Calculus Review Answers

1) $\dfrac{-1+y^2-2xy}{x^2-2xy}$

2) -1

3) Tangent: y = 4x – 4   Normal: y = -.25x + 4.5

4) $f'(x)=12x^2+1>0$ for all x. Hence f is strictly increasing. Thus f is one-to-one. Since f is negative for $x=0$ and f is positive for $x=2$ it follows that f is 0 somewhere between 0 and 2.

5a) $e^{x\ln 2}$ b) $\dfrac{d2^x}{dx}=2^x\ln 2$

6) $\dfrac{dz}{dt}=\dfrac{\partial f}{\partial x}\dfrac{dx}{dt}+\dfrac{\partial f}{\partial y}\dfrac{dy}{dt}$

For part (b) substitute in the following values

$\dfrac{\partial f}{\partial x}=\dfrac{2x}{x^2+y}$ $\dfrac{\partial f}{\partial y}=\dfrac{2y}{x^2+y^2}$ $\dfrac{dx}{dt}=-e^{-t}$ $\dfrac{dy}{dt}=e^t$

7a)   f′(x) = -14x +126 = 0
b)   x = 9
c)   f″(9) = -14 < 0 so 9 is a maximum.

8a) x = 3y   b) x = e^{3y}

9a) $3e^{3x+1}$ b) $2xe^x+x^2e^x$ c) $(x-10)^{-1}$

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	$\dfrac{\partial f}{\partial x}$	$\dfrac{\partial f}{\partial y}$
a	2x + 3y	3x + 2y
b	$\dfrac{1}{x}$	$\dfrac{2}{y}$
c	ye^{xy}	xe^{xy}

11) x = 20 and y = 40 is the solution.