CS 173, Fall 2014, Examlet 1, Part B Solutions

NAME:	**NETID:**

Discussion: Th 2 Th 3 Th 4 Th 5 Fr 9 Fr 10 Fr 11 Fr 12 Fr 1 Fr 2

1. (5 points) Suppose $\log_k x = 8$. Then $\log_k(x\sqrt{x}) =$
   Solution: $\log_k(x\sqrt{x}) = \log_k(x^{3/2}) = \frac{3}{2}\log_k(x) = \frac{3}{2} \cdot 8 = 12$

2. (10 points) Check the (single) box that best characterizes each item.

$\sqrt{2} \in \mathbb{Q}$	true	☐	false	☑		
For any real number x, if $\lvert x+5\rvert \leq 10$, then $\lvert x\rvert \leq 20$.	true	☑	false	☐	undefined	☐
$\neg(p \wedge \neg q) \equiv \neg p \wedge q$	true	☐	false	☑		
$\forall x \in \mathbb{R}$, if $\pi = 3$, then $x < 20$. (π is the familiar constant.)	true	☑	false	☐	undefined	☐

$3^{\lfloor -1.5 \rfloor} =$	-3	☐	$\frac{1}{9}$	☑	$\frac{1}{3\sqrt{3}}$	☐	$\frac{1}{3}$ ☐

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1. (5 points) $\dfrac{\log_2(32^3)}{5} =$

   Solution: $\dfrac{\log_2(32^3)}{5} = \dfrac{3\log_2(32)}{5} = \dfrac{3\log_2(2^5)}{5} = \dfrac{3 \cdot 5}{5} = 3$

2. (10 points) Check the (single) box that best characterizes each item.

$p \vee q \equiv \neg p \to q$	true	√	false			
$\exists n \in \mathbb{Z}$, such that $n^2 > 10$.	true	√	false		undefined	
For all integers n, if $n^2 = 101$, then $n > 11$.	true	√	false		undefined	
For any real number x, $\lfloor x \rfloor < \lceil x \rceil$.	true		false	√		
$0 \in \mathbb{N}$	true	√	false			

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1. (5 points) $\dfrac{1}{(\frac{1}{2})^4 + (-\frac{1}{2})^5} =$

   Solution: $\dfrac{1}{(\frac{1}{2})^4 + (-\frac{1}{2})^5} = \dfrac{1}{\frac{1}{16} - \frac{1}{32}} = \dfrac{1}{\frac{2-1}{32}} = \dfrac{1}{\frac{1}{32}} = 32$

2. (10 points) Check the (single) box that best characterizes each item.

   $p \vee q \equiv \neg p \to q$ — true [√] false [ ]

   For all positive integers n,
   if $n! < -10$, then $n > 8$. — true [√] false [ ] undefined [ ]

   $\forall x \in \mathbb{R}$,
   if $x^2 > 100$, then $|x| \geq 10$. — true [√] false [ ] undefined [ ]

   $\lfloor -3 \rfloor$ — 3 [ ] -3 [√] 4 [ ] -4 [ ]

   $\log_2 3 < \log_3 2$ — true [ ] false [√]