5.0 Calculator practice: Linear regression, systems of equations, cosine rule, frequency table statistics

1. Apply the law of cosines, $c^2 = a^2 + b^2 - 2ab\cos\theta$.

   (a) $a = 14.5$, $b = 4.7$, $\theta = 52°$. Find the third side length, c. [3]

   (b) $a = 5.4$, $b = 6.7$, $c = 8.7$. Find the angle measure, θ. [3]

Working:

Answers:

(a) .....

(b) .....

2. Perform a linear regression on the data in the table, finding $y = ax + b$.

x	18	20	17	21	22	15	17
y	63.1	68.5	60.2	73.2	76.5	52.7	59.4

   (a) Write down the value of a, b, and r. [3]

   (b) Characterize the correlation coefficient. [1]

   (c) Use your regression line to estimate y for $x = 19$. [2]

Working:

Answers:

(a) .....

(b) .....

(c) .....

3. Find the solutions for each system, the value(s) for x such that $f(x) = g(x)$. Sketch the graph to show working.

   (a) $f(x) = x^2 - 5x + 12$, $y = 3x + 15$. [3]

   (b) $f(x) = -4(x - 9)^2 - 5.5$, $y = 0.5x - 1$. [3]

Working:

Answers:

(a) .....

(b) .....

4. The data for $n = 30$ are shown in the frequency table below.

Mark (x)	$10 \leq x < 30$	$30 \leq x < 50$	$50 \leq x < 70$	$70 \leq x < 90$
Frequency	5	11	10	4

   (a) Write down the modal class. [1]

   (b) Estimate the mean $\overline{x}$. [2]

   (c) Estimate the standard deviation of the data, σ. [2]

Working:

Answers:

(a) .....

(b) .....

(c) .....