

## Math 18 - Test #2 Review Exercise Answers

1.
  - a)  $6x^2(x+3)^4(2x+1)(-6x^3-21x^2-9x+2)$
  - b)  $(x^2+3)^3(3x-1)^2(33x^2-8x+27)$
  
2.
  - a) 2
  - b) undefined
  - c)  $\ln \sqrt{\sin x + 2}$
  - d)  $\sqrt{\ln(x^2 - 1) + 2}$
  
3.
  - a)  $f \circ g: \log(2x + 1)$ ;  $g \circ f: 2 \log x + 1$ ; Domain of  $f \circ g: \left(-\frac{1}{2}, \infty\right)$
  - b)  $f \circ g: x - 4$ ;  $g \circ f: \sqrt{x^2 - 4}$ ; Domain of  $g \circ f: (-\infty, -2] \cup [2, \infty)$
  
4.
  - a)  $f(x) = \cos^{-1} x$ ;  $g(x) = \sqrt{x}$
  - b)  $f(x) = \frac{1}{x^2}$ ;  $g(x) = \ln x$ ;  $h(x) = 2x - 1$
  - c)  $f(x) = 2^x$ ;  $g(x) = \csc x$ ;  $h(x) = x^3 + 1$
  - d)  $f(x) = \sqrt{x}$ ;  $g(x) = \frac{1}{x}$ ;  $h(x) = \log x$ ;  $r(x) = e^x$
  
5.
  - a)  $\sqrt{x} \sin(x^2 + 1)$  is a product of  $\sqrt{x}$  and  $\sin(x^2 + 1)$  and a composition of  $x^2 + 1$  inside  $\sin x$
  - b)  $\ln x - \sqrt[3]{\tan x}$  is the difference of  $\ln x$  and  $\sqrt[3]{\tan x}$  and a composition of  $\tan x$  inside  $\sqrt[3]{x}$
  - c)  $\frac{x^3}{\sin^2 x}$  is the quotient of  $x^3$  and  $\sin^2 x$  and a composition of  $\sin x$  inside  $x^2$
  
6.
  - a)  $\frac{\pi}{2} + 2\pi k, \frac{4\pi}{3} + 2\pi k, \frac{3\pi}{2} + 2\pi k, \frac{5\pi}{3} + 2\pi k$
  - b)  $\pi k, \frac{3\pi}{4} + \pi k$
  
7.
  - a)  $\left(-3, -\frac{1}{2}\right) \cup (3, \infty)$
  - b)  $\left[-\frac{3}{2}, 5\right]$
  
8.
  - a)  $\cos x \ln x$
  - b)  $\log_3 2 + 2 \log_3 x + 3 \log_3(x + 1) - 2 - 4 \log_3(x - 2)$
  - c)  $\frac{2}{3} \log_2(\tan x) - 1 - \frac{1}{3} \log_2(3x - 1) - \frac{1}{3} \log_2(x + 2)$
  - d)  $\csc x + 4 \ln(x^2 + 7) - \frac{1}{5} \ln x - \ln \sin x$
  
9.
  - a) True
  - b) False
  - c) False
  - d) False