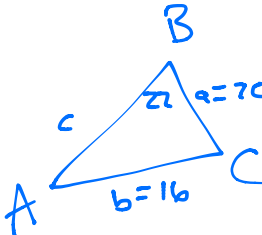


Unit 12 Review

State the number of possible triangles that can be formed using the given measurements.

1) $m\angle B = 22^\circ$, $a = 20$ km, $b = 16$ km

ASS!



$$\frac{\sin 22^\circ}{16} = \frac{\sin A}{20}$$

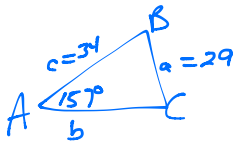
$$\frac{20 \sin 22^\circ}{16} = \sin A$$

$$\sin^{-1}\left(\frac{20 \sin 22^\circ}{16}\right) = A$$

$$27.921^\circ \approx A$$

2 possible Δ s

2) In $\triangle ABC$, $m\angle A = 157^\circ$, $c = 34$ mi, $a = 29$ mi

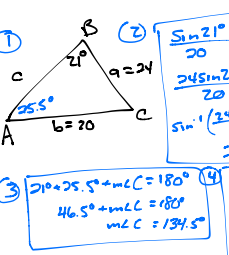


NO solutions because opposite the largest angle isn't the largest side.

Solve each triangle. Round your answers to the nearest tenth.

3) $m\angle B = 21^\circ$, $a = 24$ ft, $b = 20$ ft

Solution 1



① $\frac{\sin 21^\circ}{20} = \frac{\sin A}{24}$
 $\frac{24 \sin 21^\circ}{20} = \sin A$
 $\sin^{-1}\left(\frac{24 \sin 21^\circ}{20}\right) = A$
 $25.5^\circ \approx A$ (Maybe 2 solutions)

② $21^\circ + 25.5^\circ + m\angle C = 180^\circ$
 $46.5^\circ + m\angle C = 180^\circ$
 $m\angle C = 133.5^\circ$

③ $\frac{\sin 21^\circ}{20} = \frac{\sin 134.5^\circ}{c}$
 $c \sin 21^\circ = 20 \sin 134.5^\circ$
 $c = \frac{20 \sin 134.5^\circ}{\sin 21^\circ}$
 $c \approx 39.8$ ft

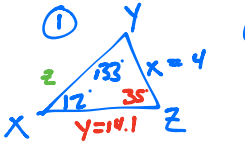
④ $m\angle A + m\angle A' = 180^\circ$
 $25.5^\circ + m\angle A' = 180^\circ$
 $m\angle A' = 154.5^\circ$

⑤ $m\angle C + 21^\circ + 154.5^\circ = 180^\circ$
 $m\angle C + 175.5^\circ = 180^\circ$
 $m\angle C = 4.5^\circ$

⑥ $\frac{\sin 21^\circ}{20} = \frac{\sin 4.5^\circ}{c}$
 $c \sin 21^\circ = 20 \sin 4.5^\circ$
 $c = \frac{20 \sin 4.5^\circ}{\sin 21^\circ}$
 $c \approx 4.4$ ft

4) In $\triangle YZX$, $m\angle Y = 133^\circ$, $m\angle X = 12^\circ$, $x = 4$ mi

Solution 2



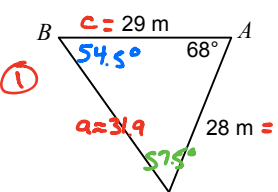
① $\frac{\sin 12^\circ}{4} = \frac{\sin 133^\circ}{y}$
 $y \sin 12^\circ = 4 \sin 133^\circ$
 $y = \frac{4 \sin 133^\circ}{\sin 12^\circ}$
 $y = 14.1$

② $12^\circ + 133^\circ + m\angle Z = 180^\circ$
 $145^\circ + m\angle Z = 180^\circ$
 $m\angle Z = 35^\circ$

③ $\frac{\sin 12^\circ}{4} = \frac{\sin 35^\circ}{z}$
 $z \sin 12^\circ = 4 \sin 35^\circ$
 $z = \frac{4 \sin 35^\circ}{\sin 12^\circ}$
 $z = 11.0$

One Solution

5)

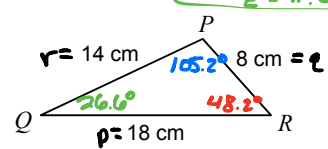


① $\frac{\sin 68^\circ}{31.9} = \frac{\sin B}{28}$
 $\frac{28 \sin 68^\circ}{31.9} = \sin B$
 $\sin^{-1}\left(\frac{28 \sin 68^\circ}{31.9}\right) = B$
 54.5°

