

# Sample solutions to the 2021 VCAA papers

## Specialist Mathematics Examination 2

### Question 1 (10 marks)

Let  $f(x) = \frac{(2x-3)(x+5)}{(x-1)(x+2)}$ .

- a. Express  $f(x)$  in the form  $A + \frac{Bx+C}{(x-1)(x+2)}$ , where  $A$ ,  $B$  and  $C$  are real constants. 1 mark

$f(x) = 2 + \frac{7}{x+2} - \frac{2}{x-1}$  (CAS):  
 $f(x) = 2 + \frac{7(x-1) - 2(x+2)}{(x-1)(x+2)}$  expand  $\left( \frac{(2x-3) \cdot (x+5)}{(x-1) \cdot (x+2)} \right)$   
 $f(x) = 2 + \frac{5x-11}{(x-1)(x+2)}$

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## Mathematical Methods Examination 2

### Question 4

The maximum value of the function  $h: [0, 2] \rightarrow \mathbb{R}$ ,  $h(x) = (x-2)e^x$  is

- A.  $-e$   
 B. 0  
 C. 1  
 D. 2  
 E.  $e$

(CAS):  $h(x) := (x-2) \cdot e^x \mid 0 \leq x \leq 2$   
 $f_{\text{Max}}(h(x), x)$   $x = 2$   
 $h(2)$  0

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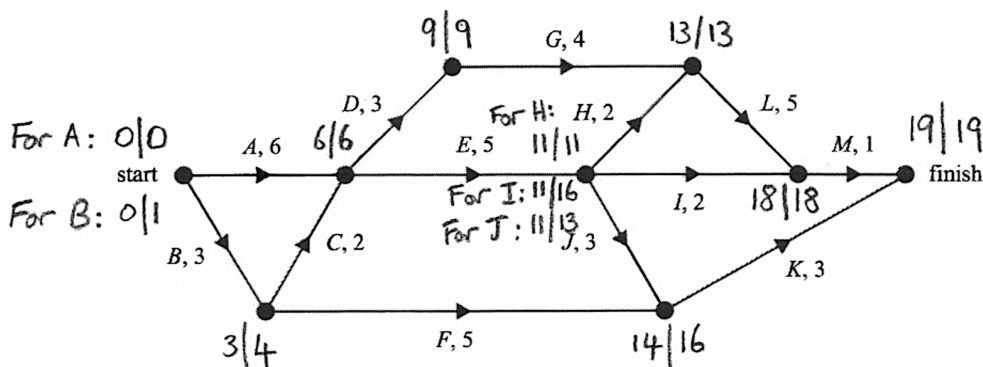
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## Further Mathematics Examination 2 Module 2 – Networks and Decision Mathematics

### Question 4 (3 marks)

Roadworks planned by the local council require 13 activities to be completed.

The network below shows these 13 activities and their completion times in weeks.



- a. What is the earliest start time, in weeks, of activity K? 1 mark

14 weeks

- b. How many of these activities have zero float time? 1 mark

7 (activities A, D, E, G, H, L, M)

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