Implicit Differentiation 2

Find $\frac{dy}{dx}$.

1. $2x^2y - xy + 4y = 2$
2. $3x^2y + 2y - 3 = 0$
3. $\tan y - \cos x - \sin y = 2$
4. $\cos(xy) = x^2 + 4y$

Find the instantaneous slope at the given value of x.

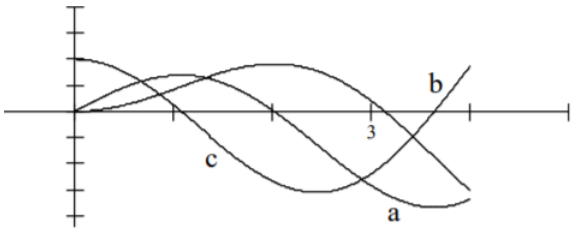
5. $2x^2y + 4y + 2x = 8$ when $x = 2$.
6. $xy + 4x^2 - 3y = 8$ when $x = -1$.

Find the 2nd derivative.

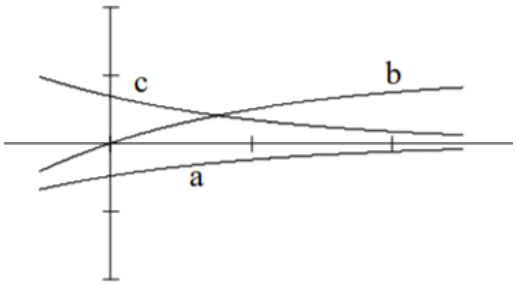
7. $x^2 + y^3 = 4$
8. $x^4 + y^4 = 17$
9. $2x^2 + y^2 = 8$

Label as f, f', f''

10.

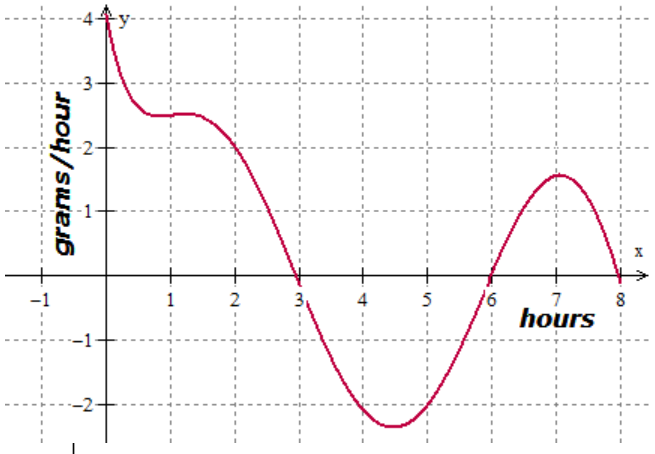


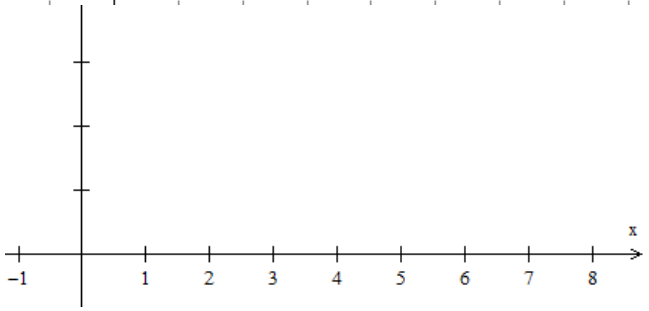
11.



A slime mode grows at the rates recorded at the right.

12. Describe the amount of slime during the 8 hour period.
13. Is the amount of slime increasing or decreasing at 2 hours? Why?
14. In which of the following times is there the most slime? 3, 4, 5, 6.
15. At what time is there the most and least slime over the 8 hour period?
16. At t=0 there is 20 grams of slime mold. Graph the amount of mold on the graph below. Label the axis.





ANSWERS

1. $\frac{dy}{dx}=\frac{y-4xy}{2x^2-x+4}$
2. $\frac{dy}{dx}=\frac{-6xy}{3x^2+2}$
3. $\frac{dy}{dx}=\frac{-\sin x}{\sec^2 y-\cos y}$
4. $\frac{dy}{dx}=\frac{2x+y\sin(xy)}{-x\sin(xy)-4}$
5. $-\frac{7}{18}$
6. $-\frac{9}{4}$
7. $\frac{d^2y}{dx^2}=\frac{-6y^3-8x^2}{9y^5}$
8. $\frac{d^2y}{dx^2}=\frac{-51x^2}{y^7}$
9. $\frac{d^2y}{dx^2}=\frac{-16}{y^3}$
10. $b\to a\to c$
11. $b\to c\to a$
12. Amount of slime is INCREASING on (0,3) and (6,8).
    Amount of slime is DECREASING on (3,6).
13. INCREASING at t = 2, since the RATE is positive at 2.
14. Most at 3
15. Most: 3
    Least: 0
16.