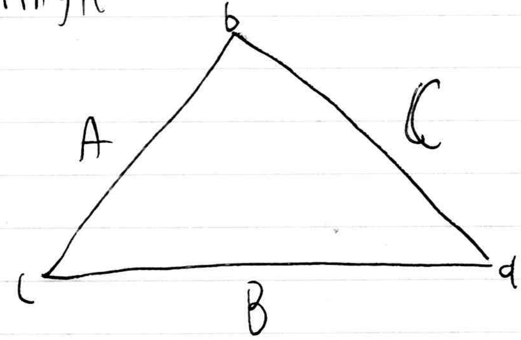
Test Prep Day 1

Notes: · Consider a triangle



· The law of sines state that the ratio of the sin of any angle over the opposite sides length is equal;

$$\frac{\sin(a)}{A} = \frac{\sin(b)}{B} = \frac{\sin(c)}{C}$$

· The law of cosines states that

$$C^2 = A^2 + B^2 - 2AB\cos(c)$$

Notice that for $c = \pi/2$, this is the pythagorean theorem.

(Drill): ~~(1):~~ Apply law of cosines

$$C^2 = 49 + 144 - 2 \cdot 49 \cdot 144 \cdot \cos(42^\circ)$$

$$C =$$

I'm sorry what. OH I'm dumb.

$$a^2 = 49 + 144 - 2 \cdot 7 \cdot 12 \cdot \cos(42^\circ)$$

$$a^2 = 68.15 \Rightarrow a = 8.26$$

Then, $\frac{\sin(42^\circ)}{8.26} = \frac{\sin(B)}{12} = \frac{\sin(C)}{7}$

implies $B = 76.43^\circ$, $C = 34.56$

$$A + B + C =$$

(1):

$$a^2 = 7^2 + 12^2 - 2 \cdot 7 \cdot 12 \cos(42^\circ)$$

$$a = 8.26$$

$$\frac{\sin(42^\circ)}{8.26} = \frac{\sin(B)}{12} \Rightarrow B = 76.43$$

$$\text{sin}'11 = \frac{\sin(C)}{7} \Rightarrow C = 34.55$$

However, one can ~~recall~~ find the "true" B by noticing that B must be obtuse, for any hope of having the angles summing to 180; $B = 180 - 76.43$ and

$$103.54 + 34.55 + 42 \approx 180$$

(2):

$$3^2 = 49 + 25 - 2 \cdot 35 \cos(A) \Rightarrow A = 21.79$$

$$\frac{\sin(21.79^\circ)}{3} = \frac{\sin(B)}{7} = \frac{\sin(C)}{5}$$

$$B^* = 60.01, \quad C = 38.22$$

Again, we need to change B to fit the visualization; $180 - 60.01 \approx 120$

$$120 + 38.22 + 21.79 = 180.$$

(3):

$$\frac{\sin(32^\circ)}{5} = \frac{\sin(B)}{8} \Rightarrow 57.98 = B \Rightarrow C = 180 - (58 + 32) = 90$$

$$\frac{\sin(32^\circ)}{5} = \frac{\sin(90^\circ)}{C}$$

$$C = 9.44$$

(4):

$$\frac{\sin(33^\circ)}{9} = \frac{\sin(C)}{6} = \frac{\sin(B)}{b}$$

$$21.29 = \arcsin\left(\frac{125.79}{6}\right) \quad C = \cancel{\arcsin\left(\frac{6\sin(B)}{b}\right)}$$

$$b = 13.418$$