

1. [10] 2. [5] 3. [15] 4. [10] 5. [15] 6. [10] 7. [10] 8. [10] 9. [15] Total: [100]

Math 223

Final (8:00 AM version)

Oct 23, 2015

Name:

Section:

Closed book and closed notes.

Answers must include supporting work.

Calculators and cell phones out of sight.

1. (10 pts) Express the angle, $\theta = 300^\circ$, in radians and determine the values:
 $\sin \theta$, $\cos \theta$, and $\tan \theta$.

2. (5 pts) Express the quantity $2 \ln x + 3 \ln y - \ln z$ as a single logarithm.

3. (15 pts) Find the exact value of each expression.

a) $\log_8 2$ b) $\log_5 \frac{1}{125}$ c) $e^{\ln 4.5}$ d) $\arctan 1$ e) $\tan(\arctan 10)$

4. (10 pts) Find the domain of $f(x) = \ln(6 - x - x^2)$.

5. (15 pts) Find all x that satisfy the equation.

a) $2 \cos x - 1 = 0$ for x in the interval $[0, 2\pi]$.

b) $e^{7-4x} = 6$

c) $e^{e^x} = 10$

6. (10 pts) Simplify the expression $\sin(\tan^{-1} x)$.

7. (10 pts) Sketch the following graphs labeling the x-intercepts and all asymptotes.

a) $y = 1 - 2^{-x}$

b) $y = \tan\left(x - \frac{\pi}{2}\right)$ on $[0, 2\pi]$

8. (10 pts) Find each x-value at which f is discontinuous. Explain your answer fully using left and right-hand limits.

$$f(x) = \begin{cases} x+2 & \text{if } x < 0 \\ 2x^2 & \text{if } 0 \leq x \leq 1 \\ 3-x & \text{if } x > 1 \end{cases}$$

9. (15 pts) Find the following limits:

a) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - x - 6}$

b) $\lim_{x \rightarrow 4^-} \frac{x^2 - 16}{|x - 4|}$

c) $\lim_{h \rightarrow 0} \frac{\sqrt{9+h} - 3}{h}$