



Name: _____

Mark:
25

MATH 101

Assignment 1

1. (2 marks) Solve for x .

$$\operatorname{arccsc} \frac{2x}{3} = \arctan \frac{1}{\sqrt{x}}$$

2. (2 marks) Differentiate and simplify.

$$f(x) = x^2 \arcsin \frac{x^2}{3} + \sqrt{9 - x^4}$$

3. (2 marks) Evaluate the definite integral.

$$\int_1^{\sqrt{e}} \frac{1}{x\sqrt{1 - (\ln x)^2}} dx$$

4. (2 marks) Find the integral.

$$\int \frac{1}{x\sqrt{x-1}} dx$$

5. (3 marks) Find the integral.

$$\int \frac{7x + 39}{x^2 + 10x + 29} dx$$

6. (2 marks) Simplify as much as possible by first converting to exponential form.

$$\frac{1 + \tanh \frac{x}{2}}{1 - \tanh \frac{x}{2}}$$

7. (2 marks) Differentiate and simplify.

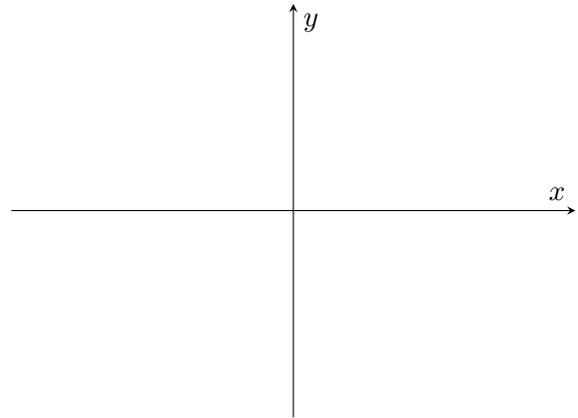
$$y = \frac{1}{2} \sinh^{-1} \left(\frac{e^{2x}}{4} \right)$$

8. (2 marks) Find the integral.

$$\int \frac{\cosh x}{1 - \cosh^2 x} dx$$

9. (2 marks) Find the equation of the tangent line to the curve $y = (\cosh x)^{\sinh x}$ at $x = 0$.

10. (3 marks) Find the area of the region in the plane bounded by the curves $y = \cosh x$ and $y = \sinh x$ for $0 \leq x \leq 1$. Round your answer to three decimal places. Include a sketch of the curves and shade the region.



11. (3 marks) Find the area of the region in the plane bounded by the curves $y = \ln x$, $y = 0$ and $x = e$ by setting up and evaluating a definite integral **with respect to y** . Include a sketch of the curves and shade the region.

