

21. If  $\frac{dy}{dx} = \sqrt{1-y^2}$ , then  $\frac{d^2y}{dx^2} =$

A.  $-2y$

B.  $-y$

C.  $\frac{-y}{\sqrt{1-y^2}}$

D.  $y$

E.  $\frac{1}{2}$

### Implicit Derivatives Note cards D37-D41

22. If  $3x^2 + 2xy + y^2 = 2$ , then the value of  $\frac{dy}{dx}$  at  $x = 1$  is

A.  $-2$

B.  $0$

C.  $2$

D.  $4$

E. undef.

### Implicit

23. If  $\tan(xy) = x$ , then  $\frac{dy}{dx} =$

A.  $\frac{1 - y \tan(xy) \sec(xy)}{x \tan(xy) \sec(xy)}$

B.  $\frac{\sec^2(xy) - y}{x}$

C.  $\cos^2(xy)$

D.  $\frac{\cos^2(xy)}{x}$

E.  $\frac{\cos^2(xy) - y}{x}$

### Implicit

24. If  $xy^2 + 2xy = 8$ . Then, at the point  $(1, 2)$ ,  $y' =$

A.  $-\frac{5}{2}$

B.  $-\frac{4}{3}$

C.  $-1$

D.  $-\frac{1}{2}$

E.  $0$

### Implicit

25. If  $y^2 - 2xy = 16$ . then  $\frac{dy}{dx} =$

A.  $\frac{x}{y-x}$

B.  $\frac{y}{x-y}$

C.  $\frac{y}{y-x}$

D.  $\frac{y}{2y-x}$

E.  $\frac{2y}{x-y}$

How do you always find max/min?  $f'(x) = 0$  &  $\max f' \rightarrow \text{to } -$

26. The function defined by  $f(x) = x^3 - 3x^2$  for all real numbers  $x$  has a relative maximum at  $x =$

A.  $-2$

B.  $0$

C.  $1$

D.  $2$

E.  $4$

### Note cards: AD5-AD9

27. For what value of  $x$  does the function  $f(x) = (x-2)(x-3)^2$  have a relative maximum?

A.  $-3$

B.  $-\frac{7}{3}$

C.  $-\frac{5}{2}$

D.  $\frac{7}{3}$

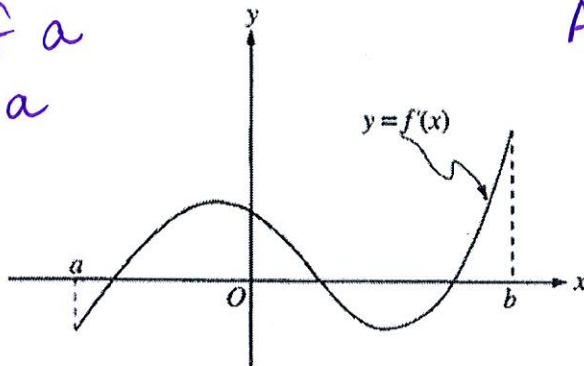
E.  $\frac{5}{2}$

28. The derivative of  $f$  is  $x^4(x-2)(x+3)$ . At how many points will the graph of  $f$  have a relative maximum?

- A. None      B. One      C. Two      D. Three      E. Four

Everytime you are given a graph of a derivative make a sign line!

Note card  
AD 15



29.

The graph of  $f'$ , the derivative of  $f$ , is shown in the figure above. Which of the following describes all relative extrema of  $f$  on the open interval  $(a, b)$ ?

- A. One relative maximum and two relative minima  
 B. Two relative maxima and one relative minimum  
 C. Three relative maxima and one relative minimum  
 D. One relative maximum and three relative minima  
 E. Three relative maxima and two relative minima

30. Let  $f$  be a function defined and continuous on the closed interval  $[a, b]$ . If  $f$  has a relative maximum at  $c$  and  $a < c < b$ , which of the following statements must be true?

- I.  $f'(c)$  exists  
 II. If  $f'(c)$  exists, then  $f'(c) = 0$   
 III. If  $f''(c)$  exists, then  $f''(c) \leq 0$

- A. II only      B. III only      C. I and II      D. I and III      E. II and III

31. The graph of  $y = 5x^4 - x^5$  has a point of inflection at

- A.  $x = 0$       B.  $x = 3$       C.  $x = 4$   
 D.  $x = 0$  and  $x = 3$       E.  $x = 0$  and  $x = 4$