MATH 171: Dr. ALLAN BICKLE

Basic Skills Exam Sample

Directions: For each question, show all work. Your answer must be completely right to receive credit. No calculator or notecard will be allowed on this exam. You will have 30 minutes to complete this exam.

1. Use the point-slope form of a line to find a line through point $(3, -5)$ with slope -2.

2. Let $f(x) = x^2$. Find the slope of the line containing the points on $f(x)$ at $x = 1$ and $x = 5$.

3. Simplify the following difference quotient completely.

$$\frac{(x+h)^3 - x^3}{h}$$

4. Simplify the following rational expression.

$$\frac{t^2 + t - 2}{t^2 - 1}$$

5. Simplify the following rational expression by multiplying by the conjugate of the numerator.

$$\frac{2 - \sqrt{x^2 - 5}}{x + 3}$$

6. Given $\tan x = 1$ and $x \in [0, \pi]$, find $\sin x$ and $\cos x$.

7. Simplify $e^{2\ln x + \ln y}$.

8. Expand the following logarithm completely (the only inputs for $\ln$ in your answer should be x, $x + 1$, or $x^2 + 1$.)

$$\ln \sqrt{(x^2 + 1)(x + 1)^2}$$

9. Draw a right triangle and use it to simplify $\sec(\tan^{-1} x)$.

10. Find all the zeros (roots) of the function $f(x) = x^4 - 1$.