

(d) Show that  $A_1 + A_2 + \dots + A_n + \dots$  is a geometric series with sum to infinity

$$\frac{e^{\pi}}{2(e^{\pi} - 1)}.$$

**(5)**

(e) Given that

$$\int_0^{\infty} e^{-x} \sin x \, dx = \frac{1}{2},$$

find the exact value of

$$\int_0^{\infty} \left| e^{-x} \sin x \right| \, dx$$

and simplify your answer.

**(4)**