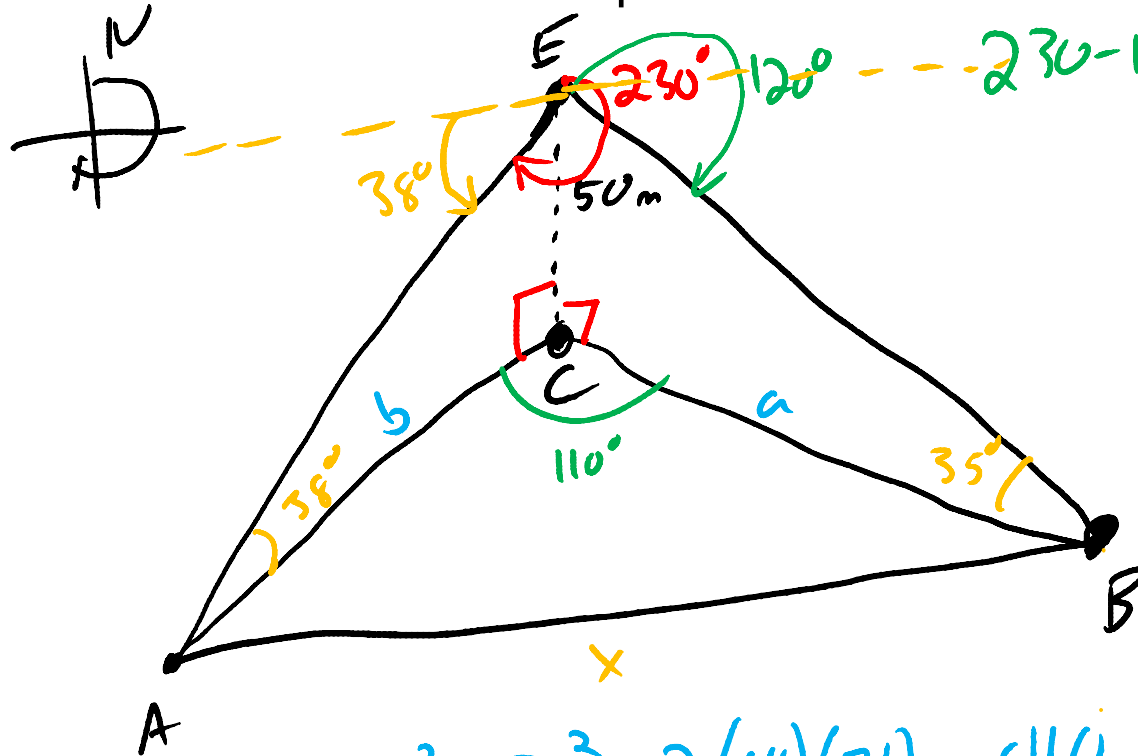# Mathematics 11U

5.8 – Three Dimensional Trigonometry

Mr. D. Hagen

Emma is on a 50 m high bridge and sees two boats anchored below. From her position, boat A has a bearing of 230° and boat B has a bearing of 120°. Emma estimates the angles of depression to be 38° for boat A and 35° for boat B. How far apart are the boats to the nearest metre?

$$230 - 120 = \boxed{110°}$$

$$\tan 38 = \frac{50}{b} \qquad \tan 35 = \frac{50}{a}$$

$$b = \frac{50}{\tan 38} \qquad a = \frac{50}{\tan 35}$$

$$b = 64_m \qquad a = 71_m$$

$$x^2 = 64^2 + 71^2 - 2(64)(71)\cos 110$$

$$x^2 = 1225.279$$

$$x = 111 m.$$