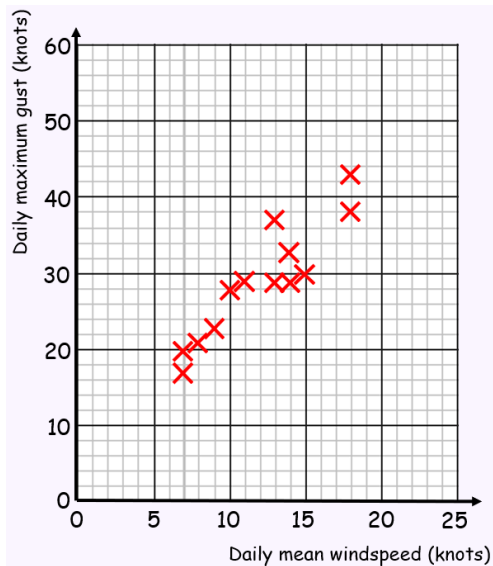# 4B Linear Regression - Lines of Best Fit

1. From the large data set, the daily mean windspeed, w knots, and the daily maximum gust, g knots, were recorded for the first 15 days in May in Camborne in 2015.

   The data was plotted on a scatter diagram:

a) Describe the correlation between daily mean windspeed and daily maximum gust

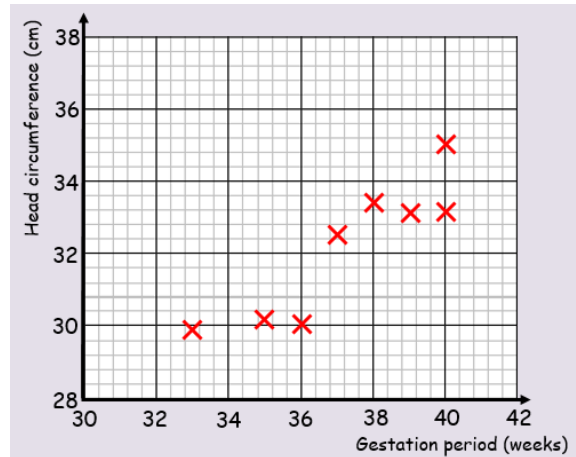| w	g
14	33
13	37
13	29
9	23
18	43
18	38
7	17
15	30
10	28
14	29
11	29
9	23
8	21
10	28
7	20

The equation of the regression line of g on w for this data is:

$$g = 7.23 + 1.82w$$

b) Give an interpretation of the value of the gradient of this regression line

c) Justify the use of a linear regression line in this case.

2. The head circumference, y cm, and gestation period, x weeks, for a random sample of newborn babies were recorded, and the scatter graph shows the results.

Gestation period, x (weeks)	Head circumference, y (cm)
36	30.0
40	35.0
33	29.8
37	32.5
40	33.2
39	32.1
35	30.9
38	33.6

The equation of the regression line of y on x is:

$$y = 8.91 + 0.624x$$

a) This equation is used to estimate the head circumference of a baby born after 39 weeks and a baby born after 30 weeks. Comment on the reliability of these estimates.

A nurse wants to estimate the gestation period for a baby born with a head circumference of 31.6cm.

b) Explain why the regression equation above is not suitable for this estimate