The unit circle. Memorize the following:

Definition of the Six Trigonometric Functions

Right triangle definitions, where $0 < \theta < \pi/2$.

\[
\sin \theta = \frac{\text{opp}}{\text{hyp}}, \quad \csc \theta = \frac{\text{hyp}}{\text{opp}}, \\
\cos \theta = \frac{\text{adj}}{\text{hyp}}, \quad \sec \theta = \frac{\text{hyp}}{\text{adj}}, \\
\tan \theta = \frac{\text{opp}}{\text{adj}}, \quad \cot \theta = \frac{\text{adj}}{\text{opp}}.
\]

Circular function definitions, where $\theta$ is any angle.

\[
\sin \theta = \frac{y}{r}, \quad \csc \theta = \frac{r}{y}, \\
\cos \theta = \frac{x}{r}, \quad \sec \theta = \frac{r}{x}, \\
\tan \theta = \frac{y}{x}, \quad \cot \theta = \frac{x}{y}.
\]

Know how to answer questions like: what is $\tan(5\pi/6)$? and what is $\cos^{-1}(1/2)$?

Trigonometric identities. Memorize the following trigonometric identities:

\begin{align*}
\text{Pythagorean Identity:} & \quad \sin^2 \theta + \cos^2 \theta = 1 \\
\text{Even/Odd Identities:} & \quad \sin(-\theta) = -\sin(\theta), \quad \cos(-\theta) = \cos(\theta) \\
\text{Supplementary Angle Identities:} & \quad \sin(\pi - \theta) = \sin(\theta), \quad \cos(\pi - \theta) = -\cos(\theta) \\
\text{Complementary Angle Identities:} & \quad \sin(\pi/2 - \theta) = \cos(\theta), \quad \cos(\pi/2 - \theta) = \sin(\theta) \\
\text{Sum and Difference Formulas:} & \quad \sin(A \pm B) = \sin(A) \cos(B) \pm \sin(B) \cos(A) \\
& \quad \cos(A \pm B) = \cos(A) \cos(B) \mp \sin(A) \sin(B)
\end{align*}

It would also be helpful to memorize the following identities, but you can survive without them if you know the sum and difference formulas:

\begin{align*}
\text{Double Angle Formulas:} & \quad \sin(2\theta) = 2\sin(\theta)\cos(\theta), \quad \cos(2\theta) = \cos^2(\theta) - \sin^2(\theta) \\
\text{Complementary Angles:} & \quad \sin^{-1}(x) + \cos^{-1}(x) = \frac{\pi}{2} \\
\text{Logarithm Rules.} & \quad \log_a(xy) = \log_a x + \log_a y, \quad a^{\log_a x} = x \\
& \quad \log_a(x/y) = \log_a x - \log_a y, \quad \log_a a^x = x \\
& \quad \log_a(x^r) = r \log_a x, \quad \log_b x = \frac{\log_a x}{\log_a b}
\end{align*}

Domain and Range. You should know the domain and range of the following functions, and know what their graphs look like: $x^2, \sqrt{x}, \ln x, a^x, \sin x, \cos x, \tan x, \sin^{-1} x, \cos^{-1} x$, and $\tan^{-1} x$.

ONLINE PRACTICE TESTS: If you have access to the web, you may take “practice tests” online at

http://wcherry.math.unt.edu/math1650/gw.html
Where to find practice problems

The following table tells you where you can find reading/practice problems if you are having trouble with some of the sample test questions. The first column refers to the problem number on the sample test.

<table>
<thead>
<tr>
<th>Prob. #</th>
<th>Question</th>
<th>Reading/Study</th>
<th>Practice Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \tan(2\pi/3) =? )</td>
<td>Memorize the unit circle on front of this hand-out and study sections 5.1, 5.2 and 5.5</td>
<td>§5.2: 3–22 =§5.5: 3–10</td>
</tr>
<tr>
<td>2</td>
<td>( t^2 = \ln(1 + x) - \ln(1 - x), x =? )</td>
<td>Study section 4.5</td>
<td>§4.5: 3–68</td>
</tr>
<tr>
<td>3</td>
<td>Solve ( \sin^2 x + 2 \sin x = 5/4 )</td>
<td>Study section 7.4</td>
<td>§7.4: 5–56</td>
</tr>
<tr>
<td>4</td>
<td>( f(x) = \sqrt{4x^2 + 8}, x \geq 0 ) find ( f^{-1} )</td>
<td>Study section 2.8, especially examples 8 &amp; 9. You may also need to study sections 4.3 and 5.5</td>
<td>page §2.8: 49–70 =§4.3: 93–94</td>
</tr>
<tr>
<td>5</td>
<td>( \sin(2 \cos^{-1} x) =? )</td>
<td>Memorize the trigonometric identities on the front of this page and study examples 7 and 8 in section 7.3.</td>
<td>§7.3: 43–54</td>
</tr>
<tr>
<td>6</td>
<td>( f(x) = \frac{1 + \sin x}{\cos x}, -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}, ) what is ( f^{-1}(x) )?</td>
<td>Study sections 1.4, 2.8, and 5.5.</td>
<td>§2.8: 49–70</td>
</tr>
<tr>
<td>7</td>
<td>( \frac{d}{dx} )</td>
<td>Study section 1.4</td>
<td>problems in §1.4, especially 59–78.</td>
</tr>
<tr>
<td>8</td>
<td>( \sqrt{12} \sqrt{x} )</td>
<td>Study section 1.2</td>
<td>§1.2: 61–78</td>
</tr>
<tr>
<td>9</td>
<td>domain of ( 2 - 1\ln(x^2 - 9) )</td>
<td>Study section 2.1 and know the domain and ranges of the functions listed on the previous page</td>
<td>§2.1: 51–72</td>
</tr>
<tr>
<td>10</td>
<td>( \frac{x^2 - 2x - 24}{x^2 - 11x + 28} )</td>
<td>Study sections 1.3 and 1.4</td>
<td>Any problems from sections 1.3 and 1.4</td>
</tr>
<tr>
<td>11</td>
<td>slope of ( 4 = -2x + 3y )</td>
<td>Study section 1.10</td>
<td>§1.10: 9–50</td>
</tr>
<tr>
<td>12</td>
<td>word problem</td>
<td>Section 1.7</td>
<td>Any word problem in section 1.7</td>
</tr>
</tbody>
</table>