PRINTABLE VERSION

Quiz 5

You scored 0 out of 100

Question 1

You did not answer the question.

E

Calculate the integral:

$$\int_0^3 \frac{x^3}{8+x^4}\,dx$$

let $u=x^4+8$. $du=4x^3dx \Rightarrow \frac{du}{4}=x^3dx$

$\int \frac{x^3}{8+x^4}dx = \frac{1}{4}\int \frac{du}{u} = \frac{1}{4}\ln|u|+c = \frac{1}{4}\ln(x^4+8)+c$

$= \frac{1}{4}\ln(x^4+8)\Big|_0^3 = \frac{1}{4}\ln(89) - \frac{1}{4}\ln(8)$

$= \frac{1}{4}\ln\left(\frac{89}{8}\right)$

a) $\ln(89)$

b) $-\ln(89)$

c) $-\frac{1}{4}\ln\left(\frac{89}{8}\right)$

d) $\ln\left(\frac{89}{8}\right)$

e) $\boxed{\frac{1}{4}\ln\left(\frac{89}{8}\right)}$

Question 2

You did not answer the question.

D

Calculate the integral:

$$\int \frac{5x}{\sqrt{2-x^2}}\,dx$$

let $u=2-x^2$. $du=-2xdx \Rightarrow \frac{du}{-2}=xdx$

$5\int \frac{1}{\sqrt{u}}\cdot\frac{du}{-2} = -\frac{5}{2}\int\frac{du}{\sqrt{u}} = -\frac{5}{2}\cdot 2\cdot\sqrt{u}+c$

$= -5\cdot\sqrt{2-x^2}+c$

a) $-10\sqrt{2-x^2}+C$

b) $10-5x^2+C$

c) $\frac{10x}{\sqrt{2-x^2}}+C$

d) $\boxed{5\sqrt{2-x^2}+C}$

e) $-5\sqrt{2-x^2}+C$

Question 3

You did not answer the question.

C

Calculate the integral:

$$\int_1^2 \frac{e^{\left(\frac{8}{x}\right)}}{x^2}\,dx$$

Let $u=\frac{8}{x}$, $du=-\frac{8}{x^2}dx \Rightarrow \frac{du}{-8}=\frac{dx}{x^2}$

$\int\frac{e^{(\frac{8}{x})}}{x^2}dx = \int e^u\cdot\frac{du}{-8} = -\frac{1}{8}\int e^u du = -\frac{1}{8}e^u+c$

$= -\frac{1}{8}e^{\frac{8}{x}}+c$

$= -\frac{1}{8}e^{\frac{8}{x}}\Big|_1^2 = -\frac{1}{8}(e^4-e^8)$

$= \frac{1}{8}e^8 - \frac{1}{8}e^4$

a) $-\frac{1}{8}e^8+\frac{1}{8}e^4$

b) e^8+e^4

c) $\boxed{\frac{1}{8}e^8-\frac{1}{8}e^4}$

d) $\frac{1}{8}e^8+\frac{1}{8}e^4$

e) e^8-e^4

Question 4

You did not answer the question.

C

Calculate the integral:

$$\int \frac{9e^x}{9+e^{2x}}\,dx$$

Let $u=e^x$, $du=e^xdx$

$=\int\frac{9du}{3^2+u^2} = 9\cdot\frac{1}{3}\tan^{-1}\left(\frac{u}{3}\right)+c$

$=3\tan^{-1}\left(\frac{e^x}{3}\right)+c$

a) $\frac{1}{3}\arctan\left(\frac{1}{9}e^x\right)+C$

b) $\frac{1}{3}\arctan(e^x)+C$

c) $\boxed{3\arctan\left(\frac{1}{3}e^x\right)+C}$

d) $3\arctan(e^x) + C$

e) $3e^{2x} + C$

Question 5

D

You did not answer the question.

