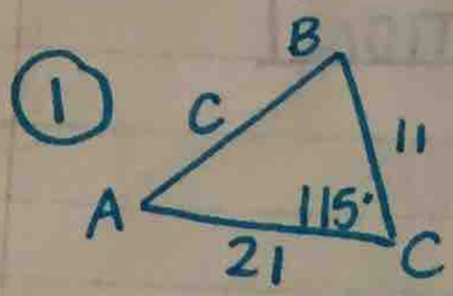
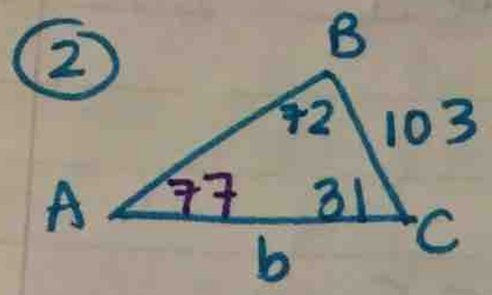
6.4 Law of Cosines & Sines solutions

① 

$c^2 = 11^2 + 21^2 - 2(11)(21)\cos 115°$

$c = 27.5$

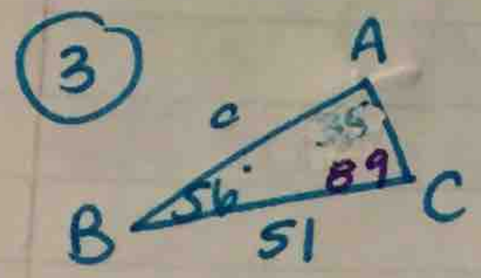
SAS → law of cosines

② 

$\frac{b}{\sin 72} = \frac{103}{\sin 77}$

$b = 100.5$

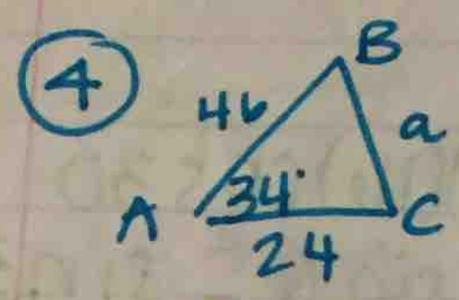
ASA → law of sines

③ 

$\frac{c}{\sin 89} = \frac{51}{\sin 35}$

$c = 88.9$

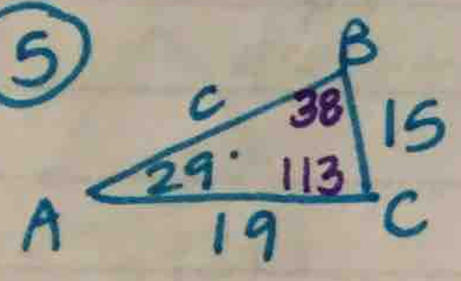
AAS → law of sines

④ 

$a^2 = 46^2 + 24^2 - 2(46)(24)\cos 34°$

$a = 29.4$

SAS → cosines

⑤ 

$\frac{\sin 29}{15} = \frac{\sin B}{19}$

$m\angle B = 38° \text{ OR } 142°$

① $\frac{c}{\sin 113} = \frac{15}{\sin 29}$

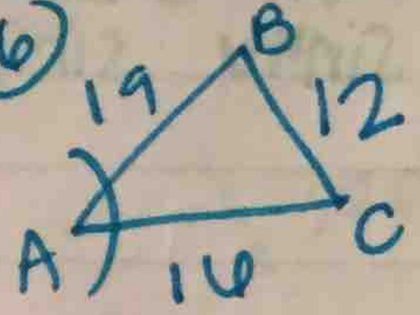
$c = 28.5$

OR

$\frac{c}{\sin 9} = \frac{15}{\sin 29}$

$c = 4.8$

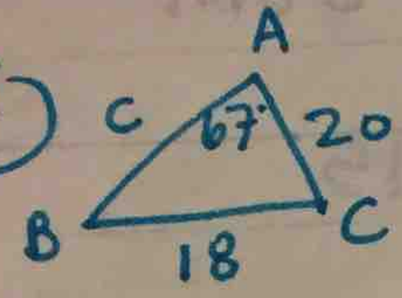
SSA → ambiguous!! (sines)

