



i



① Name (weak positive, etc) (direction & strength)

② Value of correlation coefficient (a, c, d, e, g, h)

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height (m)	165	172	172	176	180	182	183	183	186	187	190	198
100m sprint (s)	11.1	12.1	10.3	10.2	10.1	10	9.9	9.9	9.7	9.8	10.1	9.5

③ Calculate Pearsons coefficient (calculator)

④ Calculate Least Squares Regression Line (calculator)

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⑤ What is the difference between causation and correlation?

⑥ Which is interpolation and which is extrapolation? Draw graph to demonstrate.

3 → $r = -0.72$

4 → $y = -0.059x + 20.97$