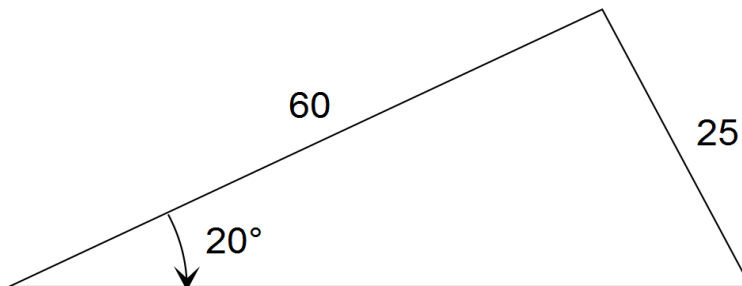


## TRNGL program

Follow the instructions below to find the length of the unknown side and the magnitude of each of the two unknown angles in the triangle below using the HP50g program TRNGL. The program will also return the area of the triangle.



Run the TRNGL program by pressing  $\boxed{FI}$  (if in RPN mode) or  $\boxed{FI}$  followed by  $\boxed{ENTER}$  (if in ALG mode).



RPN mode, press:

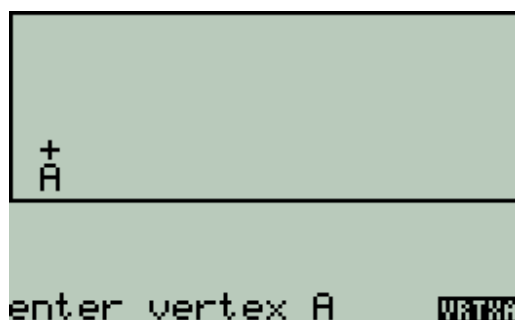
$\boxed{FI}$   $\boxed{ENTER}$



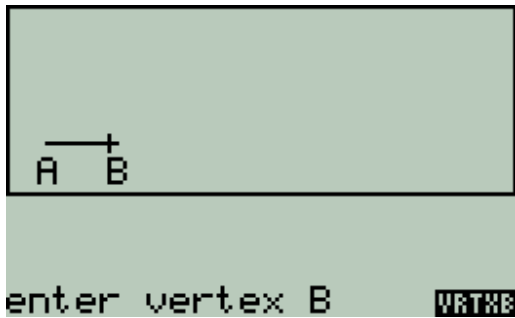
ALG mode, press:

$\boxed{FI}$   $\boxed{ENTER}$ , release, then press  $\boxed{ENTER}$

The screen should now look like this:

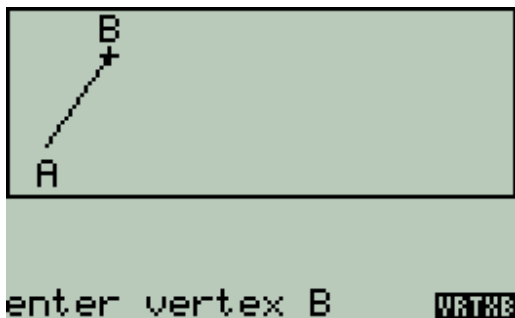


Press **F6** (**||||**) to locate vertex A on the screen:



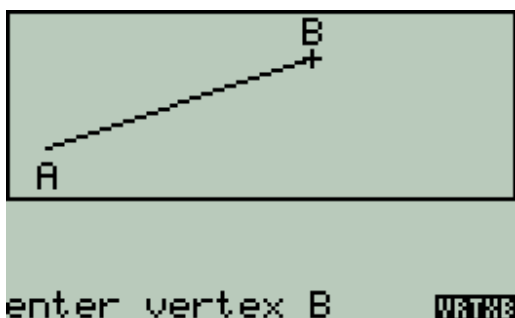
Press **▼** once to move vertex B to the top of the screen.  
Another way to do this is to press **↶**, release, then press **▲** (abbreviated **↶▲**).  
A third way is to hold down the **▲** key until vertex B is at the top of the screen.

The screen should now look like this:

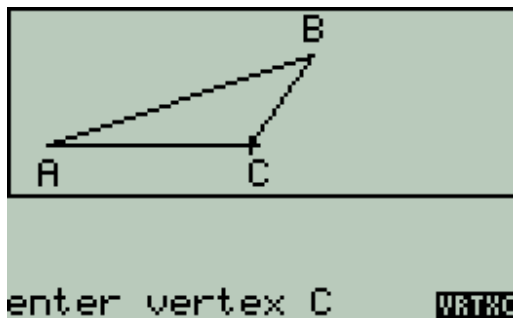


Press **↶▶** to move vertex B to the centre, then hold down **▶** momentarily to move vertex B closer to the right-hand edge of the screen.

