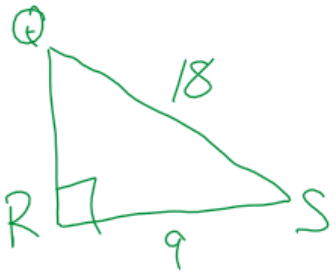
Do on pg 12

Warm up

In ΔQRS, $m\angle R = 90°$ and $\sin(Q) = \frac{9}{18}$.

1. What is $\cos(S)$? $\frac{9}{18} = \frac{1}{2}$ $\cos(S) = \frac{1}{2}$
2. What is $m\angle S$? $60°$
3. What is the length of $\overline{QS}$?

$9\sqrt{3} \approx 15.6$



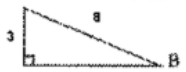
$\overline{QR}$

Using a Calculator

If you know the value of a specific trig ratio for an unknown angle, you can calculate the measure of the angle.

For example, if for the triangle below $\sin B = \frac{3}{8}$

$\sin B \approx .375$



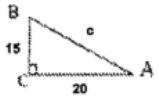
On most calculators written above the Sin, Cos and Tan buttons are: $\sin^{-1}, \cos^{-1}, \tan^{-1}$

These are used to find the angle when you already know the value for the ratio. On the calculator there will be a button, sometimes it reads "2nd", that will need to be pushed before you push the Sin, Cos or Tan button. This button will allow you to do the function above the button.

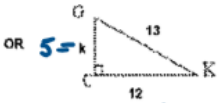
1

Problem-Solving Strategies

Scenario 1) You are given 2 sides of the triangle. Find the other side and the two acute angles.



OR



1A. Use the Pythagorean theorem to find the 3rd side.

$15^2+20^2=c^2$

$625=c^2$

$25=c$

$k^2+12^2=13^2$

$k^2=25$

$k=5$

1B. Use an inverse trig function to get an angle. Then use that angle to calculate the 3rd angle. Sum of the angles = 180°

$\tan(A)=\frac{15}{20}$

$A=\tan^{-1}(\frac{15}{20})$

$A=36.9°$

$B=90-36.9$

$B=53.1°$

$\cos(K)=\frac{12}{13}$

$K=\cos^{-1}(\frac{12}{13})$

$K=22.6°$

$G=90-22.6$

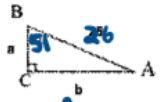
$G=67.4°$

2

Problem-Solving Strategies

Scenario 2) You are given an angle and a side.

Find the other angle and the two other sides.



1A. Use 2 different trig ratios from the given angle to get each of the other two sides.

$\cos(51)=\frac{a}{26}$

$a=26\cdot\cos(51)$

$a=16.4$

$\sin(51)=\frac{b}{26}$

$b=26\cdot\sin(51)$

$b=20.2$

1B. Use the sum of the angles to get the 3rd angle.

$A=90-51$

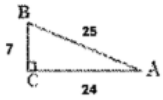
$A=39°$

3

Problem-Solving Strategies

Scenario 3) You are given all 3 sides of the triangle.

Find the two non-right angles.



1. Use 2 different trig. ratios to get each of the angles.

$\sin(A)=\frac{7}{25}$

$A=\sin^{-1}(\frac{7}{25})$

$A=16.3°$

$B=90-16.3=73.7°$

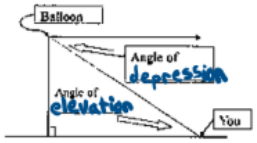
4

Angle of Elevation/Depression

Sometimes when we use right triangles to model real-life situations, we use the terms angle of elevation and angle of depression.

If you are standing on the ground and looking up at a hot air balloon, the angle that you look up from ground level is called the angle of elevation

If someone is in the hot air balloon and looks down to the ground to see you, the angle that they have to lower their eyes, from looking straight ahead, is called the angle of depression



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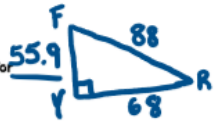
Draw a Picture

When solving math problems, it can be very helpful to draw a picture of the situation if none is given.

Here is an example.

Find the missing sides and angles for Triangle FRY. Given that angle Y is the right angle, f = 68, and y = 88.



$68^2+x^2=88^2$

$4624+x^2=7744$

$x^2=3120$

$x=55.9$

$\sin(F)=\frac{68}{88}$

$F=50.6°$

$R=90-50.6=39.4°$

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