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ÁREA DE MATEMÁTICAS
4ᵗᵒ CONCURSO NACIONAL DE MATEMÁTICAS IB
PRUEBA 1 Y 2 – ESTUDIOS MATEMÁTICOS NM
2017 – 2018

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QUESTION 5.1   *Unit penalty (UP) applies in parts (a), (c) and (e).*

   (a) $AB^2 = 10^2 + 8^2 - 2 \times 10 \times 8 \times \cos 150°$ *(M1)(A1)*

(UP) $AB = 17.4 \text{ km}$ *(A1)(G2)*   *[3 marks]*

> **Note:** Award *(M1)* for substitution into correct formula, *(A1)* for correct substitution, *(A1)* for correct answer.

   (b) $\dfrac{8}{\sin C\hat{A}B} = \dfrac{17.4}{\sin 150°}$ *(M1)(A1)*

          $C\hat{A}B = 13.3°$ *(A1)(ft)(G2)*

> **Notes:** Award *(M1)* for substitution into correct formula, *(A1)* for correct substitution, *(A1)* for correct answer. Follow through from their answer to part (a).

(UP) (c) $AD = 8.70 \text{ km}$ (8.7 km) *(A1)(ft)*   *[1 mark]*

> **Note:** Follow through from their answer to part (a).

   (d) $DT = \tan(13.29...°) \times 8.697... = 2.0550...$ *(M1)(A1)*

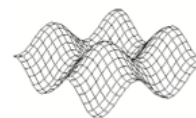 $= 2.06$ *(AG)*

          [2 marks]

> **Notes:** Award *(M1)* for correct substitution in the correct formula, award *(A1)* for the unrounded answer seen.
> If 2.06 not seen award at most *(M1)(A0)*.

(UP) (e) $\sqrt{8.70^2 + 2.06^2} + 8.70 + 2.06$ *(A1)(M1)*

       $= 19.7$ km   *(A1)***(ft)***(G2)*   *[3 marks]*

> **Note:** Award *(A1)* for AT, *(M1)* for adding the three sides of the triangle ADT, *(A1)***(ft)** for answer.
> Follow through from their answer to part (c).

(f) $\dfrac{19.7}{70} \times 60 + 10$ *(M1)(M1)*

       $= 26.9$ *(A1)***(ft)**

> **Note:** Award *(M1)* for time on road in minutes, *(M1)* for adding 10, *(A1)***(ft)** for unrounded answer. Follow through from their answer to (e).

       $= 27$ (nearest minute)   *(A1)***(ft)***(G3)*   *[4 marks]*

> **Note:** Award *(A1)***(ft)** for their unrounded answer given to the nearest minute.

Total [16 marks]