MATH 141 REVIEW 1

1. Find the natural domain of the following function.

$$f(x) = \sqrt{\frac{x+7}{x-8}}$$

2. Find the exact value of each expression.

a. $\tan^{-1}(\sqrt{3})$

b. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

c. $\sec[\sin^{-1}\left(\frac{1}{2}\right)]$

d. $\tan[\cos^{-1}\left(\frac{x}{2}\right)]$

3. Solve for x.

$$\log_2(x+2) = 3 + \log_2(x-5)$$

4. Solve for x.

$$\log_8(x-1) + \log_8(x+1) = 1$$

5. Solve for x.

$$\log(x-1) - \log 6 = \log(x-2) - \log x$$

6. Solve for x.

$$2(5^{x+3}) + 13 = 25$$

7. Solve for x.

$$3(2^{x+5}) + 4 = 22$$

8. Find the limit.

$$\lim_{x \to 16} \frac{x - 16}{\sqrt{x} - 4}$$

9. Find the limit.

$$\lim_{x \to 2} \frac{(3x-1)(3x-6)^2}{(x-2)^2}$$

10. Find the limit.

$$\lim_{x \to -4^+} \frac{x^2+x-6}{x^2-x-20}$$

11. Find the limit.

$$\lim_{x \to 0} \frac{(x+3\sin x)^2}{x^2}$$

12. Use the limit definition to find $f'(x)$ for the following function.

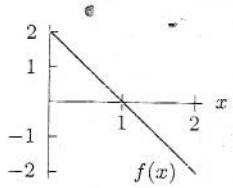
$$f(x) = \frac{1}{x^2 + 1}$$

13. What three statements must be true for a function to be continuous when $x = a$?

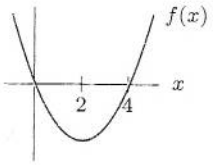
14. Find the equation of the tangent line to the curve $y = 3x^2 + 4x - 5$ when $x = 1$.

15. Sketch the graph of the derivative of the given functions.

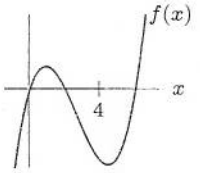
a.



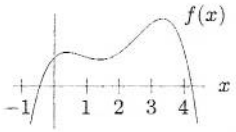
b.



c.



d.



e.