PRINTABLE VERSION

Quiz 19

Question 1

A rectangular garden 98 square feet in area is to be fenced off against rats. Find the dimensions that will require the least amount of fencing if one side of the garden is already protected by a barn.

a) 56 by $\frac{7}{4}$ feet

b) 42 by $\frac{7}{3}$ feet

c) 14 by 7 feet

d) 13 by 6 feet

e) 16 by 6 feet

Question 2

Find the largest possible area for a rectangle with base on the x-axis and upper vertices on the curve $y = 9 - x^2$.

a) $12\sqrt{3}$

b) 36

c) $6\sqrt{3}$

d) $6\sqrt{6}$

e) $24\sqrt{3}$

Question 3

Of all the rectangles with an area of 25 square feet, find the dimensions of the one with the smallest perimeter.

a) 5 ft. x 5 ft.

b) $\frac{5}{2}$ ft. x 10 ft.

c) $\frac{5}{3}$ ft. x 15 ft.

d) *not possible*

e) $\frac{5}{4}$ ft. x 20 ft.

Question 4

Of all the rectangles with a perimiter of 40 feet, find the dimensions of the one with the largest area.

a) *not possible*

b) 10 ft. x 10 ft.

c) 5 ft. x 15 ft.

d) $\frac{10}{3}$ ft. x $\frac{50}{3}$ ft.

e) $\frac{5}{2}$ ft. x $\frac{35}{2}$ ft.

Question 5

A rectangular playground is to be fenced off and divided into two parts by a fence parallel to one side of the playground. 1200 feet of fencing is used. Find the dimensions of the playground that will enclose the greatest total area.

a) 320 by 210 feet with the divider 210 feet long

b) 300 by 300 feet with the divider 300 feet long

c) 310 by 210 feet with the divider 310 feet long

d) 300 by 200 feet with the divider 200 feet long

e) 295 by 205 feet with the divider 296 feet long

Question 6

Find A and B given that the function $y = \dfrac{A}{\sqrt{x}} + B\sqrt{x}$ has a minimum value of 4 at x = 1.

a) A = 2 and B = 6

b) A = 4 and B = 4

c) A = 4 and B = 2

d) A = 2 and B = 2

e) A = 2 and B = 4

Question 7

Find the coordinates of the point(s) on the curve $3y = 18 - x^2$ that are closest to the origin.

a) $\left(\dfrac{3\sqrt{6}}{2}, \dfrac{3}{2}\right)$

b) $\left(\frac{3\sqrt{6}}{2}, \frac{3}{2}\right)$ and $\left(\frac{-3\sqrt{6}}{2}, \frac{3}{2}\right)$

c) $(0, 6)$, $\left(\frac{3\sqrt{6}}{2}, \frac{3}{2}\right)$ and $\left(\frac{-3\sqrt{6}}{2}, \frac{3}{2}\right)$

d) $\left(1, \frac{17}{3}\right)$

e) $\left(\frac{-3\sqrt{6}}{2}, \frac{3}{2}\right)$

Question 8

Find the coordinates of the point(s) on the curve $y = \sqrt{x+2}$ that are closest to the point (5, 0).

a) $(1, \sqrt{3})$

b) $\left(\frac{9}{2}, \frac{\sqrt{26}}{2}\right)$

c) $(9, \sqrt{11})$

d) $\left(\frac{11}{2}, \frac{\sqrt{30}}{2}\right)$

e) $(0, \sqrt{2})$ and $\left(\frac{9}{4}, \frac{\sqrt{17}}{2}\right)$

Question 9

A rectangle has one side on the *x*-axis and the upper two vertices on the graph of $y = \mathrm{e}^{-3\,x^2}$. Where should the vertices be placed so as to maximize the area of the rectangle?

a) $\left(\frac{\sqrt{6}}{12}, e^{-1/2}\right)$ and $\left(-\frac{\sqrt{6}}{12}, e^{-1/2}\right)$

b) $\left(-\frac{\sqrt{6}}{6}, \frac{1}{2} e^{-1/2}\right)$ and $\left(-\frac{\sqrt{6}}{6}, \frac{1}{2} e^{-1/2}\right)$

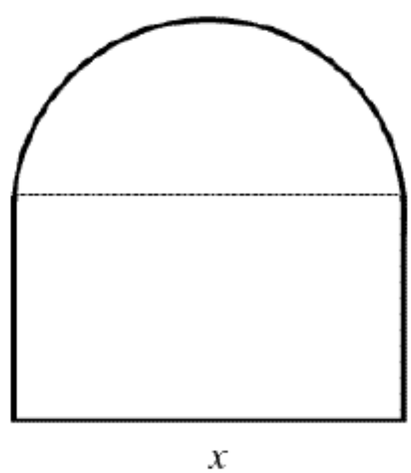
c) $\left(\frac{\sqrt{6}}{6}, e^{-1/2}\right)$ and $\left(-\frac{\sqrt{6}}{6}, e^{-1/2}\right)$

d) $\left(\frac{\sqrt{6}}{3}, e^{-1/2}\right)$ and $\left(-\frac{\sqrt{6}}{3}, e^{-1/2}\right)$

e) $\left(\frac{\sqrt{6}}{6}, -\frac{1}{2} e^{-1/2}\right)$ and $\left(-\frac{\sqrt{6}}{6}, \frac{1}{2} e^{-1/2}\right)$

Question 10

The figure below shows a region that consists of a semi-circle on top of a rectangle. Give the value of *x* that maximizes the area of the region if the circumference of the region is 8.



a) $\dfrac{16\pi}{\pi + 2}$

b) $\dfrac{8}{\pi + 2}$

c) $\dfrac{8\pi}{\pi + 4}$

d) $\dfrac{16}{\pi + 4}$

e) $\dfrac{16}{\pi + 2}$