Math 3A Test 1 Solutions

1. $\frac{3\pi}{2\pi} = 1.5$ rounds

1st Round:

In Quadrant II, $x = \pi - \frac{\pi}{3}$
$= \frac{3\pi}{3} - \frac{\pi}{3}$
$= \frac{2\pi}{3}$

In Quadrant III, $x = \pi + \frac{\pi}{3}$
$= \frac{3\pi}{3} + \frac{\pi}{3}$
$= \frac{4\pi}{3}$

Half round is only in Quadrant II: $x = \frac{2\pi}{3} + 2\pi$
$= \frac{2\pi}{3} + \frac{6\pi}{3}$
$= \frac{8\pi}{3}$

$\boxed{\frac{2\pi}{3}, \frac{4\pi}{3}, \frac{8\pi}{3}}$

2. Plugging in 6 for x:

$\frac{10}{1-x} = \frac{10}{1-6}$
$= \frac{10}{-5}$
$= -2$

$(3,-5)\ (6,-2)$

$m = \frac{-2 - -5}{6-3}$
$= \frac{3}{3}$
$= \boxed{1}$

3a. -2

3b. -1

3c. dne

3d. -2

3e. 1

3f. 2

4a. $\lim_{x \to 7} \frac{(x+9)\cancel{(x-7)}}{\cancel{x-7}}$
$= \lim_{x \to 7} (x+9)$
$= 7+9$
$= \boxed{16}$

4b. $\lim_{t \to 0} \frac{(\sqrt{100+t} - \sqrt{100-t})(\sqrt{100+t} + \sqrt{100-t})}{t(\sqrt{100+t} + \sqrt{100-t})}$
$= \lim_{t \to 0} \frac{100+t-(100-t)}{t(\sqrt{100+t} + \sqrt{100-t})}$
$= \lim_{t \to 0} \frac{\cancel{100}+t-\cancel{100}+t}{t(\sqrt{100+t} + \sqrt{100-t})}$
$= \lim_{t \to 0} \frac{2\cancel{t}}{\cancel{t}(\sqrt{100+t} + \sqrt{100-t})}$
$= \frac{2}{\sqrt{100+0} + \sqrt{100-0}}$
$= \frac{2}{\sqrt{100} + \sqrt{100}}$
$= \frac{2}{10+10}$
$= \frac{2}{20}$
$= \boxed{\frac{1}{10}}$

5. $4(8)^2 + a(8) + a + 23 = 0$
$256 + 9a + 23 = 0$
$9a + 279 = 0$
$\frac{9a}{9} = \frac{-279}{9}$
$\boxed{a = -31}$

6. $f(2) = 2^3 + 4(2) - 25 = -9$
$f(3) = 3^3 + 4(3) - 25 = 14$

Since $K = 0$ is between $f(2) = -9$ and $f(3) = 14$ and $f(x) = x^3 + 4x - 25$ is continuous on $[2,3]$, by the Intermediate Value Theorem, there is a root of the equation $x^3 + 4x - 25 = 0$ on the interval $(2,3)$.