② $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = (28)^2 + (29)^2 - 2(28)(29) \cos 68^\circ$
 $a^2 = 784 + 841 - 1624 \cos 68^\circ$
 $a^2 = 1625 - 1624 \cos 68^\circ$
 $a = \sqrt{1625 - 1624 \cos 68^\circ}$
 $a \approx 31.9$

④ $54.5^\circ + 68^\circ + m\angle C = 180^\circ$
 $122.5^\circ + m\angle C = 180^\circ$
 $m\angle C = 57.5^\circ$

6)



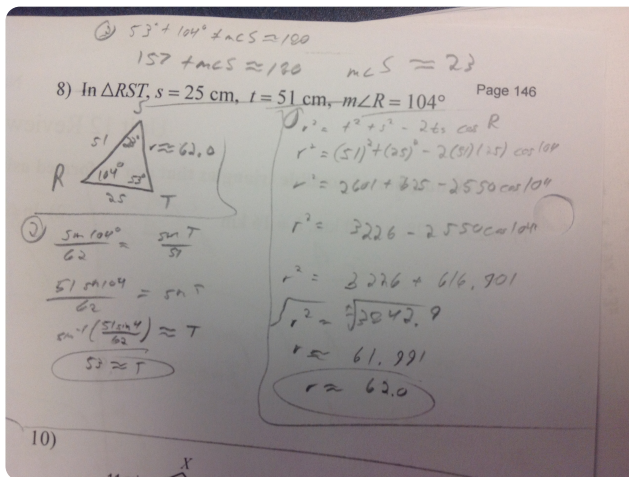
① $p^2 = r^2 + q^2 - 2rq \cos P$
 $(18)^2 = (14)^2 + (8)^2 - 2(14)(8) \cos P$
 $324 = 196 + 64 - 224 \cos P$
 $324 = 260 - 224 \cos P$
 $64 = -224 \cos P$
 $\frac{64}{-224} = \cos P$
 $\cos^{-1}\left(\frac{64}{-224}\right) = P$
 $105.2^\circ \approx P$

② $r^2 = p^2 + q^2 - 2pq \cos R$
 $(14)^2 = (18)^2 + (8)^2 - 2(18)(8) \cos R$
 $196 = 324 + 64 - 288 \cos R$
 $196 = 388 - 288 \cos R$
 $-192 = -288 \cos R$
 $\frac{192}{288} = \cos R$
 $\cos^{-1}\left(\frac{192}{288}\right) = R$
 $48.2^\circ \approx R$

③ $105.2^\circ + 48.2^\circ + m\angle Q = 180^\circ$
 $153.4^\circ + m\angle Q = 180^\circ$
 $m\angle Q = 26.6^\circ$

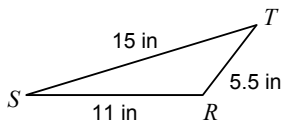
7) $b = 22$ cm, $a = 26$ cm, $c = 28$ cm

$m\angle B = 47.9^\circ$
 $m\angle A = 61.3^\circ$
 $m\angle C = 70.8^\circ$



Find the area of each triangle to the nearest tenth.

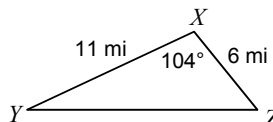
9)



$S = \frac{1}{2}(s+r+t)$
 $S = \frac{1}{2}(11+5.5+15)$
 $S = \frac{1}{2}(31.5)$
 $S = 15.75$

$A = \sqrt{s(s-a)(s-b)(s-c)}$
 $A = \sqrt{15.75(15.75-11)(15.75-5.5)(15.75-15)}$
 $A = \sqrt{15.75(.75)(4.25)(10.25)}$
 $A = \sqrt{575.1210938}$ in^2
 $A \approx 24.0 \text{ in}^2$

10)



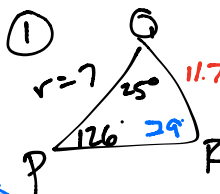
$A = \frac{1}{2}YZ \sin X$
 $A = \frac{1}{2}(6)(11) \sin 104^\circ$
 $A = 33 \sin 104^\circ$
 $A \approx 32.0 \text{ mi}^2$

11) In $\triangle FDE$, $d = 16$ ft, $e = 10$ ft, $f = 10$ ft

$S = \frac{1}{2}(e+f+d)$
 $S = \frac{1}{2}(16+10+10)$
 $S = \frac{1}{2}(36)$
 $S = 18$

$A = \sqrt{s(s-d)(s-e)(s-f)}$
 $A = \sqrt{18(18-16)(18-10)(18-10)}$
 $A = \sqrt{18(2)(8)(8)}$
 $A = \sqrt{2304}$ ft^2
 $A \approx 48 \text{ ft}^2$

12) In $\triangle PQR$, $m\angle P = 126^\circ$, $r = 7$ ft, $m\angle Q = 25^\circ$