Calculate the integral:

$$\int \cosh(6x)\sinh^5(6x)\,dx$$

Let $u=\sinh(6x)$. $du = 6\cosh(6x)\,dx$

$\int \frac{du}{6}\cdot u^5 = \frac{1}{6}\int u^5\,du = \frac{1}{6}\cdot\frac{u^6}{6}+C$

$= \frac{1}{36}\cdot(\sinh(6x))^6 + C$

a) $\frac{1}{24}\cosh^4(6x) + C$

b) $\frac{1}{24}\sinh^4(6x) + C$

c) $\frac{1}{36}\cosh^6(6x) + C$

d) $\boxed{\frac{1}{36}\sinh^6(6x) + C}$

e) $\frac{1}{6}\sinh^6(6x) + C$

Question 6

You did not answer the question.

C

Calculate the integral:

$$\int \underbrace{6x}_{A}\,\underbrace{e^{-9x}}_{E}\,dx = -\frac{2}{3}xe^{-9x} - \frac{2}{27}e^{-9x} + C$$

$(\frac{d}{dx})\,u$	$(\int)\,dv$	sign
$6x$	e^{-9x}	$+$
6	$\frac{e^{-9x}}{-9}$	$-$
0	$\frac{e^{-9x}}{81}$	$+$
STOP →		$-$

$-\frac{6}{9}xe^{-9x}$

$\frac{6}{81}e^{-9x}$

a) $-\frac{2}{3}e^{-9x} + xe^{-9x} + C$

b) $-\frac{1}{81}e^{-9x} + C$

c) $\boxed{-\frac{2}{27}e^{-9x} - \frac{2}{3}xe^{-9x} + C}$

d) $-\frac{2}{3}e^{-9x} - \frac{2}{3}xe^{-9x} + C$

e) $\frac{2}{27}e^{-9x} + \frac{2}{3}xe^{-9x} + C$

Question 7

C

You did not answer the question.

Calculate the integral:

$$\int_1^{e^3} \underbrace{x}_{A}\,\underbrace{\ln(\sqrt{x})}_{L}\,dx$$

let $u=\ln(\sqrt{x})$ ← $dv = x\,dx$

$\Rightarrow du = \frac{1}{\sqrt{x}}\cdot\frac{1}{2}\cdot\frac{1}{\sqrt{x}}dx$ ← $v=\frac{x^2}{2}$

$= \frac{1}{2x}$

$\frac{x}{4}$

$\frac{x^2}{2}\ln(\sqrt{x})\Big|_1^{e^3} - \int_1^{e^3}\frac{x^2}{2}\cdot\frac{1}{2x}\,dx$

$= \frac{e^6}{2}\ln(e^{\frac{3}{2}}) - 0 - \left[\frac{x^2}{8}\Big|_1^{e^3}\right]$

$= \frac{3}{2}\cdot\frac{e^6}{2} - \frac{e^6}{8} + \frac{1}{8} = (\frac{3}{4}-\frac{1}{8})e^6 + \frac{1}{8}$

$= \frac{5}{8}e^6 + \frac{1}{8}$

a) $\frac{1}{16} + \frac{5}{16}e^6$

b) $\frac{3}{16} + \frac{15}{16}e^6$

c) $\boxed{\frac{1}{8} + \frac{5}{8}e^6}$

d) $\frac{3}{8} + \frac{15}{8}e^6$

e) $\frac{1}{4} + \frac{5}{4}e^6$

Question 8

B

You did not answer the question.

Calculate the integral:

$$\int \frac{\tan(\ln(6x+4))}{6x+4}\,dx$$

let $u=\ln(6x+4)$. $du = \frac{6}{6x+4}dx$

$= \frac{1}{6}\int \tan(u)\,du$.

$= \frac{1}{6}\ln|\sec(u)| + C$

$= \frac{1}{6}\ln|\sec(\ln(6x+4))| + C$.

a) $\frac{1}{6}\sec^2(6x+4) + C$

b) $\boxed{\frac{1}{6}\ln|\sec\ln(6x+4)| + C}$

c) $-\ln|\sec(\ln(6x+4))| + C$

d) $\frac{1}{6}\ln|\sec(\ln(6x+4))| + C$

e) $\ln|\sec(\ln(6x+4))| + C$

Recall:
$$\int \sec(x)\,dx = \ln|\sec(x)+\tan(x)| + C$$

Question 9

You did not answer the question.

