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Class: 3C3

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Maths D Holiday HW

Trigonometry 6.2 P2

11a(i) $BS = \sqrt{20^2 - 8^2}$

$$= 18.330 \dots$$

$$= 18.3 \text{ m (3 sf)} \#$$

a(ii) $\sin \angle RBS = \frac{8}{20}$

$$\therefore \angle RBS = 23.578 \dots$$

$$= 23.6^\circ \text{ (1 dp)} \#$$

b(i) $\cos \angle RBS' = \frac{5}{20}$

$$\angle RBS' = 75.5224 \dots$$

$$= 75.522^\circ \text{ (3 dp)}$$

$$\angle \text{of rotation} = 75.522^\circ - 23.578^\circ$$

$$= 51.944$$

$$= 51.9^\circ \text{ (1 dp)}$$

Jib was rotated 51.9° anti-clockwise abt B #

b(ii) $RS' = \sqrt{20^2 - 5^2}$

$$= 19.3649 \dots$$

$$= 19.365 \text{ m (5 sf)}$$

$$\text{length of increment} = [(19.365 + 11) - 8] \text{ m}$$

$$= 22.365 \dots$$

$$= 22.4 \text{ m (3 sf)} \#$$

12a. $\tan 14^\circ = \frac{AD}{83}$

$$\therefore AD = 83 \tan 14^\circ$$

$$= 20.694 \dots$$

$$= 20.7 \text{ m (3 sf)} \#$$

b. $BC^2 = 83^2 + 46^2 - 2(83)(46) \cos 67^\circ$

$$= 9005 - 7636 \cos 67^\circ$$

$$\therefore BC = 77.597 \dots$$

$$= 77.6 \text{ m (3 sf)} \#$$

c. Area of ABC = $\frac{1}{2} \times 83 \times 46 \times \sin 67^\circ$

$$= 1757.24 \dots$$

$$= 1760 \text{ m}^2 \text{ (3 sf)} \#$$

$$d. \frac{\sin \angle ACB}{83} = \frac{\sin 67^\circ}{77.597}$$

$$\sin \angle ACB = \frac{83 \sin 67^\circ}{77.597}$$

$$\angle ACB = 79.9312 \dots$$

$$= 79.931^\circ \text{ (3 dp)}$$

let the shortest dist. be AE.

$$\sin 79.931^\circ = \frac{AE}{46}$$

$$AE = 46 \sin 79.931^\circ$$

$$= 45.291 \dots$$

$$= 45.3 \text{ m (3 sf)} \#$$

e. let the angle of elevation be x°

$$\tan x = \frac{20.694}{45.291}$$

$$\therefore x^\circ = 24.556 \dots$$

$$= 24.6^\circ \text{ (1 dp)}$$

$\therefore$ The greatest angle of elevation is 24.6° #

13.

$$14a. \angle ACB = 180^\circ - 22^\circ - 32^\circ$$

$$= 126^\circ$$

$$\frac{AC}{\sin 32^\circ} = \frac{800}{\sin 126^\circ}$$

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$$= 524.01 \dots$$

$$= 524 \text{ m (nearest m) (shown) } \#$$

$$b. NC^2 = 200^2 + 524.01^2 - 2(200)(524.01)\cos 22^\circ$$

$$NC = 346.763 \dots$$

$$= 347 \text{ m (3sf) } \#$$

$$c(i) \tan 12^\circ = \frac{HN}{200}$$

$$HN = 200 \tan 12^\circ$$

$$= 42.511 \dots$$

$$= 42.5 \text{ m (3sf) } \#$$

$$c(ii) PN = 2 \left(\frac{1}{2} \times \sin 22^\circ \times 200 \times 524 \right) \div 524$$

$$= 74.921 \text{ m (5sf)}$$

$$\angle \text{ of elevation} = \tan^{-1} \left(\frac{42.511}{74.921} \right)$$

$$= 29.571 \dots$$

$$= 29.6^\circ \text{ (1 dp) } \#$$

$$15a(i) \text{ Bearing of C from B} = 360^\circ - 90^\circ - (180^\circ - 21^\circ)$$

$$= 111^\circ$$

#

$$a(ii) \cos \angle BAC = \frac{82}{173}$$

$$\therefore \angle BAC = 61.706 \dots$$

$$= 61.7^\circ \text{ (1 dp) } \#$$

$$a(iii) \text{ Bearing of C from A} = 21^\circ + 61.706^\circ$$

$$= 82.706^\circ$$

$$= 082.7^\circ \#$$

$$b(i) \tan 35^\circ = \frac{CE}{82}$$

$$CE = 82 \tan 35^\circ$$

$$= 57.417 \dots$$

$$= 57.4 \text{ m (3sf) } \#$$

$$b(ii) BC = \sqrt{(173^2 - 82^2)}$$

$$= 152.331 \dots$$

$$= 152.33 \text{ m (5sf)}$$

$$\text{Let the } \angle \text{ of elevation} = \angle EBC$$

$$\tan \angle EBC = \frac{57.417}{152.33}$$

$$\therefore \angle EBC = 20.65 \dots$$

$$= 20.7^\circ \text{ (1dp)} \#$$

$$c. \text{ Distance} = \frac{40}{\sin 63^\circ}$$

$$= 44.893 \dots$$

$$= 44.9 \text{ m (3sf)} \#$$