

# MATH-119

## WEEK 10

### RECITATION QUESTIONS

1. Compute

a)  $\tan^{-1}(\tan \frac{2\pi}{3})$

b)  $\sin(\cos^{-1}(\frac{-1}{3}))$

2. Find the derivative w.r.t  $x$  of the function.

$$f(x) = \sin^{-1}\left(\frac{2x-1}{3}\right)$$

3. Find the slope of

$$\tan^{-1}\left(\frac{2x}{y}\right) = \frac{\pi x}{y^2} \text{ at } (1, 2)$$

4. Verify the addition formulas for

$$\cosh(x+y) \text{ and } \sinh(x+y)$$

5. Verify that

$$\int \operatorname{sech} x \, dx = \tan^{-1}(\sinh x) + c$$

6. Verify that

$$\int \tanh^{-1} x \, dx = x \tanh^{-1} x + \frac{1}{2} \ln(1-x^2) + c$$

7. Compute the limits

a)  $\lim_{x \rightarrow 0} x \cot x$

b)  $\lim_{x \rightarrow 0} \frac{10^x - e^x}{x}$

c)  $\lim_{t \rightarrow \frac{\pi}{2}^-} (\sec t - \tan t)$

d)  $\lim_{x \rightarrow 0^+} x^{\sqrt{x}}$