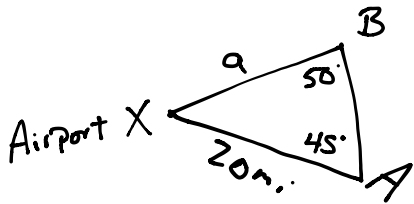
$126^\circ + 25^\circ + m\angle R = 180^\circ$
 $151^\circ + m\angle R = 180^\circ$
 $m\angle R = 29^\circ$

$\frac{\sin 29^\circ}{7} = \frac{\sin 126^\circ}{p}$
 $p \sin 29^\circ = 7 \sin 126^\circ$
 $p = \frac{7 \sin 126^\circ}{\sin 29^\circ}$
 $p = 11.7$

$A = \frac{1}{2}rP \sin Q$
 $A = \frac{1}{2}(7)(11.7) \sin 25^\circ$
 $A = 40.95 \sin 25^\circ$
 $A \approx 17.3 \text{ ft}^2$

Unit 12 Review Application

1. Airplane A is flying directly toward the airport that is 20 miles away. The pilot notices airplane B 45 degrees to her right. Airplane B is also flying directly toward the airport. The pilot of airplane B calculates that airplane A is 50 degrees to his left. Based on that information, how far is airplane B from the airport?



$$\frac{\sin 50^\circ}{20} = \frac{\sin 45^\circ}{a}$$

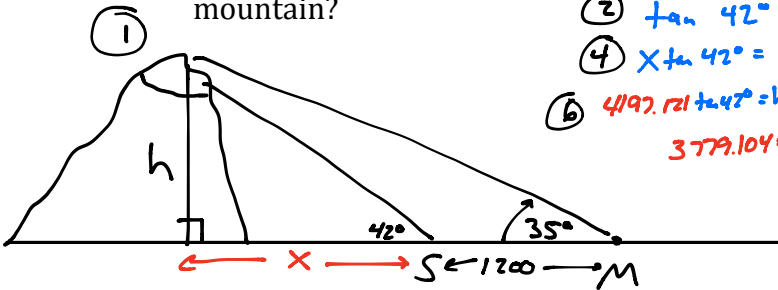
$$a \sin 50^\circ = 20 \sin 45^\circ$$

$$a = \frac{20 \sin 45^\circ}{\sin 50^\circ}$$

$$a = 18.5 \text{ mi}$$

Airplane B is 18.5 miles from the airport

2. Matt measures the angle of elevation of the peak of a mountain as 35°. Susie, who is 1200 feet closer on a straight level path, measures the angle of elevation as 42°. How high is the mountain?



② $\tan 42^\circ = \frac{h}{x}$ ③ $\tan 35^\circ = \frac{h}{x+1200}$

④ $x \tan 42^\circ = h$ ⑤ $\tan 35^\circ = \frac{x \tan 42^\circ}{x+1200}$

⑥ $4197.121 \tan 42^\circ = h$ $(x+1200) \tan 35^\circ = x \tan 42^\circ$

$3779.104 = h$ $x \tan 35^\circ + 1200 \tan 35^\circ = x \tan 42^\circ$

$1200 \tan 35^\circ = x \tan 42^\circ - x \tan 35^\circ$

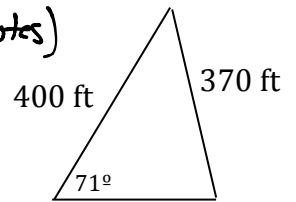
$1200 \tan 35^\circ = x (\tan 42^\circ - \tan 35^\circ)$

$\frac{1200 \tan 35^\circ}{\tan 42^\circ - \tan 35^\circ} = x$

$4197.121 = x$

3. Brust becomes a real estate agent as a side gig. Bean is considering purchasing a piece of property and is waiting for Brust's surveying report before closing the deal. Brust submits a drawing of the plot similar to the figure below. Explain why Brust should be fired.

Brust should be fired because (Look at your notes)



4. Brust submits a corrected drawing as shown below. Find the area of the plot of land.

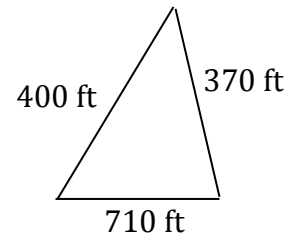
$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$A = \sqrt{740(740-400)(740-370)(740-710)}$$

$$A = \sqrt{740(340)(370)(30)}$$

$$A = \sqrt{2,792,760,000}$$

$$A \approx 52,846.570 \text{ ft}^2$$



$$s = \frac{1}{2}(a+b+c)$$

$$s = \frac{1}{2}(400+370+710)$$

$$s = \frac{1}{2}(1480)$$

$$s = 740$$

The area of the plot is 52,846.570 ft²

