7.1 Right Triangles

$a^2 + b^2 = c^2$

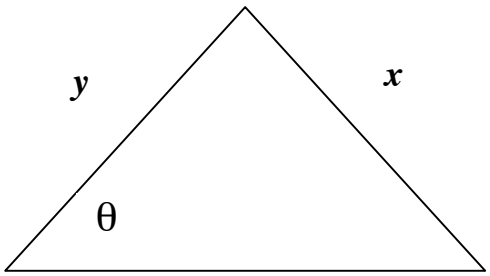
$\sin\theta$ = opposite/hypotenuse $\cos\theta$ = adjacent/hypotenuse $\tan\theta$ = opposite/adjacent

7.2 Law of Sines (Use when you know 2 angles and one side or when you know two sides and an angle that is not in between those two sides)

$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

The ambiguous case: SSA

You can label your triangle with the letters given in a certain problem later. For now we need to see the dimensions given as a side (call is ***x***) & the angle opposite that side (call it θ) and another side (call it ***y***).



Compare x and y.

1) If $x \geq y$, then there is one triangle.
2) Otherwise, find $h = y\sin\theta$.
    a) if $x < h = y\sin\theta$, then there is NO triangle
    b) if $x = h = y\sin\theta$, then there is ONE triangle
    c) if $x > h = y\sin\theta$, then there are TWO triangles.

7.3 Law of Cosines (SSS and SAS)

$a^2 = b^2 + c^2 - 2bc \times\cos A$

$b^2 = a^2 + c^2 - 2ac \times\cos B$

$c^2 = a^2 + b^2 - 2ab \times\cos C$

7.4 Area Formulas

When you know 3 sides (SSS):

S = (1/2)(a+b+c)
A = $\sqrt{s(s-a)(s-b)(s-c)}$

When you know 2 sides (s_1 & s_2) and the angle, θ, between them (SAS):
A = $(1/2)s_1s_2\sin\theta$

7.5 Simple Harmonic Motion

For y = asin (bx – c) or y = acos(bx – c)

|a| = A = amplitude = maximum displacement
T = 2π/B = period = time it takes for one oscillation
F = frequency = 1/T

To find phase shift set bx – c = 0 and solve for x. The solution is the phase shift.

8.1 Polar Coordinates

$x = r\cos\theta$ $y = r\sin\theta$ $r = \sqrt{x^2 + y^2}$ $r^2 = x^2 + y^2$

$\cos 2\theta = \cos^2\theta - \sin^2\theta$ $\sin 2\theta = 2\cos\theta \times \sin\theta$

8.2 Graphs of Polar Equations

These should be clear in your notes

8.3 Complex Numbers

$a + bi = r(\cos\theta + i\sin\theta)$ where $r = \sqrt{a^2 + b^2}$ (called magnitude of the number) and $\alpha = \tan^{-1}|b/a|$, α is a reference angle for θ (you need to determine in which quadrant θ lies to get an accurate answer)

For products, quotients, powers, and roots of complex numbers written in polar form consult your notes.

8.4 Vectors

Review scalar multiples,adding and subtracting vectors, magnitude of vectors, finding unit vectors in the direction of the vector, and given the terminal and initial points for a vector find the vector in a given direction (the position vector).

All of this was given in lecture – we can review it on Thursday if necessary.