**Solve** and then select the correct answer:

Serial No:

The equation of the tangent line to the curve  $y = 2 \tan \left(\frac{\pi x}{4}\right)$  at x = 1 is

(a) 
$$y = x + \frac{\pi}{4}$$

(a)  $y = x + \frac{\pi}{4}$ (b)  $y = \pi x + 2 - \pi$ (c)  $y = -\pi x + 2 + \pi$ (d)  $y = \frac{\pi}{4}x + 2 - \frac{\pi}{4}$ (e)  $y = 3\pi x + 2 - 3\pi$ 2. Let  $f(x) = 1 + 2x - x^2$ ,  $x \le 1$ . Then  $\frac{df^{-1}}{dx}|_{x=-2} = \frac{df^{-1}}{dx}|_{x=-2} = \frac{df^{-1}}{dx}|_{x=-2$ 

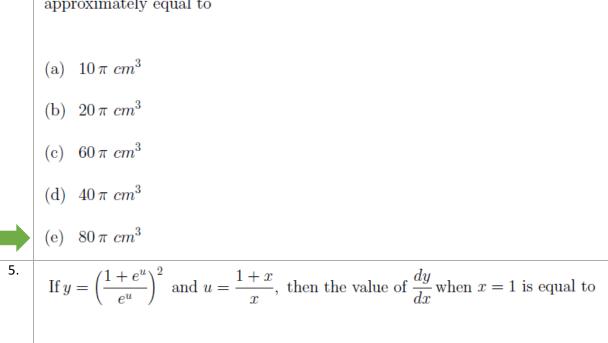


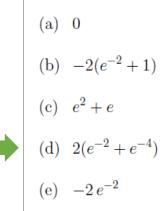
(a) 
$$\frac{xy}{y + \ln x}$$

(b)  $\frac{y^2}{x - xy \ln x}$ (c)  $x^{y-1}$ (d)  $\frac{x^2}{x + y \ln x}$ 

4.	The radius of a sphere was measured to be $20cm$ with a possible error in measurement
	of at most $0.05cm$ . The maximum error in the computed volume of the sphere is
	approximately equal to







The slope of the tangent line to the curve  $\sin(x+y)=xy$  at the point (0,0) is



	The area of a circle is decreasing at a rate of $\frac{8\pi}{9} cm^2/min$ . At what rate is the radius the circle changing when the area is $\frac{\pi}{9} cm^2$ ?	s of
--	--	------

(a) 
$$\frac{4}{3} cm/min$$

(b) 
$$\frac{-4}{3} cm/mir$$

(c) 
$$-2\pi \ cm/min$$

(d) 
$$-2 \ cm/min$$

(e) 
$$2\pi \ cm/min$$

8. If 
$$y = x^2 \sin^{-1}(x^2) + \sqrt{1 - x^4}$$
, then  $y' =$ 



7.

(a) 
$$2x\sin^{-1}(x^2)$$

(b) 
$$2x\sin^{-1}(x^2) + \frac{4x}{\sqrt{1-x^4}}$$

(a) 
$$2x \sin^{-1}(x^2)$$
  
(b)  $2x \sin^{-1}(x^2) + \frac{4x}{\sqrt{1-x^4}}$   
(c)  $x \sin^{-1}(x^2) + \frac{4x^3}{\sqrt{1-x^4}}$   
(d)  $\sin^{-1}(x^2) - \frac{2x^3}{\sqrt{1-x^4}}$   
(e)  $2x \sin^{-1}(x^2) - \frac{2x}{\sqrt{1-x^4}}$ 

(d) 
$$\sin^{-1}(x^2) - \frac{2x^3}{\sqrt{1-x^4}}$$

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

9. A man 2 m tall walks directly away from a street light that is 8 m high at the rate of 3 m/sec. How fast is the length of his shadow changing?

(a) 
$$\frac{9}{2}$$
  $m/sec$ 

(b) 
$$\frac{3}{2}$$
  $m/sec$ 



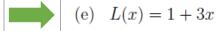
(c) 
$$\frac{1}{2}$$
  $m/sec$ 

(d) 
$$3 m/sec$$

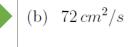
(e) 
$$\frac{1}{3}$$
  $m/sec$ 

10.	The linearization of $f(x) = e^{\tan^{-1}(3x)}$ at $x = 0$ is given by

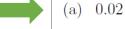
- (a) L(x) = 3 x
- (b) L(x) = 3x
- (c) L(x) = 1 2x
- (d) L(x) = 2 + x



- 11. The edge of a cube increases at a rate of  $3 \, cm/s$ . When the edge length is  $2 \, cm$ , the rate at which the **surface area** of the cube is increasing is
  - (a)  $40 \, cm^2/s$



- (c)  $12 \, cm^2/s$
- (d)  $36 \, cm^2/s$
- (e)  $84 \, cm^2/s$
- 12. Using a suitable linear approximation, the value of ln(1.02) is approximated by



- (b) 0.01
- (c) 1.02
- (d) 1.01
- (e) 0.04