⑥ 

$12^2 = 19^2 + 16^2 - 2(19)(16)\cos A$

$m\angle A = 39°$

SSS → cosines

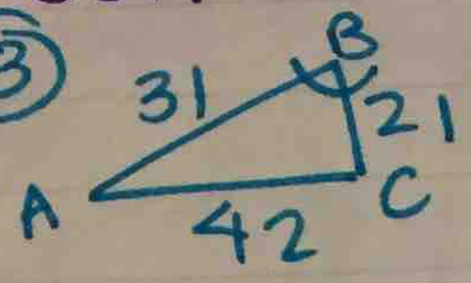
(7) 

$\frac{\sin B}{20} = \frac{\sin 67}{18}$

NO SOLUTION

$\sin^{-1}(1.02)$ DNE

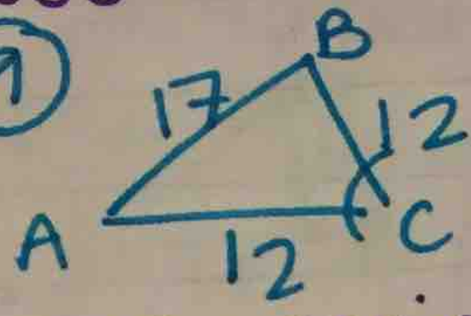
SSA → ambiguous (sines)

(8) 

$42^2 = 31^2 + 21^2 - 2(21)(31)\cos B$

$m\angle B = \boxed{106°}$

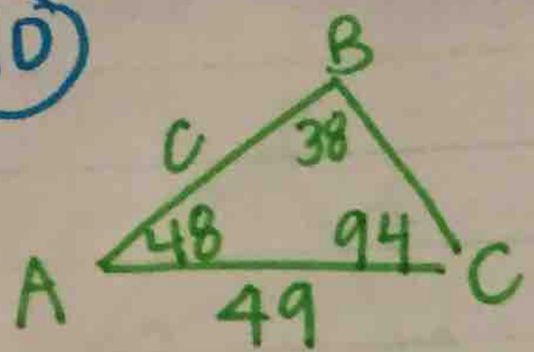
SSS → cosines

(9) 

$17^2 = 12^2 + 12^2 - 2(12)(12)\cos C$

$m\angle C = \boxed{90°}$

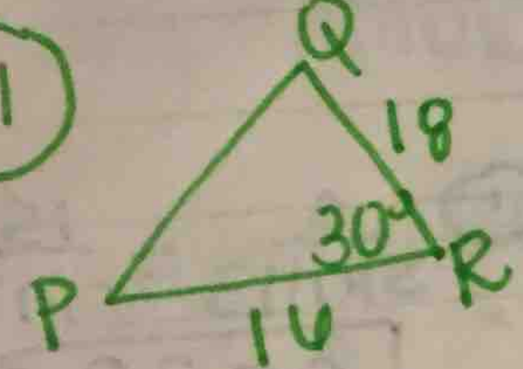
SSS → cosines

(10) 

$\frac{c}{\sin 94} = \frac{49}{\sin 38}$

$\boxed{c = 79.4}$

AAS → sines

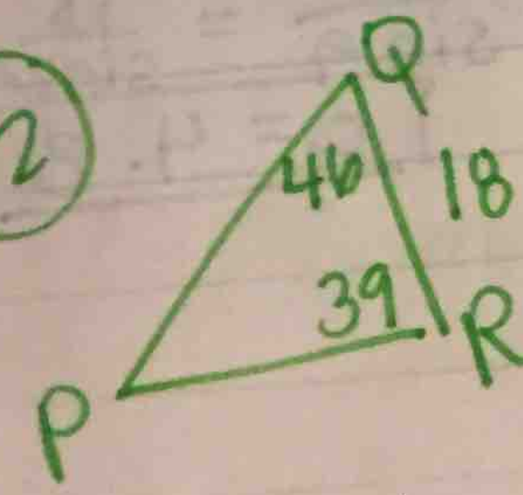
(11) 

$\boxed{\begin{array}{l} m\angle P = 90° \\ m\angle Q = 60° \\ r = 9 \end{array}}$

$r^2 = 18^2 + 16^2 - 2(18)(16)\cos 30$

$\frac{\sin P}{18} = \frac{\sin 30}{9}$ $\quad \frac{\sin Q}{16} = \frac{\sin 30}{9}$

SAS → cosines

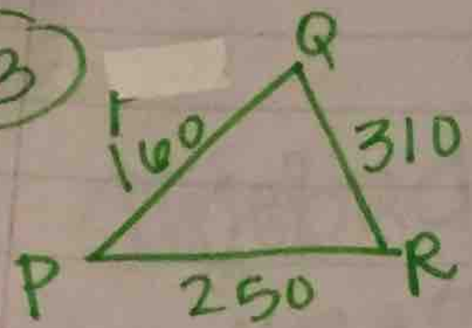
(12) 

$\boxed{\begin{array}{l} m\angle P = 95° \\ r = 11.4 \\ q = 13 \end{array}}$

$\frac{r}{\sin 39} = \frac{18}{\sin 95}$ $\quad \frac{q}{\sin 46} = \frac{18}{\sin 95}$

ASA → sines

(13)

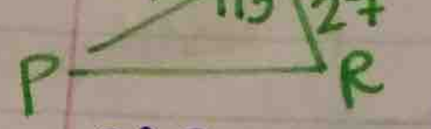


m∠P = 96°
m∠Q = 53°
m∠R = 31°

$310^2 = 250^2 + 160^2 - 2(250)(160)\cos P$
$250^2 = 160^2 + 310^2 - 2(160)(310)\cos Q$
$180 - 96 - 53$

SSS → cosines

(14)



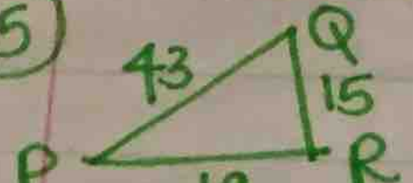
m∠P = 25°
m∠R = 42°
q = 59

$\frac{\sin P}{27} = \frac{\sin 113}{59}$

$q^2 = 43^2 + 27^2 - 2(43)(27)\cos 113$

SAS → cosines

(15)



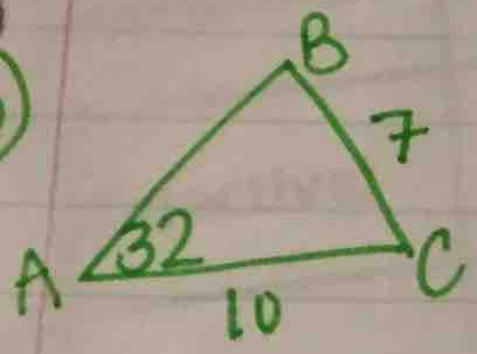
m∠P =
m∠Q =
m∠R =

NO SOLUTION

$15^2 = 43^2 + 19^2 - 2(43)(19)\cos P$
$\cos P = 1.214$
DNE

SSS → cosines

(16)



$\frac{\sin B}{10} = \frac{\sin 32}{7}$

$\sin^{-1}(.757) = m\angle B$

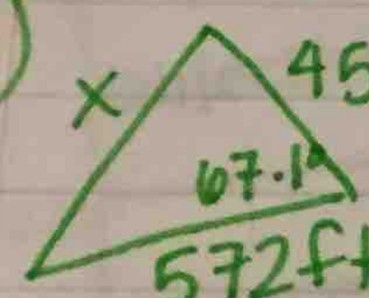
TWO SOLUTIONS!

m∠B = 49° OR 131° = m∠B
m∠C = 99° 17° = m∠C
c = 13 3.9 = c

$\frac{\sin 32}{7} = \frac{\sin 99}{c}$ $\frac{\sin 32}{7} = \frac{\sin 9}{c}$

SSA → ambiguous (sines)

(17)

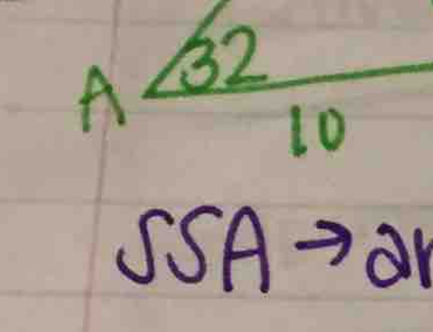


$x^2 = 452^2 + 572^2 - 2(452)(572)\cos 67.1$

575 ft

SAS → cosines

(18)



$429^2 = 541^2 + 395^2 - 2(541)(395)\cos A$

$\frac{\sin 51.7}{429} = \frac{\sin B}{541}$

SSS → cosines

51.7°, 82°, 46.3°