

# MATH 141 REVIEW 1

## Logarithms

1. Solve for  $x$ .

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

2. Solve for  $x$ .

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

3. Solve for  $x$ .

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

2

## Exponentials

4. Solve for  $x$ .

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

5. Solve for  $x$ .

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

## Inverses

6. Verify that the following functions are inverses. One direction will suffice.

$$f(x) = \frac{2x + 3}{5 - x} \qquad g(x) = \frac{5x - 3}{2 + x}$$

7. Find the inverse  $f^{-1}(x)$ . Specify the domain of  $f^{-1}(x)$ .

$$f(x) = 2(x + 7)^2 - 3, \quad x \leq -7$$

8. Find the inverse  $f^{-1}(x)$ . Specify the domain of  $f^{-1}(x)$ .

$$f(x) = 5 + \sqrt{x + 2}$$

## Pre-L'Hopital Limits

9. Find the limit.

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

10. Find the limit.

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

11. Find the limit.

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

12. Find the limit.

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

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

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

6

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

### Early Derivative Problems

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

**16.** Find the equation of the tangent line to the curve  $y = \frac{1}{x^2}$  when  $x = 2$ .