PRINTABLE VERSION

Sol

Quiz 23

Question 1

Given that $\int_0^1 f(x)\,dx = 4$, $\int_0^3 f(x)\,dx = 2$, and $\int_3^4 f(x)\,dx = 3$ find $\int_0^4 f(x)\,dx$.

$\int_0^4 f(x)dx = \int_0^3 f(x)dx + \int_3^4 f(x)dx$

$= 2+3 = 5$

a) -1

b) 2

c) 5

d) 3

e) 9

Question 2

Given that $x > -1$ and $F(x) = \int_3^x t\sqrt{t+1}\,dt$ find $F(3)$.

$F(3) = \int_3^3 t\sqrt{t+1}\,dt = 0$

a) 6

b) 2

c) 0

d) 3

e) $\frac{11}{4}$

Question 3

Given that $x > -1$ and $F(x) = \int_5^x t\sqrt{t+1}\,dt$, find $F'(x)$.

By F. T. C. (fundamental theorem of calculus)

$F'(x) = x\sqrt{x+1}$

a) $x+1$

b) $x\sqrt{x+1}$

c) $\sqrt{x+1} + 1/2\,\frac{x}{\sqrt{x+1}}$

d) $\sqrt{x+1}$

e) x

Question 4

Given that $x > -7$ and $F(x) = \int_2^x t\sqrt{t+7}\,dx$, find $F'(4)$.

By F.T.C.

$F'(x) = x\sqrt{x+7}$

$F'(4) = 4\sqrt{4+7} = 4\sqrt{11}$.

a) $\frac{13\sqrt{11}}{11}$

b) $\sqrt{11}$

c) $4\sqrt{11}$

d) 11

e) 4

Question 5

Given that $F(x) = \int_0^x \frac{1}{t^2+25}\,dt$, find $F'(-5)$.

By F.T.C. $F'(x) = \frac{1}{x^2+25}$

$F'(-5) = \frac{1}{(-5)^2+25} = \frac{1}{50}$

a) $\frac{1}{25}$

b) -1

c) $\frac{1}{50}$

d) 0

e) $\frac{1}{250}$

Question 6

Given that $F(x) = \int_0^x \frac{1}{t^2+4}\,dx$, find $F''(x)$.

By F.T.C. $F'(x) = \frac{1}{x^2+4}$

$F''(x) = \frac{-2x}{(x^2+4)^2}$

a) $\frac{6x^2-8}{(x^2+4)^3}$

b) $\frac{1}{4}$

c) $\frac{1}{x^2+4}$

d) $\frac{-2x}{(x^2+4)^2}$

e) 0

Question 7

Given that $F(x) = \int_x^0 \sqrt{t^2+9}\,dt$, find $F'(5)$.

$F(x) = -\int_0^x \sqrt{t^2+9}\,dt$

$F'(x) = -\sqrt{x^2+9}$

$F'(5) = -\sqrt{5^2+9} = -\sqrt{34}$

a) $\sqrt{34}$

b) $-\sqrt{34}$

c) 0

d) 3

e) $\frac{5\sqrt{34}}{34}$

Fundamental Theorem of Calculus.

$F(x)=\int_a^x f(t)dt \Rightarrow F'(x)=f(x)$; $F(x)=\int_a^{u(x)} f(t)dt \Rightarrow F'(x)=f(u(x))\cdot u'(x)$.

(a is a given constant)

Question 8

Find the derivate of $F(x)=\int_0^{x^2} t\sin(t)\,dt$.

$F'(x)=\left[x^2\sin(x^2)\right]\cdot(x^2)'$

$=2x^3\sin(x^2)$.

a) $\sin\left(x^2\right)+x^2\cos\left(x^2\right)$

b) $x^2\sin\left(x^2\right)$

c) $2x^2\sin(x)$

d) $2x^3\sin\left(x^2\right)$

e) $x\sin(x)$

Question 9

Find the derivate of $F(x)=\int_0^{x\cos(x)}\sqrt{49-t^2}\,dx$.

$F'(x)=\sqrt{49-(x\cos(x))^2}\cdot(x\cos(x))'$

$=(\cos(x)-x\sin(x))\sqrt{49-x^2\cos^2(x)}$

a) $(\cos(x)-x\sin(x))\sqrt{49-x^2}$

b) $(\cos(x)-x\sin(x))\sqrt{49-x^2(\cos(x))^2}$

c) $\sqrt{49-x^2(\cos(x))^2}$

d) $\sqrt{49-x^2}$

e) $-\dfrac{x\cos(x)}{\sqrt{49-x^2(\cos(x))^2}}$

Question 10

Find a formula for $f(x)$ given that f is continuous and $-x^4+x^2-3x=\int_0^x f(t)\,dt$. Do derivative on both sides

we have $-4x^3+2x-3=f(x)$

a) $f(x)=-4x^3+2x-3$

b) $f(x)=-1/5\,x^5+1/3\,x^3-3/2\,x^2$

c) $f(x)=-x^4+x^2-3x$

d) $f(x)=-x^4+x^2-2x$

e) $f(x)=-1/5\,x^5+1/3\,x^3-3/2\,x^2-3$