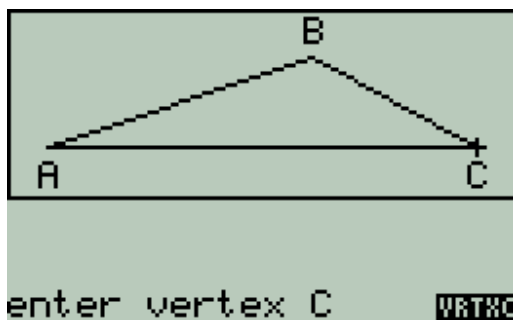
The screen should now look like this:



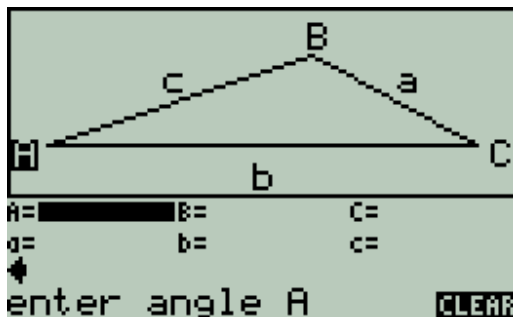
Press  $F6$  ( $\frac{\square}{\square}$ ) to locate vertex B on the screen:



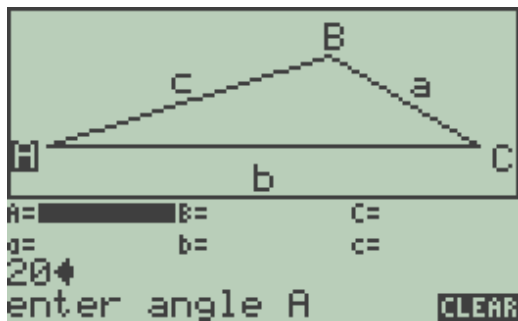
Press  $\leftarrow$   $\rightarrow$   $\leftarrow$   $\rightarrow$  :



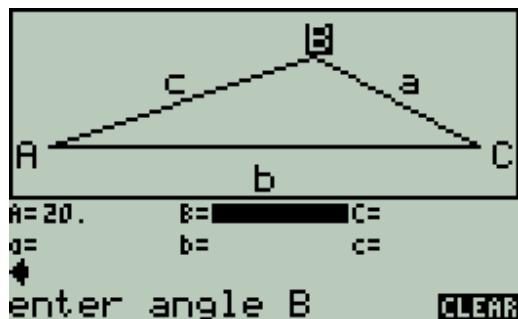
Press  $F6$  ( $\frac{\square}{\square}$ ) to locate vertex C on the screen:



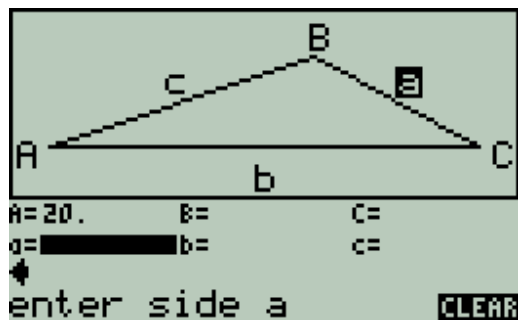
Type the magnitude of angle A ( $20^\circ$ ) by pressing   :



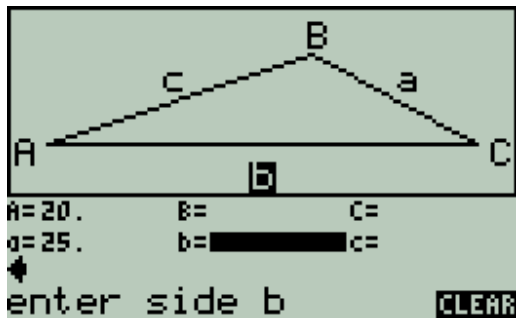
Then press  :



