

Test #2

Name: _____

Math 18, Prof. Beydler

Monday, October 15, 2018

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. Good luck!

1. (2 points) Factor the following.

$$8(2x + 3)^4(x - 2) + 32(2x + 3)^3(x - 2)^2$$

Answer: _____

2. Given $f(x) = \sin x$, $g(x) = x^2 - 3$, and $h(x) = \sqrt{1 + 2x}$, evaluate

a) (2 points) $(h \circ f)(\pi)$

Answer: _____

b) (2 points) $h(f(g(x)))$

Answer: _____

3. (2 points) Find $g \circ f$ for the following function. Find the domain for the composition.

$$f(x) = x^2 - 4, \quad g(x) = \frac{1}{x}$$

$g \circ f =$ _____

Domain of $g \circ f$: _____

4. (2 points) Decompose the following functions. Make sure none of your functions are just x .

a) $f(g(x)) = e^{\sqrt{x}}$

$f(x) =$ _____

$g(x) =$ _____

b) $f(g(h(x))) = \sin \frac{1}{(\ln x)^2}$

$f(x) =$ _____

$g(x) =$ _____

$h(x) =$ _____

5. (2 points) Each of the following functions is a combination of two or more functions of the variable x . They are either a sum, difference, product, quotient, composition or combination of these. Describe each in words. Don't just write "product" but follow the example shown and specify the functions.

Example: $x^2 \cos(2x + 1)$ is a product of x^2 and $\cos(2x + 1)$ and a composition of $2x + 1$ inside $\cos x$

$$\frac{x^2}{\sqrt{\cos x}}$$

6. (3 points) Solve the following equations.

$$\cos^2 x - \sin x \cos x = 0$$

Answer: _____

7. (3 points) Solve the following inequality.

$$x(2x + 3)^2(x - 1)^3 < 0$$

Answer: _____

8. (3 points) Expand the following expression using the properties of logarithms.

$$\log \sqrt{\frac{10 \sin^3 x}{3x^2 - x - 2}}$$

Answer: _____

9. (1 point) Determine whether the following statement is true or false.

$$\ln \sqrt[4]{x + y} = \frac{1}{4} \ln x + \frac{1}{4} \ln y$$

True False (circle one)