B

Calculate the integral.

$$\int (\sec(5x) - 3)^2\,dx$$

$$= \int \sec^2(5x) - 6\sec(5x) + 9\,dx$$

$$= \frac{1}{5}\tan(5x) - \frac{6}{5}\ln|\sec(5x)+\tan(5x)| + 9x + C$$

a) $\frac{1}{5}\tan(5x) + \frac{6}{5}\ln|\sec(5x)+\tan(5x)| - 9x + C$

b) $\boxed{\frac{1}{5}\tan(5x) - \frac{6}{5}\ln|\sec(5x)+\tan(5x)| + 9x + C}$

c) $\tan(5x) - 9x + C$

d) $\frac{1}{5}\tan(5x) + 9x - C$

e) $-\tan(5x) - 6\ln|\sec(5x)+\tan(5x)| - 45x + C$

Question 10

You did not answer the question.

B

Calculate the integral.

$$\int \frac{x}{6+5x^2}\,dx$$

Let $u = 6+5x^2$, $du = 10x\,dx$.

$$\frac{1}{10}\int \frac{du}{u} = \frac{1}{10}\ln|u| + C$$

$$= \frac{1}{10}\ln(6+5x^2) + C$$

a) $-\frac{1}{10}\ln(|6+5x^2|) + C$

b) $\boxed{\frac{1}{10}\ln(|6+5x^2|) + C}$

c) $\frac{1}{2}\ln(|6+5x^2|) + C$

d) $-\frac{5x}{(6+5x^2)^2} + C$

e) $-\frac{5}{(6+5x^2)^2} + C$

Question 11

E

You did not answer the question.

Calculate the given integral:

$$\int \frac{4x}{\sqrt{8-x^2}}\,dx$$

let $u = 8-x^2$, $du = -2x\,dx$

$\Rightarrow \frac{du}{-2} = x\,dx$

$$4\int \frac{1}{\sqrt{u}}\cdot\frac{du}{-2} = \frac{4}{-2}\int\frac{du}{\sqrt{u}}$$

$$= -2\cdot 2\sqrt{u} + C$$

$$= -4\sqrt{8-x^2} + C$$

a) $-32 - 4x^2 + C$

b) $-\frac{4}{(8-x^2)^{3/2}} + C$

c) $4\sqrt{8-x^2} + C$

d) $4(8-x^2)^{3/2} + C$

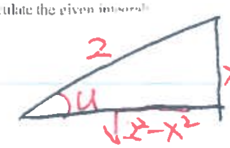
e) $\boxed{-4\sqrt{8-x^2} + C}$

Question 12

B

You did not answer the question.

Calculate the given integral:



$\sin u = \frac{x}{2}$

$$\int \frac{3x^2}{\sqrt{4-x^2}}\,dx$$

let $x = 2\sin u$ $dx = 2\cos u\,du$

$\sqrt{4-x^2} = \sqrt{4-4\sin^2 u}$

$= \sqrt{4\cos^2 u}$

$$\int \frac{3(2\sin u)^2}{2\cos u}\cdot 2\cos u\,du$$

$$= \int 12\sin^2 u\,du = \int 12\left(\frac{1}{2} - \frac{1}{2}\cos 2u\right)du$$

$$= 6\int 1 - \cos 2u\,du = 6\left(u - \frac{\sin 2u}{2}\right) + C$$

$$= 6u - 3\cdot 2\sin u\cos u + C = 6\cdot\sin^{-1}\left(\frac{x}{2}\right) - 6\cdot\frac{x}{2}\cdot\frac{\sqrt{4-x^2}}{2} + C$$