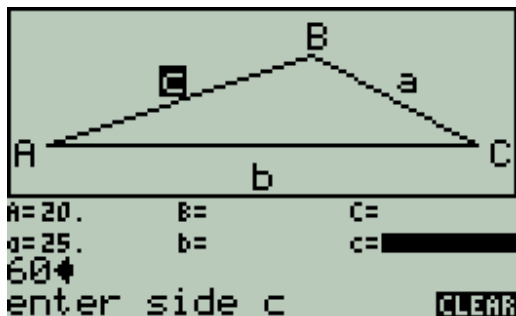
Press  twice:



Type the length of side a (25) then press **ENTER** :



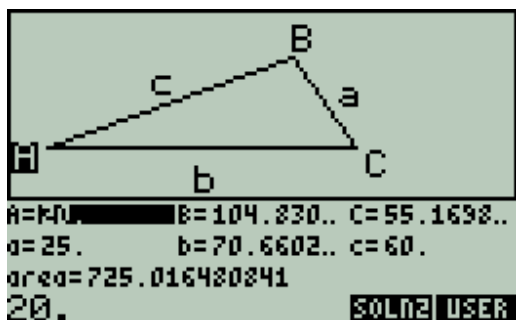
Press **ENTER** (or **▶**) then type the length of side c (60):



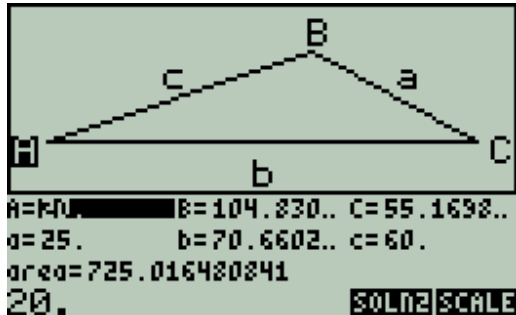
Press **ENTER**.

The calculator determines the magnitudes of the unknown angles and the length of the unknown side, and displays the results together with the area and a scale diagram of the triangle.

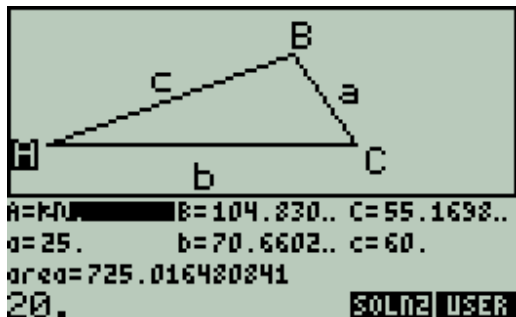
Note that there are 2 solutions in this case (as indicated by the **SOLN2** menu label):



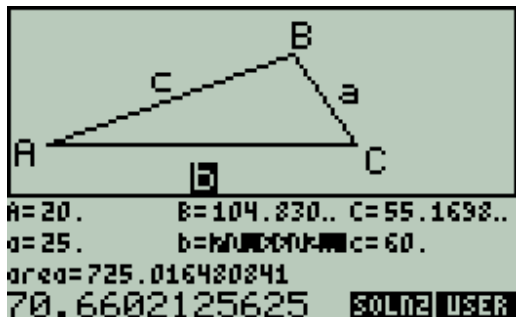
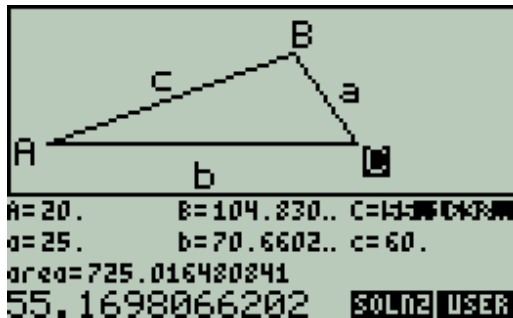
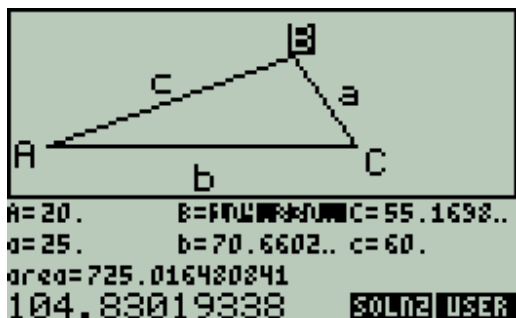
Press  $F_6$  ( $\square$ ) to see the original triangle you drew:



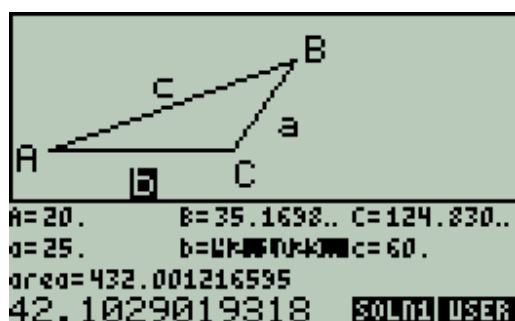
Press  $F_6$  ( $\square$ ) again to return to the scale diagram:



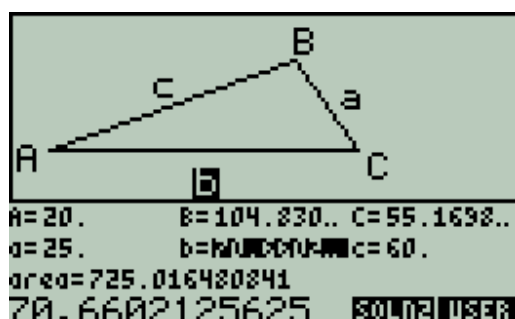
Use any of the  $\triangleleft$   $\triangleleft$   $\triangleright$   $\triangleright$  keys to highlight the value of each angle and side. The highlighted value can be viewed in its entirety at the very bottom of the screen:



Now press  $\boxed{F5}$  ( $\boxed{SOLN1}$ ) to examine the second solution:



Press  $\boxed{F5}$  ( $\boxed{SOLN2}$ ) again to return to the first solution:



When you have finished, press  $\boxed{ON}$  to exit the program and return to the home screen:



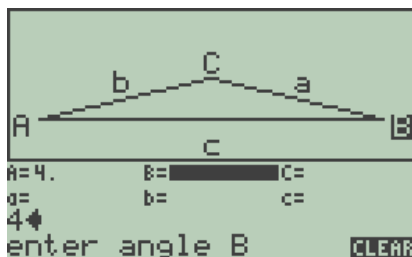
RPN mode



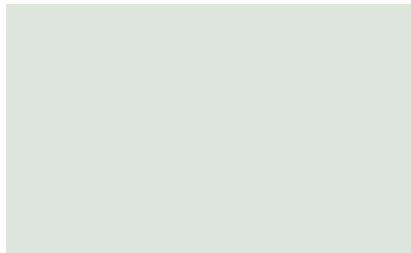
ALG mode

## NOTES

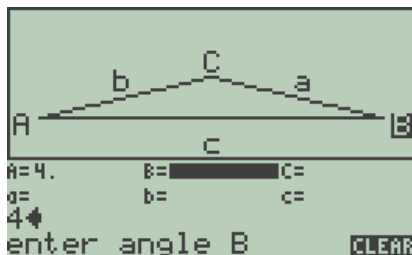
1. The triangle drawn by the user is simply a guide and need not be drawn accurately.
2. To exit the program at any time, press **ON**.
3. Use the left-shifted arrow keys (i.e. **←**) followed by one of **▲** **◀** **▼** **▶** ) to navigate quickly about the screen when drawing the triangle.
4. The calculator may be turned off at any time without exiting the program. Execution resumes when the calculator is turned back on:



Press **→** **ON** ( often written **→** **OFF** ):




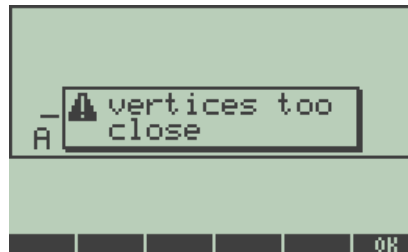
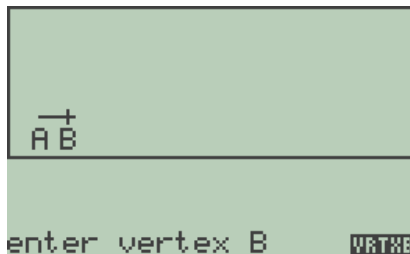
Press **ON**:



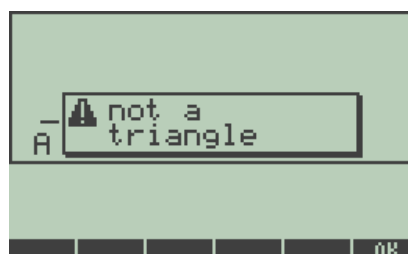
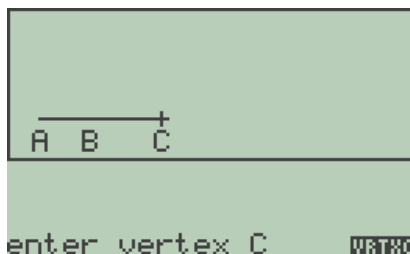
You may now continue using the program as usual.




