

## Group Quiz - Level 1

Name:

02/20/2020

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This quiz has 1 questions worth 10 points on 1 pages. Try to do as many questions as possible. You can use your calculator.

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1. (10 points) Find the derivative of following functions.

(a)  $f(x) = x^{100} + x$ .

(b)  $f(\theta) = \cos(\theta) - \sin(\theta)$ .

(c)  $g(t) = 100^t + 100^e$ .

(d)  $h(z) = z^2 - 2^z$ .

(e)  $w(s) = s^{0.01} + s^{0.02} - 10s^{0.03}$ .

(f)  $k(x) = x \ln(x)$ .

(g)  $j(u) = \frac{1}{\sqrt{u+1}}$ .

(h)  $f(t) = \cos(t) \sin(t) + \cos(t)$ .

(i)  $q(v) = \frac{\sqrt{v}}{1+v}$ .

(j)  $p(r) = \frac{1}{r + 1/r}$ .

## Group Quiz - Level 2

Name:

02/20/2020

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This quiz has 1 questions worth 20 points on 1 pages. Try to do as many questions as possible. You can use your calculator.

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1. (20 points) Find the derivative of following functions.

(a)  $g(t) = e^{-2t}$ .

(b)  $f(t) = 2^{t/\ln(3)}$ .

(c)  $g(t) = (\cos(t) - \sin(t))^5$ .

(d)  $j(r) = (r^6 - 1)^3 (r^3 + r^2 + 1)^7$ .

(e)  $m(z) = \frac{z}{\sqrt{1+z}}$ .

(f)  $h(s) = e^{2e^{3s}}$ .

(g)  $k(x) = \ln(\cos(x))$ .

(h)  $p(u) = \sqrt{u}e^{\sqrt{u}}$ .

(i)  $q(t) = \frac{\sin(e^t)}{t^{3/2}}$ .

(j)  $f(v) = \frac{v}{\sqrt{1 - (v/v_0)^2}}$ .

## Group Quiz - Level 3

Name:

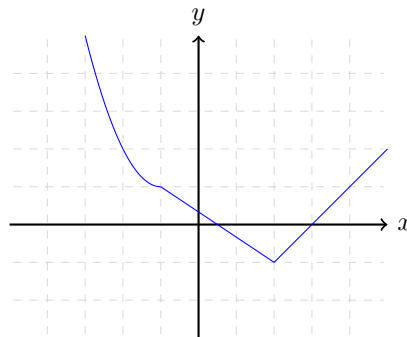
02/20/2020

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This quiz has 1 questions worth 12 points on 1 pages. Try to do as many questions as possible. You can use your calculator.

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1. Part of the graph of a piecewise defined function  $f(x)$  is shown below. Note that  $f(x)$  is defined on all real numbers and this graph is large enough to show all features of  $f$ .



The graph of  $x \leq -1$  is given by  $f(x) = x^2 + 2x + 2$ , and the graphs for  $x > -1$  are linear. The graph goes through  $(-1, 1)$ ,  $(2, -1)$  and  $(5, 2)$ . For each of the following, write answers in *exact form* if exist, otherwise write DNE.

(a) (4 points) Let  $h(x) = \frac{f(2x)}{f(-x)}$ . Find  $h'(x)$  and  $h'(2)$ .

(b) (4 points) Let  $g(x) = f(f(f(x)))$ . Find  $g'(x)$  and  $g'(2)$ .

(c) (4 points) Let  $j(x) = f\left(\frac{1+f(x)}{1-f(x)}\right)$ . Find  $j'(x)$  and  $j'(0)$ .

## Group Quiz - Level 4

Name:

02/20/2020

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This quiz has 2 questions worth 14 points on 1 pages. Try to do as many questions as possible. You can use your calculator.

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1. (4 points) Let  $f(x) = \sin^2(x)$ . Find  $4f(x) + f''(x)$ .

2. The *hyperbolic trigonometric function*  $\cosh(x)$  and  $\sinh(x)$  is defined by

$$\cosh(x) = \frac{e^x + e^{-x}}{2} \quad \sinh(x) = \frac{e^x - e^{-x}}{2}$$

Find following derivatives

(a) (4 points)  $(\cosh(x))''$  and  $(\sinh(x))''$ .

(b) (4 points)  $(\cosh^2(x))'$  and  $(\sinh^2(x))'$ .

(c) (2 points) If we write  $f(x) = \cosh^2(x) - \sinh^2(x)$ , then what is  $f'(x)$ ? What does it tell you about  $f(x)$ ? What is  $f(x)$ ?

## Group Quiz - Level 5

Name:

02/20/2020

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This quiz has 2 questions worth 20 points on 1 pages. Try to do as many questions as possible. You can use your calculator.

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1. (4 points) Let the function  $j(x) = x^x$ . Find  $j'(2)$  in *exact form*.

2. (16 points) The function  $f(x)$  and  $g(x)$ , and their derivatives are given by following table.

$x$	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	1	2	$\pi$	$\ln(\pi)$
2	2	$e = 2.71828\dots$	1	$\ln(2)$
3	3	$8/9$	3	0

Let  $h(x) = f(x)^{g(x)}$ . Find  $h'(1)$ ,  $h'(2)$  and  $h'(3)$  in *exact form*.