Differentiation Test 6A

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Name: _____

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Navigator | Assessment | Student | 25 min

Question: 1

If $f(x)=\log_e(\sin(2x))$ then $f'\left(\frac{\pi}{6}\right)$ is equal to

a) $-\frac{2\sqrt{3}}{3}$ b) $\frac{2\sqrt{3}}{3}$ c) $2\sqrt{3}$ d) $-2\sqrt{3}$ e) $\sqrt{3}$

Question: 2

If $y=\cos^{-1}\left(\frac{5}{4x}\right)$ and $x>0$ then $\frac{dy}{dx}$ is equal to

a) $\frac{-20}{\sqrt{25-16x^2}}$

b) $\frac{-12}{\sqrt{16x^2-25}}$

c) $\frac{-4}{\sqrt{25-16x^2}}$

d) $\frac{\sqrt{25-16x^2}}{-12}$

e) $\frac{5}{x\sqrt{16x^2-25}}$

Question: 3

The volume of a sphere is decreasing at a rate of 3 cm^3/min. When the radius is 3 cm, the rate of change of the radius of the sphere, in cm/min is equal to:

a) -108π b) 108π c) $-\frac{1}{12\pi}$ d) $\frac{1}{12\pi}$ e) -12π

Question: 4

If $y=\tan^{-1}\left(\frac{x}{3}\right)$ then $\frac{d^2y}{dx^2}$ is equal to

a) $\frac{-54x}{\left(9x^2+1\right)^2}$ b) $\frac{-27}{\left(9x^2+1\right)^2}$ c) $\frac{-18x}{\left(9x^2+1\right)^2}$ d) $\frac{-6x}{\left(x^2+9\right)^2}$ e) $\frac{3x}{\left(x^2+9\right)^2}$

Question: 5

If $b\in R^+$, then gradient of the normal to the curve: $3\sin(y)=bx$ at the origin is equal to:

a) $-\frac{3}{b}$ b) $-\frac{b}{3}$ c) $\frac{3}{b}$ d) $\frac{b}{3}$ e) -1

Question: 6

If $x=\frac{1}{2t}$ and $y=\sqrt{t}$ then $\frac{dy}{dx}$ is equal to:

a) $-\frac{1}{\sqrt{t^3}}$ b) $\frac{1}{\sqrt{t^3}}$ c) $-\frac{1}{4\sqrt{t^3}}$ d) $-\sqrt{t^3}$ e) $-4\sqrt{t^3}$

Question: 7

The gradient of the tangent to the curve $x^3+9xy+y^3+11=0$ at the point $(-1,2)$ is equal to

a) -7 b) 7 c) $-\frac{1}{7}$ d) $\frac{1}{7}$ e) -1

Question: 8

If $f(x)=x(x-4)(x-2)(c-x)$ is convex over the interval [0, 1] then:

a) $c=0$ b) $c=2$ c) $c=0,2,4$ d) $c=-\frac{4}{3}$ e) $c=\frac{5}{4}$

Question: 9

The graph of $y=x^2e^{-2x}$

a) has a local minimum at $(1,e^{-2})$ and an asymptote at $x=0$.

b) has a local maximum at $(0,0)$ and an asymptote at $y=0$.

c) has a asymptotes at $x=0$ and $y=0$.

d) has a local maximum at $(1,e^{-2})$, a local minimum at $(0,0)$ and no asymptotes

e) has inflection points at $x=\frac{2\pm\sqrt{2}}{2}$ and an asymptote at $y=0$

Question: 10

If $y=\sin(t)$ and $x=\cos(t)$ then $\frac{d^2y}{dx^2}$ is equal to:

a) $\tan(t)$ b) $-\tan(t)$

c) $\sin(t)\cos(t)$ d) $-\sec^2(t)\sin(t)$

e)