5.0C 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) $a = 12.3$, $b = 14.7$, $\theta = 71°$. Find the third side length, c. [3]

   (b) $a = 11.4$, $b = 17.1$, $c = 16.0$. Find $\hat{C}$ (the angle opposite side c). [3]

Working:

Answers:

(a) .....

(b) .....

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

x	17	18	17	19	23	15	16
y	71.1	78.6	69.2	71.2	80.5	55.7	58.4

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

   (b) Write down the correlation coefficient r. [1]

   (c) Use your regression line to estimate y for $x = 22$. [2]

Working:

Answers:

(a)(i) .....

(ii) .....

(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) $f(x) = -2x^2 + 5x + 7$

   $g(x) = -2x + 4$ [3]

Working:

Answers:

(a) .....

4. The data for $n = 50$ are shown in the frequency table below.

x	$15 \leq x < 25$	$25 \leq x < 35$	$35 \leq x < 45$	$45 \leq x < 55$
Frequency	k	21	16	8

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

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

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

Working:

Answers:

(a) .....

(b) .....

(c) .....