a) $-\frac{3}{4}x\sqrt{4-x^2} + 3\arcsin\left(\frac{1}{2}x\right) + C$

b) $\boxed{-\frac{3}{2}x\sqrt{4-x^2} + 6\arcsin\left(\frac{1}{2}x\right) + C}$

c) $\frac{3}{2}x\sqrt{4-x^2} - 6\arcsin\left(\frac{1}{2}x\right) + C$

d) $-3x\sqrt{4-x^2}+12\arcsin\left(\frac{1}{2}x\right)+C$

e) $\frac{3}{2}\frac{x}{(4-x^2)^{3/2}}-\frac{3}{2}\arctan\left(\frac{x}{\sqrt{4-x^2}}\right)+C$

$$\circledast\ \int \sec^3\theta\,d\theta=\int \sec^2\theta\cdot\sec\theta\,d\theta=\sec\theta\tan\theta-\int\tan^2\theta\sec\theta\,d\theta$$

IBP $u=\sec\theta$, $dv=\sec^2\theta\,d\theta$, $du=\sec\theta\tan\theta$, $v=\tan\theta$

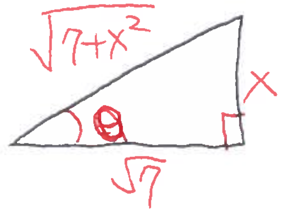
$$=\sec\theta\tan\theta-\int(\sec^2\theta-1)\sec\theta\,d\theta$$

$$=\sec\theta\tan\theta-\int\sec^3\theta\,d\theta+\int\sec\theta\,d\theta$$

shift to the other side

$$\Rightarrow 2\int\sec^3\theta\,d\theta=\sec\theta\tan\theta+\ln|\sec\theta+\tan\theta|$$

$$\Rightarrow \int\sec^3\theta=\frac{1}{2}\sec\theta\tan\theta+\frac{1}{2}\ln|\sec\theta+\tan\theta|$$



$\tan\theta=\frac{x}{\sqrt{7}}$ $\Downarrow$ $\sec\theta=\frac{\sqrt{7+x^2}}{\sqrt{7}}$

Question 13

You did not answer the question.

B

Calculate the given integral:

$$\int\frac{3x^2}{\sqrt{7+x^2}}\,dx$$

let $x=\sqrt{7}\tan\theta$

$\Rightarrow dx=\sqrt{7}\sec^2\theta\,d\theta$

and $\sqrt{7+x^2}=\sqrt{7+7\tan^2\theta}=\sqrt{7}\sec\theta$

$$\int\frac{3\cdot7\tan^2\theta}{\sqrt{7}\sec\theta}\cdot\sqrt{7}\sec^2\theta\,d\theta=21\int\tan^2\theta\sec\theta\,d\theta$$

$$=21\int(\sec^2\theta-1)\sec\theta\,d\theta=21\cdot\left[\int\sec^3\theta-\sec\theta\,d\theta\right]$$

$$=21\int\sec^3\theta\,d\theta-21\int\sec\theta\,d\theta$$

$$\overset{\circledast}{=}21\cdot\left(\frac{1}{2}\sec\theta\tan\theta+\frac{1}{2}\ln|\sec\theta+\tan\theta|-\ln|\sec\theta+\tan\theta|\right)+C$$

$$=21\left(\frac{1}{2}\sec\theta\tan\theta-\frac{1}{2}\ln|\sec\theta+\tan\theta|\right)+C$$

$$=\frac{21}{2}\cdot\left(\frac{\sqrt{7+x^2}}{\sqrt{7}}\cdot\frac{x}{\sqrt{7}}-\ln\left|\frac{\sqrt{7+x^2}}{\sqrt{7}}+\frac{x}{\sqrt{7}}\right|\right)+C$$

a) $\frac{3}{2(7+x^2)^{3/2}}+C$

b) $\frac{3}{2}x\sqrt{7+x^2}-\frac{21}{2}\ln\left|x+\sqrt{7+x^2}\right|+C$

c) $\frac{3}{2}x\sqrt{7+x^2}+\frac{3}{2}\ln\left|x+\sqrt{7+x^2}\right|+C$

d) $\frac{3}{2}\frac{x}{(7+x^2)^{3/2}}-\frac{21}{2}\ln\left|\left(\sqrt{7+x^2}\right)\right|+C$

e) $\frac{3}{2}\sqrt{7+x^2}+21\ln\left|x+(7+x^2)^{1/2}\right|+C$

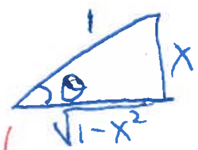
Question 14

You did not answer the question.

B

Calculate the given integral:

$$\int_0^{1/2}\frac{11x^2}{(1-x^2)^{3/2}}\,dx=11\frac{x}{\sqrt{1-x^2}}-11\sin^{-1}x\,\Big|_0^{\frac{1}{2}}$$



Let $x=\sin\theta$, $dx=\cos\theta\,d\theta$

$$\int\frac{11x^2}{(1-x^2)^{\frac{3}{2}}}\,dx=\int\frac{11\sin^2\theta}{\cos^3\theta}\cdot\cos\theta\,d\theta$$

$$=\int 11\frac{\sin^2\theta}{\cos^2\theta}d\theta=11\int\tan^2\theta\,d\theta=11\int(\sec^2\theta-1)d\theta$$

$$=11\cdot\tan\theta-11\theta+C=11\frac{x}{\sqrt{1-x^2}}-11\sin^{-1}x+C$$

$\theta=\arcsin x$

and $\tan\theta=\frac{x}{\sqrt{1-x^2}}$

$$=11\cdot\frac{1}{2}\cdot\frac{1}{\sqrt{\frac{3}{4}}}-11\sin^{-1}\left(\frac{1}{2}\right)+11\sin^{-1}0$$

$$=\frac{11}{3}\sqrt{3}-11\cdot\frac{\pi}{6}+0$$

a) $\frac{11}{3}\sqrt{3}-\frac{11}{3}\pi$

b) $\frac{11}{3}\sqrt{3}-\frac{11}{6}\pi$

c) $33\sqrt{3}-\frac{11}{3}\pi$

d) $\frac{11}{6}\sqrt{3}-\frac{1}{6}\pi$

e) $11\sqrt{3}-\frac{11}{6}\pi$

Question 15

You did not answer the question.

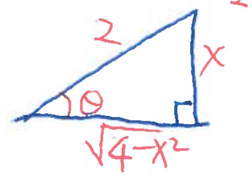
D

Calculate the given integral:

$$\int_0^2\frac{4x^3}{\sqrt{4-x^2}}\,dx$$

Let $x=2\sin\theta$, $dx=2\cos\theta\,d\theta$

$\sin\theta=\frac{x}{2}$ $\Rightarrow\cos\theta=\frac{\sqrt{4-x^2}}{2}$



$$\int\frac{4x^3}{\sqrt{4-x^2}}=\int\frac{4\cdot2^3\sin^3\theta}{2\cos\theta}\cdot2\cos\theta\,d\theta$$

$$=32\int\sin^3\theta\,d\theta=32\int(1-\cos^2\theta)\sin\theta\,d\theta$$

$\sin^2\theta\cdot\sin\theta$

u-sub.

$$=32\left[-\cos\theta+\frac{\cos^3\theta}{3}\right]+C$$

$$=+\frac{32}{3}\cos^3\theta-32\cos\theta+C=+\frac{32}{3}\left(\frac{\sqrt{4-x^2}}{2}\right)^3-32\cdot\left(\frac{\sqrt{4-x^2}}{2}\right)+C$$

$$\frac{32}{3}\left(\frac{\sqrt{4-x^2}}{2}\right)^3-32\left(\frac{\sqrt{4-x^2}}{2}\right)\Big|_0^2$$

$$=-\frac{32}{3}\cdot1+32=\frac{64}{3}$$

a) $\frac{32}{3}$

b) $\frac{128}{3}$

c) 32

d) $\frac{64}{3}$

e) $\frac{128}{9}$

Question 16

You did not answer the question.

Calculate the given integral:

$$\int\frac{2x^2}{(x^2+7)^{3/2}}\,dx$$

Let $x=\sqrt{7}\tan\theta$

$dx=\sqrt{7}\sec^2\theta\,d\theta$

$\tan\theta=\frac{x}{\sqrt{7}}$

$$=\int\frac{2\cdot7\cdot\tan^2\theta}{7\sqrt{7}\cdot\sec^3\theta}\cdot\sqrt{7}\sec^2\theta\,d\theta$$

$$=\int2\cdot\frac{\tan^2\theta}{\sec\theta}d\theta=2\int\frac{\sec^2\theta-1}{\sec\theta}d\theta$$

$$=2\int\sec\theta-\frac{1}{\sec\theta}d\theta=2\int\sec\theta-\cos\theta\,d\theta=2\ln|\sec\theta+\tan\theta|-2\sin\theta+C$$

$\sec\theta = \frac{\sqrt{x^2+7}}{\sqrt{7}}$, $\sin\theta = \frac{x}{\sqrt{x^2+7}}$

$\Rightarrow 2\cdot\ln\left|\frac{\sqrt{x^2+7}}{\sqrt{7}} + \frac{x}{\sqrt{7}}\right| - 2\frac{x}{\sqrt{x^2+7}} + C$

a) $\frac{x}{\sqrt{x^2+7}} - 2\ln\left|x+\sqrt{x^2+7}\right| + C$

b) $-\frac{2x}{(x^2+7)^{1/2}} - 2\ln\left|x+(x^2+7)^{1/2}\right| + C$

c) $\boxed{-\frac{2x}{\sqrt{x^2+7}} + 2\ln\left|x+\sqrt{x^2+7}\right| + C}$

d) $\frac{2x}{(x^2+7)^{3/2}} + 2\ln\left|x+\sqrt{x^2+7}\right| + C$

e) $\frac{x}{\sqrt{x^2+7}} - \ln\left|2x+\sqrt{x^2+7}\right| + C$

Question 17

You did not answer the question.

Calculate the given integral:

$$\int_0^7 2\sqrt{49-x^2}\,dx$$

Q17, Let $x = 7\sin\theta$, $dx = 7\cos\theta\,d\theta$ $\Rightarrow \sin\theta = \frac{x}{7}$

$\int 2\sqrt{49-x^2}\,dx = \int 2\cdot 7\cos\theta\cdot 7\cos\theta\,d\theta$

$= 98\int\cos^2\theta\,d\theta = 98\int\left(\frac{1}{2}+\frac{1}{2}\cos 2\theta\right)d\theta$

$= 49\theta + 49\cdot\frac{\sin 2\theta}{2} + C$

$\sin 2\theta = 2\sin\theta\cos\theta$

$\Rightarrow \cos\theta = \frac{\sqrt{49-x^2}}{7}$

$= 49\cdot\sin^{-1}\left(\frac{x}{7}\right) + \frac{49}{2}\cdot 2\,\frac{x}{7}\cdot\frac{\sqrt{49-x^2}}{7} + C$

$\Rightarrow 49\sin^{-1}\left(\frac{x}{7}\right) + x\sqrt{49-x^2}\,\Big|_0^7$

$= 49\sin^{-1}(1) - 49\sin^{-1}0 + 7\cdot 0 - 0\cdot 7$

$= 49\,\frac{\pi}{2} = \frac{49}{2}\pi$

a) $\frac{147}{2}\pi$

b) $\frac{147}{4}\pi$

c) $\boxed{\frac{49}{2}\pi}$

d) 49π

e) $\frac{49}{3}\pi$

Question 18

You did not answer the question.

Calculate the given integral:

$$\int\frac{2}{x^2\sqrt{49+x^2}}\,dx$$

Let $x = 7\tan\theta$, $\Rightarrow \tan\theta = \frac{x}{7}$

$dx = 7\sec^2\theta\,d\theta$

$= \int\frac{2}{49\tan^2\theta\cdot 7\cdot\sec\theta}\cdot 7\sec^2\theta\,d\theta$

$= \frac{2}{49}\int\frac{\sec\theta}{\tan^2\theta}\,d\theta = \frac{2}{49}\int\frac{1}{\cos\theta}\cdot\frac{\cos^2\theta}{\sin^2\theta}\,du$