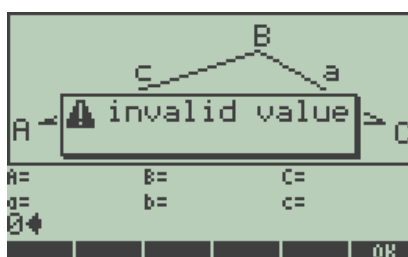
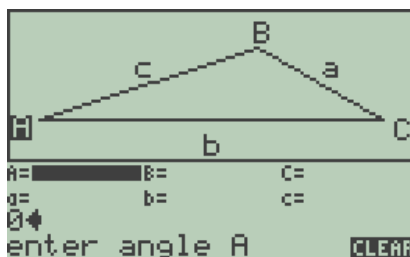
5. If the vertices are too close to one another or if all three vertices lie in a straight line an error will be generated. Press  $F_6$  (  ) and move the vertex to a different position:



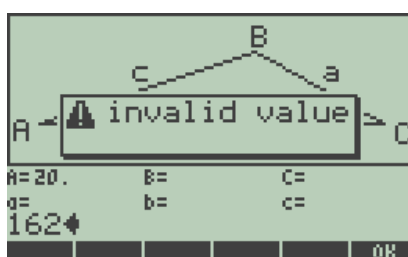
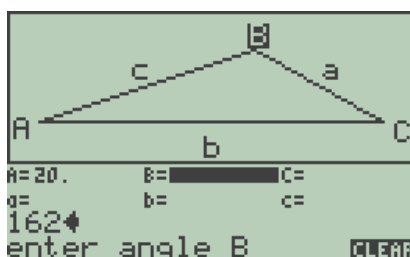
or



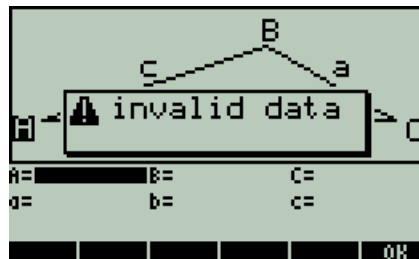
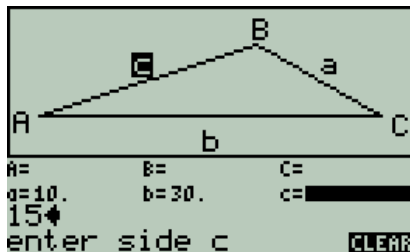
6. If 0 is entered for any angle or side or a number equal to or greater than 180 is entered for any angle an error will be generated. An error is also generated if the sum of the magnitudes of any two angles is greater than or equal to 180. Press  $F_6$  (  ) and enter a new value:



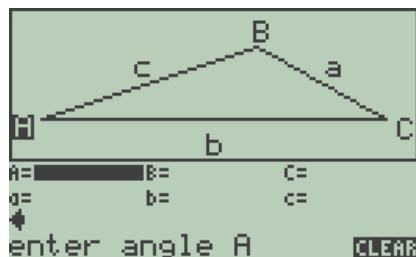
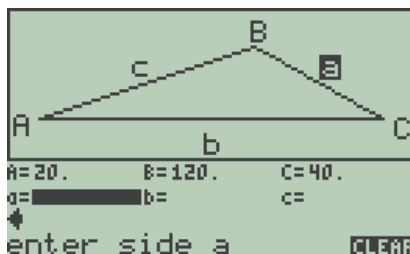
or



Similarly if it is not possible to construct a triangle with the values entered by the user an error is generated and the entered values deleted:



7. To delete all of the values entered press  $F6$  (ALL):



8. Any angle less than  $7^\circ$  is set to  $7^\circ$  in the scale diagram in order to maintain the appearance of a triangle. The calculated values are not affected:

