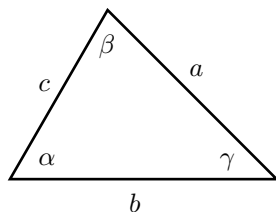


More problems for section 4.12 of *Essentials of Precalculus with Calculus Previews* by Zill and Dewar, 6e.

In all of these problems,  $a$ ,  $b$ , and  $c$  are the three sides of a triangle. The angle opposite side  $a$  is  $\alpha$ , the angle opposite side  $b$  is  $\beta$ , and the angle opposite side  $c$  is  $\gamma$ :



Hint: identify each group of problems as either SAS, SSA, AAS, or SSS.

1. Find  $\gamma$ ,  $a$ , and  $b$ , given  $c$ ,  $\alpha$ , and  $\beta$ .

- a.  $c = 10$ ,  $\alpha = 15^\circ$ ,  $\beta = 18^\circ$     b.  $c = 15$ ,  $\alpha = 25^\circ$ ,  $\beta = 15^\circ$     c.  $c = 90$ ,  $\alpha = 90^\circ$ ,  $\beta = 18^\circ$   
d.  $c = 100$ ,  $\alpha = 105^\circ$ ,  $\beta = 20^\circ$     e.  $c = 25$ ,  $\alpha = 155^\circ$ ,  $\beta = 30^\circ$     f.  $c = 12$ ,  $\alpha = 15^\circ$ ,  $\beta = 100^\circ$

2. (SSA: will not appear on your final exam.) Find  $\gamma$ ,  $\beta$ , and  $b$ , given  $a$ ,  $c$ , and  $\alpha$ .

- a.  $c = 15$ ,  $\alpha = 15^\circ$ ,  $a = 7$     b.  $c = 2$ ,  $\alpha = 20^\circ$ ,  $a = 3$     c.  $c = 4$ ,  $\alpha = 25^\circ$ ,  $a = 1.5$   
d.  $c = 10$ ,  $\alpha = 45^\circ$ ,  $a = 5$     e.  $c = 10$ ,  $\alpha = 45^\circ$ ,  $a = 8$     f.  $c = 70$ ,  $\alpha = 80^\circ$ ,  $a = 62$   
g.  $c = 95$ ,  $\alpha = 105^\circ$ ,  $a = 94$     h.  $c = 95$ ,  $\alpha = 105^\circ$ ,  $a = 96$     i.  $c = 3$ ,  $\alpha = 25^\circ$ ,  $a = 2$   
j.  $c = 6$ ,  $\alpha = 37^\circ$ ,  $a = 4$     k.  $c = 9$ ,  $\alpha = 42^\circ$ ,  $a = 12$     l.  $c = 12$ ,  $\alpha = 20^\circ$ ,  $a = 9$   
m.  $c = 10$ ,  $\alpha = 15^\circ$ ,  $a = 12$

#### Answers

- 1a.  $\gamma = 147^\circ$ ,  $a = 4.752$ ,  $b = 5.673$     1b.  $\gamma = 140^\circ$ ,  $a = 9.862$ ,  $b = 6.039$     1c.  $\gamma = 72^\circ$ ,  $a = 94.631$ ,  $b = 29.242$     1d.  $\gamma = 55^\circ$ ,  $a = 117.918$ ,  $b = 41.752$     1e. no such triangle exists.    1f.  $\gamma = 65^\circ$ ,  $a = 3.426$ ,  $b = 13.039$     2a. Either  $\gamma = 33.684^\circ$ ,  $\beta = 131.315^\circ$ ,  $b = 20.313$  Or  $\gamma = 146.315^\circ$ ,  $\beta = 18.684^\circ$ ,  $b = 8.664$     2b.  $\gamma = 13.180^\circ$ ,  $\beta = 146.82^\circ$ ,  $b = 4.800$     2c. no such triangle exists.    2d. no such triangle exists.    2e. Either  $\gamma = 62.114^\circ$ ,  $\beta = 72.885^\circ$ ,  $b = 10.812$  Or  $\gamma = 117.886^\circ$ ,  $\beta = 17.114^\circ$ ,  $b = 3.329$     2f. no such triangle exists.    2g. no such triangle exists.    2h.  $\gamma = 72.914^\circ$ ,  $\beta = 2.086^\circ$ ,  $b = 3.617$     2i. Either  $\gamma = 39.340^\circ$ ,  $\beta = 115.659^\circ$ ,  $b = 4.265$  Or  $\gamma = 140.659^\circ$ ,  $\beta = 14.340^\circ$ ,  $b = 1.172$     2j. Either  $\gamma = 64.518^\circ$ ,  $\beta = 78.481^\circ$ ,  $b = 6.512$  Or  $\gamma = 115.482^\circ$ ,  $\beta = 27.518^\circ$ ,  $b = 3.070$     2k.  $\gamma = 30.122^\circ$ ,  $\beta = 107.878^\circ$ ,  $b = 17.067$     2l. Either  $\gamma = 27.131^\circ$ ,  $\beta = 132.869^\circ$ ,  $b = 19.286$  Or  $\gamma = 152.869^\circ$ ,  $\beta = 7.131^\circ$ ,  $b = 3.266$     2m.  $\gamma = 12.455^\circ$ ,  $\beta = 152.544^\circ$ ,  $b = 21.376$