$= \frac{2}{49}\int\frac{\cos\theta}{\sin^2\theta}\,d\theta = \frac{2}{49}\int\frac{du}{u^2} = \frac{2}{49}\cdot(-u^{-1}) + C$

$u = \sin\theta$

$du = \cos\theta\,d\theta$

$= -\frac{2}{49}\cdot\frac{1}{\sin\theta} + C$

$\Rightarrow \sin\theta = \frac{x}{\sqrt{49+x^2}}$

$= -\frac{2}{49}\cdot\frac{\sqrt{49+x^2}}{x} + C$

a) $\frac{2}{49}\,\frac{\sqrt{49+x^2}}{x} + C$

b) $-\frac{2}{49}\,\frac{(49+x^2)^{3/2}}{x} + C$

c) $\boxed{-\frac{2}{49}\,\frac{\sqrt{49+x^2}}{x} + C}$

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

e) $\frac{2}{7(49+x^2)^{3/2}} + C$

Question 19

You did not answer the question.

Calculate the given integral:

$$\int\frac{2}{e^x\sqrt{6+e^{2x}}}\,dx = \int\frac{2}{e^x\sqrt{6+(e^x)^2}}\,dx$$

let $e^x = \sqrt{6}\tan\theta$ $\Rightarrow e^x dx = \sqrt{6}\sec^2\theta\,d\theta$

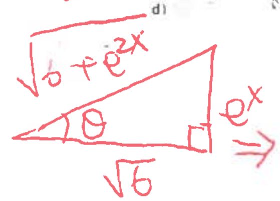
$\Rightarrow dx = \frac{\sqrt{6}\sec^2\theta}{e^x}\,d\theta$

$\tan\theta = \frac{e^x}{\sqrt{6}}$

$\int\frac{2}{\sqrt{6}\tan\theta\,\sqrt{6}\sec\theta}\cdot\frac{\sec^2\theta}{\tan\theta}\,d\theta$ $= \frac{\sqrt{6}\sec^2\theta}{\sqrt{6}\tan\theta}\,d\theta$ $= \frac{\sec^2\theta}{\tan\theta}\,d\theta$

$= \frac{2}{6}\int\frac{\sec\theta}{\tan^2\theta}\,d\theta$

(see Q18) $= -\frac{1}{3}\cdot\frac{1}{\sin\theta} + C = -\frac{1}{3}\cdot\frac{\sqrt{6+e^{2x}}}{e^x} + C$



$\Rightarrow \sin\theta = \frac{e^x}{\sqrt{6+e^{2x}}}$

a) $-\frac{2\sqrt{6+e^{2x}}}{e^x} + C$

b) $-\frac{1}{3}(6+e^{2x})^{3/2} + C$

c) $\boxed{-\frac{1}{3}\,\frac{\sqrt{6+e^{2x}}}{e^x} + C}$

d) $\frac{1}{3}\,\frac{\sqrt{6-e^{2x}}}{e^x} + C$

e) $\dfrac{2\,(6+e^{2x})^{3/2}}{e^{x}}+C$

Question 20

You did not answer the question.

Calculate the given integral

$$\int \frac{x+5}{\sqrt{x^2+10x+10}}\,dx$$

~~complete the square~~

$\cancel{x^2+10x+10}$

$\cancel{= x^2+10x+25-25+10}$

$\cancel{=(x+5)^2-15}$

let $u = x^2+10x+10$

$du = 2x+10\;dx$

$= 2(x+5)\,dx \Rightarrow \frac{du}{2} = (x+5)dx$

$\int \frac{du}{2}\cdot\frac{1}{\sqrt{u}} = \frac{1}{2}\cdot 2\sqrt{u}+C$

$= \sqrt{u}+C$

$= \sqrt{x^2+10x+10}+C$

a) $-(x^2+10x-10)^{3/2}+C$

b) $\boxed{\sqrt{x^2+10x+10}+C}$

c) $2x\sqrt{x^2+10x+10}+C$

d) $-x\sqrt{x^2+10x-10}+C$

e) $(x^2+10x+10)^{3/2}+C$