Worksheet for 10/15/13

(1.) Differentiate the following functions:

a) $(2x+1)^7$

b) $\sin(5x)$

c) $\sqrt{7x+1}$

d) $(x^2+1)^7$

e) $\sqrt{1-x^2}$

f) $\sqrt{e^x+2}$

g) $\sin(e^x)$

h) $(e^x+1)^6$

(2.) Suppose f, g are functions with the following values:

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
0	0	3	12	3
1	2	1	-6	2
2	1	7	0	7

Determine $(g \circ f)'(1)$. (remember: $g \circ f(x)$ is defined to be $g(f(x))$.)

(3) Differentiate $f(x) = 2^x$.

(4) Differentiate: (you will need to combine multiple rules)

a) $\tan(x \cdot 2^x)$

b) $\sin\left(\frac{x}{x+1}\right)$

c) $\sqrt{\cos(x^2)}$

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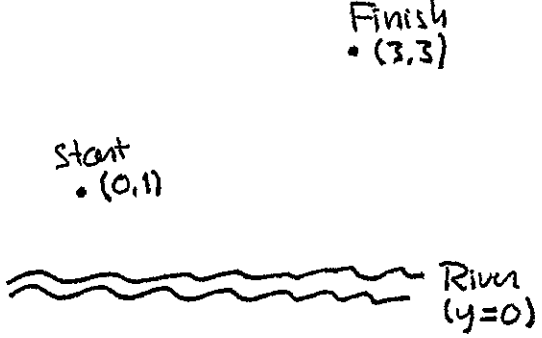
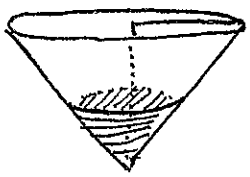
(5)



A horse begins at (0,1). She wants to walk to the river (the line $y=0$) then back to the stable (3,3). Wha is the shortest distance she must walk

(6.)



A coffee filter is shaped like a cone with height = radius = 5 cm.
As the liquid drains through it over time, the height of the liquid is described by

$$h(t) = \frac{5}{1+t}.$$ (t in seconds, h in cm)

What is the rate of change of the volume of liquid at $t = 4$ sec.