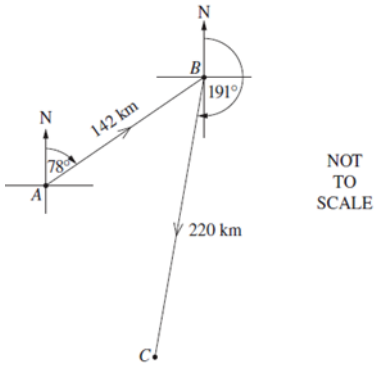
TG 3 Chris leaves island *A* in a boat and sails 142 km on a bearing of 078° to island *B*. Chris then sails on a bearing of 191° for 220 km to island *C*, as shown in the diagram.

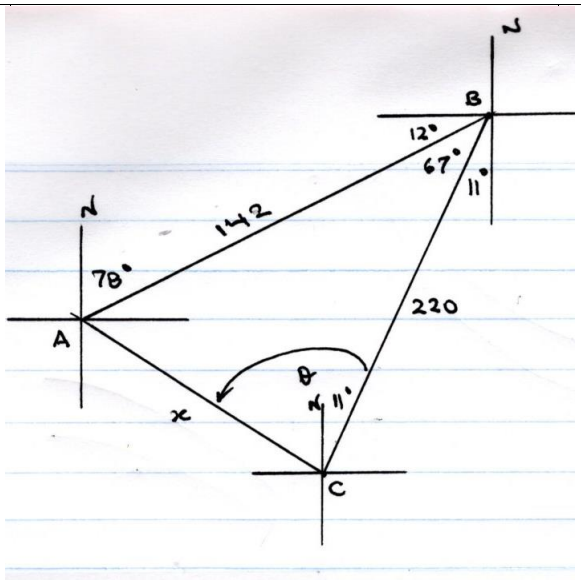
(a) Show that the distance from island *C* to island *A* is approximately 210 km.

(b) Chris wants to sail from island *C* directly to island *A*. On what bearing should Chris sail? Give your answer correct to the nearest degree.



(a) As 90 – 12 – 11 = 67, $\angle ABC = 67°$:

$$x^2 = 142^2 + 220^2 - 2(142)(220)\cos 67°$$
$$= 44\,151.11909\ldots$$
$$x = 210.1216769\ldots$$
$$= 210 \text{ (nearest whole)}$$



(b) $$\frac{\sin\theta}{142} = \frac{\sin 67^o}{210}$$

$$\sin\theta = \frac{142\sin 67^o}{210}$$
$$= 0.622076175\ldots$$
$$\theta = 38.46790685\ldots$$
$$= 38 \text{ (nearest whole)}$$

As 38 – 11 = 27 and 360 – 27 = 333, the bearing is 333°.