Differential Calculus Test 1A

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Name: _____

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Question: 1

The function $f(x)=x^2+6x+5$ has a tangent at $x=-2$. The equation to the tangent is:

a) $y=2x-7$ b) $y=2x$ c) $y=2x+1$ d) $y=-2x-1$ e) $y=-2x+1$

Question: 2

For the cubic equation shown below, which one of the following statements is true:

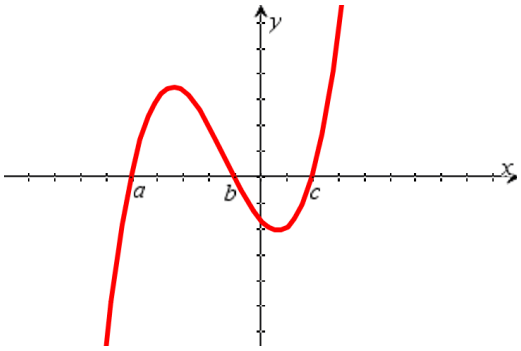
a) $f'\left(\frac{a+b}{2}\right)=0$

b) $f'(x)<0$ *for* $x<a$

c) $f'(x)<0$ *for* $b<x<c$

d) $f'(x)>0$ *for* $x>c$

e) All of the above



Question: 3

If $f(x)=x^3+6x^2+ax+7$ has no turning points then:

a) $a=12$ b) $a>12$ c) $a<12$ d) $a=0$ e) $a<0$

Question: 4

If the tangent to $g(x)=\ln(x)$ at the point where $x=a$ passes through the origin, then a equals.

a) 0 b) 1 c) 2.7 d) e e) π

Question: 5

If $f(x)=\sqrt{g(x)}$, $g(4)=9$ and $g'(4)=6$ then $f'(4)$ is equal to:

a) 1 b) 2 c) 3 d) $\sqrt{6}$ e) $3\sqrt{6}$

Question: 6

If $f(x)=\frac{g(x)}{x}$ and $g(2)=4$ and $g'(2)=6$ then $f'(2)$ is equal to:

a) 1.5 b) 2 c) 3 d) 6 e) 8

Question: 7

Given the function: $f(x)=\dfrac{\sin(x)}{x}$, then at $x = 0$ there is a:

a) Local maximum

b) Local minimum

c) Stationary point of inflection

d) Asymptote

e) Point of discontinuity

Question: 8

Given the function: $f(x)=\begin{cases}\sin(x) & x\geq 0\\ 0 & x<0\end{cases}$, which of the following is true?

a) The function is not continuous at $x = 0$ but is differentiable at $x = 0$

b) The function is not continuous at $x = 0$ and not differentiable at $x = 0$

c) The $\lim\limits_{x\to 0} f(x)$ exists so the function is differentiable at $x = 0$

d) The function is continuous at $x = 0$ and differentiable at $x = 0$

e) The function is continuous at $x = 0$ but not differentiable at $x = 0$

Question: 9

The average rate of change of the function $f(x)=x\cos(x)$ over the interval $\left[\dfrac{\pi}{3},\dfrac{\pi}{6}\right]$ is equal to:

a) $\dfrac{1}{2}\left(2-\sqrt{3}\right)$ b) $\dfrac{\pi}{12}\left(\sqrt{3}-2\right)$ c) $\dfrac{\sqrt{2}}{8}(4-\pi)$ d) 0.5330 e) 0.2791

Question: 10

The hypotenuse of a right angled isosceles triangle is increasing at a rate of $2\sqrt{2}$ cm/min. When the hypotenuse is equal to $6\sqrt{2}$, the rate of increase of the area of the triangle, in cm^2/min is:

a) 24 b) 12 c) 6 d) $12\sqrt{2}$ e) $6\sqrt{2}$