BECA / Huson / 11.1 IB Math SL Name:
23 May 2019

Exam: Statistics, sequences, overall review (complete on lined paper)

1a. Consider the following data.

7, 5, 8, 7, 9, 11, 7, 11, 10

Write down the mode. *[1 mark]*

1b. Find the value of the range. *[2 marks]*

1c. Find the mean. *[2 marks]*

1d. Find the median. *[2 marks]*

2a. The first three terms of an arithmetic sequence are $u_1 = 7.1, u_2 = 7.8, u_3 = 8.5$.

Find the common difference. *[2 marks]*

2b. Find the 18th term of the sequence. *[2 marks]*

2c. Find the sum of the first 18 terms. *[2 marks]*

3a. Let $f(x) = e^{0.75x} - 3$.

For the graph of *f*:

(i) write down the *y*-intercept;

(ii) find the *x*-intercept;

(iii) write down the equation of the horizontal asymptote. *[4 marks]*

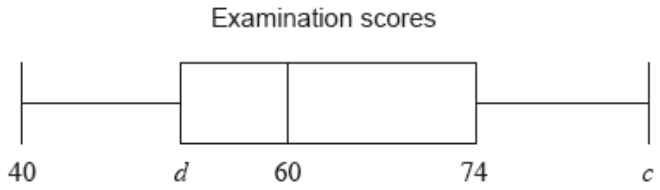
3b. On the grid on page 5, sketch the graph of *f*, for $-3 \leq x \leq 3$. *[3 marks]*

4a. Let $f(x) = x^2 - x - 12$.

Write down the *y*-intercept of the graph of *f*. *[1 mark]*

4b. Solve $f(x) = 0$. *[3 marks]*

5a. The following box-and-whisker plot represents the examination scores of a group of students.



Write down the median score. *[1 mark]*

The range of the scores is 42 marks, and the interquartile range is 23 marks.

5b. Find the value of

(i) c;

(ii) d. *[4 marks]*

5b. What percentage of the data are between 60 and 74? *[1 marks]*

6. Three consecutive terms of a geometric sequence are $x - 3, 4$, and $x + 3$.

Find the possible values of x. *[6 marks]*

7a. Let $f(x) = 2\ln x$ and $g(x) = \ln 3x^2$.

Express $g(x)$ in the form $f(x) + \ln a$, where $a \in \mathbb{Z}^+$. *[4 marks]*

7b. The graph of g is a transformation of the graph of f. Give a full geometric description of this transformation. *[3 marks]*

8a. There are 25 items in a data set. The sum of the items is 35.

Find the mean. *[2 marks]*

8b. Each value in the set is multiplied by 2. Write down the value of the new mean. *[1 mark]*

9. Solve $\log_2 x + \log_2(x - 6) = 4$, for $x > 2$. *[7 marks]*

10a. Let $f(x) = 8(x-3)^2$, for $x \in \mathbb{R}$.

Find $f^{-1}(x)$. *[3 marks]*

10b. Let g be a function so that $(f \circ g)(x) = 8x^6$. Find $g(x)$. *[3 marks]*

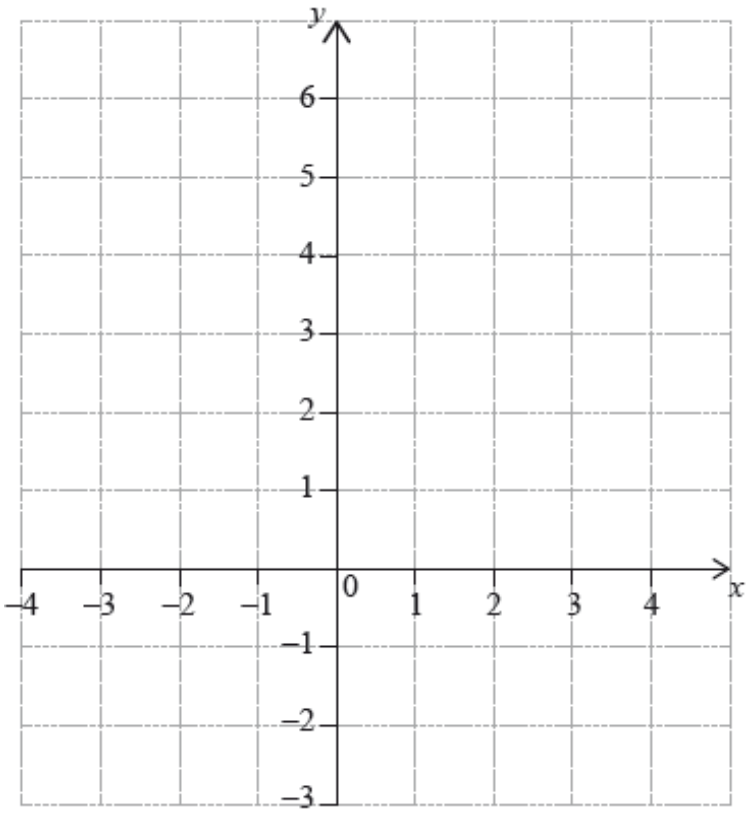
11a. The equation $x^2 + kx + 36 = 0$ has no real solutions.

Find all possible values of *k*. *[6 marks]*

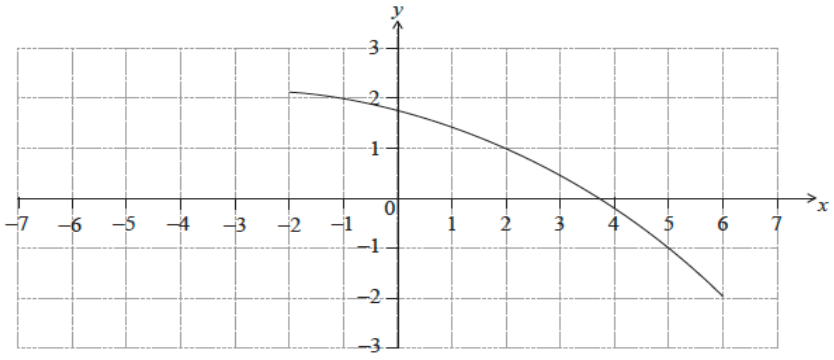
(continued from page 1)

3 Let $f(x) = e^{0.75x} - 3$.

3b. On the grid below, sketch the graph of *f*, for $-3 \leq x \leq 3$. *[3 marks]*



13a. The following diagram shows the graph of a function f.



Find $f^{-1}(-1)$. *[2 marks]*

13b. Find $(f \circ f)(-1)$. *[3 marks]*

13c. On the same diagram, sketch the graph of $y = f(-x)$. *[2 marks]*