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) $a = 22.5$, $b = 15.7$, $\theta = 110°$. Find the third side length, c.   [3]

   (b) $a = 8.4$, $b = 7.2$, $c = 13.0$. 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	14	15	13	16	19	11	13
y	51.1	58.7	49.2	63.2	71.5	45.7	48.4

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

   (a) $f(x) = x^2 - 6x + 10$

   $y = \frac{3}{2}x + 1$ [3]

   Working:

   Answers:

   (a) ....

4. The data for $n = 40$ 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	7	13	17	k

   (a) Find the value of k. [1]

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

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

   Working:

   Answers:

   (a) ....

   (b) ....

   (c) ....