

Test #2 (Part 1, No Calculator)

Name: _____

Math 160, Prof. Beydler

Thursday, October 25, 2018

Directions: Show all work. No calculator, books, or notes. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. When you're finished with Part 1, please turn it in, take a bathroom break, get your calculator out, and start Part 2. Good luck!

1. (3 points) Find the inverse of $f(x) = \frac{2x-1}{3-x}$. Be sure to state the domain of $f^{-1}(x)$.

$$f^{-1}(x) = \underline{\hspace{10em}}$$

Domain of $f^{-1}(x)$: _____

2. (3 points) Find the domain of $f(x) = \log_3(x + 3) + \sqrt{\frac{x}{x+2}}$

Domain: _____

3. (3 points) Expand using the properties of logarithms: $\ln \sqrt{\frac{e^x}{x^3(3x+2)^4}}$

Answer: _____

4. (3 points) Write as a single logarithm and simplify:

$$\frac{1}{3}\log(x + 2) - 2\log(2x - 3) + \log(x + 1) - \frac{1}{4}\log x$$

Answer: _____

5. Find the exact value without a calculator.

a) (1 point) $\sin\left(-\frac{7\pi}{6}\right)$

Answer: _____

b) (1 point) $\cos\frac{5\pi}{4}$

Answer: _____

c) (1 point) $\cot 41\pi$

Answer: _____

d) (1 point) $\csc\frac{11\pi}{3}$

Answer: _____

6. (2 points) Suppose $\cos \theta = -\frac{\sqrt{5}}{3}$ and $\cot \theta < 0$. Find $\csc \theta$.

Answer: _____

7. Find the exact value in radians without a calculator.

a) (1 point) $\cos^{-1} \frac{1}{\sqrt{2}}$

Answer: _____

b) (1 point) $\tan^{-1} \left(-\frac{1}{\sqrt{3}} \right)$

Answer: _____

c) (1 point) $\sin^{-1} \pi$

Answer: _____

d) (1 point) $\sin^{-1} \left(\sin \frac{11\pi}{6} \right)$

Answer: _____

8. (2 points) Rewrite each expression as an algebraic expression in x .

$\cot(\sin^{-1} x)$

Answer: _____

9. (3 points) Find the exact value of $\cos \left(2 \tan^{-1} \frac{5}{2} \right)$ without a calculator.

Answer: _____

10. (3 points) Prove the identity: $\frac{1}{\tan \theta + \cot \theta} = \sin \theta \cos \theta$

11. (4 points) Suppose $\cot x = -\frac{2}{3}$ and $270^\circ < x < 360^\circ$. Find $\sin 2x$ and $\cos \frac{x}{2}$.

$\sin 2x =$ _____

$\cos \frac{x}{2} =$ _____

12. (3 points) Express $\cos^4 x$ in terms of the first power of cosine.

Answer: _____