PRINTABLE VERSION

Quiz 20

Question 1

Use differentials to estimate the value $\sqrt[3]{25}$.

a) $\frac{185}{54}$

b) 1

c) $\frac{83}{27}$

d) $\frac{79}{27}$

e) $\frac{131}{54}$

Question 2

Use differentials to estimate the value $(15.5)^{1/4}$.

a) $\frac{127}{64}$

b) $\frac{3}{2}$

c) $\frac{159}{64}$

d) $\frac{95}{64}$

e) $\frac{129}{64}$

Question 3

Use differentials to estimate the value $\cos(62^o)$.

a) $\frac{\sqrt{3}}{2} + \frac{1}{180}\pi$

b) $\frac{1}{2} - \frac{\sqrt{3}}{180}\pi$

c) $\frac{1}{2} - \frac{\sqrt{3}}{90}\pi$

d) $\frac{\sqrt{3}}{2} + \frac{1}{90}\pi$

e) $\frac{1}{2} + \frac{\sqrt{3}}{180}\pi$

Question 4

Taking $\ln(2) \approx 0.69$, use differentials to estimate $\ln(2.1)$.

a) 0.740

b) 0.860

c) 0.820

d) 0.790

e) 0.660

Question 5

Find the differential dy for $y = 3\,e^x \cos(x)$ (use $h = \Delta x$).

a) $dy = (3\,e^x \sin(x) - e^x \cos(x))\Delta x$

b) $dy = (-3\,e^x \sin(x))\Delta x$

c) $dy = (3\,e^x \cos(x))\Delta x$

d) $dy = (3\,e^x \cos(x) - 3\,e^x \sin(x))\Delta x$

e) $dy = (-3\,e^x \sin(x) - 3\,e^x \cos(x))\Delta x$

Question 6

Consider the function $f(x) = x^{3/4}$. Approximate the change in f as x changes from 80 to 81.

a) $\frac{109}{4}$

b) $-\frac{3}{4}$

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

d) $\frac{107}{4}$

e) $\frac{5}{4}$

Question 7

A spherical ball bearing will be coated by 0.06 cm of protective coating. If the radius of this ball bearing is 10 cm, approximately how much coating will be required? (use $\pi \approx 3.14$)

a) $4262.026\ \text{cm}^3$

b) $75.360\ \text{cm}^3$

c) $4111.306\ \text{cm}^3$

d) $74.360\ \text{cm}^3$

e) $76.360\ \text{cm}^3$

Question 8

Give the derivative of $f(x) = \text{e}^{\arcsin(2x)}$ at the point where $x = \frac{1}{4}$.

a) $\frac{\sqrt{3}}{3}\text{e}^{\pi/3}$

b) 1

c) 4

d) $\frac{4\sqrt{3}}{3}\text{e}^{\pi/6}$

e) $\frac{2\sqrt{3}}{3}\text{e}^{\pi/6}$

Question 9

Find the derivative of $(3x+4)^{5x}$.

a) $15x(3x+4)^{5x-1}$

b) $(3\,x+4)^{5\,x}\left(5\ln(3x+4)+\dfrac{15\,x}{3\,x+4}\right)$

c) $(3\,x+4)^{5\,x}\left(5\ln(3x+4)-\dfrac{5}{3\,x+4}\right)$

d) $\left(5\ln(3x+4)+\dfrac{15\,x}{3\,x+4}\right)$

e) $5x(3x+4)^{5x-1}$

Question 10

Given $f(x)=3x^3+x-7$ verify that $f(x)$ is invertible and, if so, find the equation of the tangent line to $f^{-1}(x)$ at the point where $x=-33$. Note that $f(-2)=-33$.

a) $f(x)$ is not invertible.

b) $y+33=-\dfrac{1}{37}\,(x-2)$

c) $y+2=\dfrac{1}{37}\,(x+33)$

d) $y+33=\dfrac{1}{37}\,(x+2)$

e) $y-2=-\dfrac{1}{37}\,(x+33)$