1. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

Use algebra to determine the values of x for which

$$\frac{2}{x+3} < 1 - \frac{3}{x-2}$$

(7)

(Total for Question 1 is 7 marks)

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2. (a) Show that, for $r \geqslant 0$

$$\frac{1}{(r+1)!} - \frac{1}{(r+2)!} \equiv \frac{r+1}{(r+2)!}$$

(2)

(b) Hence use the method of differences to determine

$$\sum_{r=1}^{n} \frac{r+1}{(r+2)!}$$

giving the answer as a single fraction.

(3)

(c) Using the answer to part (b) and making your method clear, determine the value of

$$\sum_{r=4}^{10} \frac{3r+3}{(r+2)!}$$

giving the answer to 3 significant figures.

(2)

(Total for Question 2 is 7 marks)
