Math 220 (section ???) Quiz 3 Fall 2011

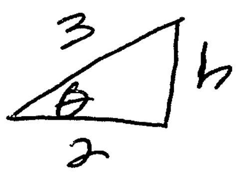
Name solutions

- No calculators allowed.
- Show sufficient work to justify each answer.
- You have 15 minutes for this quiz.

1. (2 points) Evaluate $\tan\left(\sec^{-1}\left(\frac{3}{2}\right)\right)$.

Let $\theta = \sec^{-1}\left(\frac{3}{2}\right)$

so $\sec\theta = 3/2 \left(\frac{hyp}{adj}\right)$



$\Rightarrow 2^2 + h^2 = 3^2 \Rightarrow h = \sqrt{5}$

$\tan\left(\sec^{-1}\left(\frac{3}{2}\right)\right) = \tan\theta$

$= \frac{\sqrt{5}}{2}$ $\left(\frac{opp}{adj}\right)$

You could use identity $\tan^2\theta = \sec^2\theta - 1$ as well

2. (2 points) There is an odd function $f(x)$ which is continuous at all real numbers and takes on the following values.

$f(1) = 2, \quad f(2) = -4, \quad f(3) = 5, \quad f(4) = 6, \quad f(5) = 4, \quad f(6) = -2$

Evaluate $\lim_{x \to -4} f(x)$. $= f(-4)$ since f is continuous

$= -f(4)$ since f is odd

$= -6$

3. (2 points each) Evaluate the following limits.

(a) $\lim_{x\to-\infty} \frac{5+2x^3}{3x^3+4}$ $= \lim_{x\to-\infty} \frac{(5+2x^3)(1/x^3)}{(3x^3+4)(1/x^3)}$

$= \lim_{x\to-\infty} \frac{5/x^3+2}{3+4/x^3}$

$= \frac{0+2}{3+0} = \frac{2}{3}$

(b) $\lim_{x\to 2.5^+} \frac{e^x}{5-2x}$ $\frac{\nearrow e^{2.5}}{\to 0^-}$

since $e^x \to e^{2.5}$ (a positive number)

and $5-2x \to 0^-$

$\lim_{x\to 2.5^+} \frac{e^x}{5-2x} = -\infty$

(c) $\lim_{x\to 3} \frac{2x^2-18}{2x^2-5x-3}$ $= \lim_{x\to 3} \frac{2(x^2-9)}{(2x+1)(x-3)}$

$= \lim_{x\to 3} \frac{2(x-3)(x+3)}{(2x+1)(x-3)}$

$= \lim_{x\to 3} \frac{2(x+3)}{2x+1}$ $\frac{\to 12}{\to 7}$

$= \frac{12}{7}$