

## Implicit Differentiation (No Calculator)

### 2008 #10

In the  $xy$ -plane, what is the slope of the line tangent to the graph of  $x^2 + xy + y^2 = 7$  at the point  $(2, 1)$ ?

- (A)  $-\frac{4}{3}$       (B)  $-\frac{5}{4}$       (C)  $-1$       (D)  $-\frac{4}{5}$       (E)  $-\frac{3}{4}$

### 1997 #17

If  $x^2 + y^2 = 25$ , what is the value of  $\frac{d^2y}{dx^2}$  at the point  $(4, 3)$ ?

- (A)  $-\frac{25}{27}$       (B)  $-\frac{7}{27}$       (C)  $\frac{7}{27}$       (D)  $\frac{3}{4}$       (E)  $\frac{25}{27}$

### 2008 #16

If  $\sin(xy) = x$ , then  $\frac{dy}{dx} =$

- (A)  $\frac{1}{\cos(xy)}$   
(B)  $\frac{1}{x \cos(xy)}$   
(C)  $\frac{1 - \cos(xy)}{\cos(xy)}$   
(D)  $\frac{1 - y \cos(xy)}{x \cos(xy)}$   
(E)  $\frac{y(1 - \cos(xy))}{x}$

### 2003 #26

What is the slope of the line tangent to the curve  $3y^2 - 2x^2 = 6 - 2xy$  at the point  $(3, 2)$ ?

- (A)  $0$       (B)  $\frac{4}{9}$       (C)  $\frac{7}{9}$       (D)  $\frac{6}{7}$       (E)  $\frac{5}{3}$