Find the area of the region between these two curves

$$y = 12 - x^2$$

$$y = 2x^2$$

Find the area of the region between these two curves
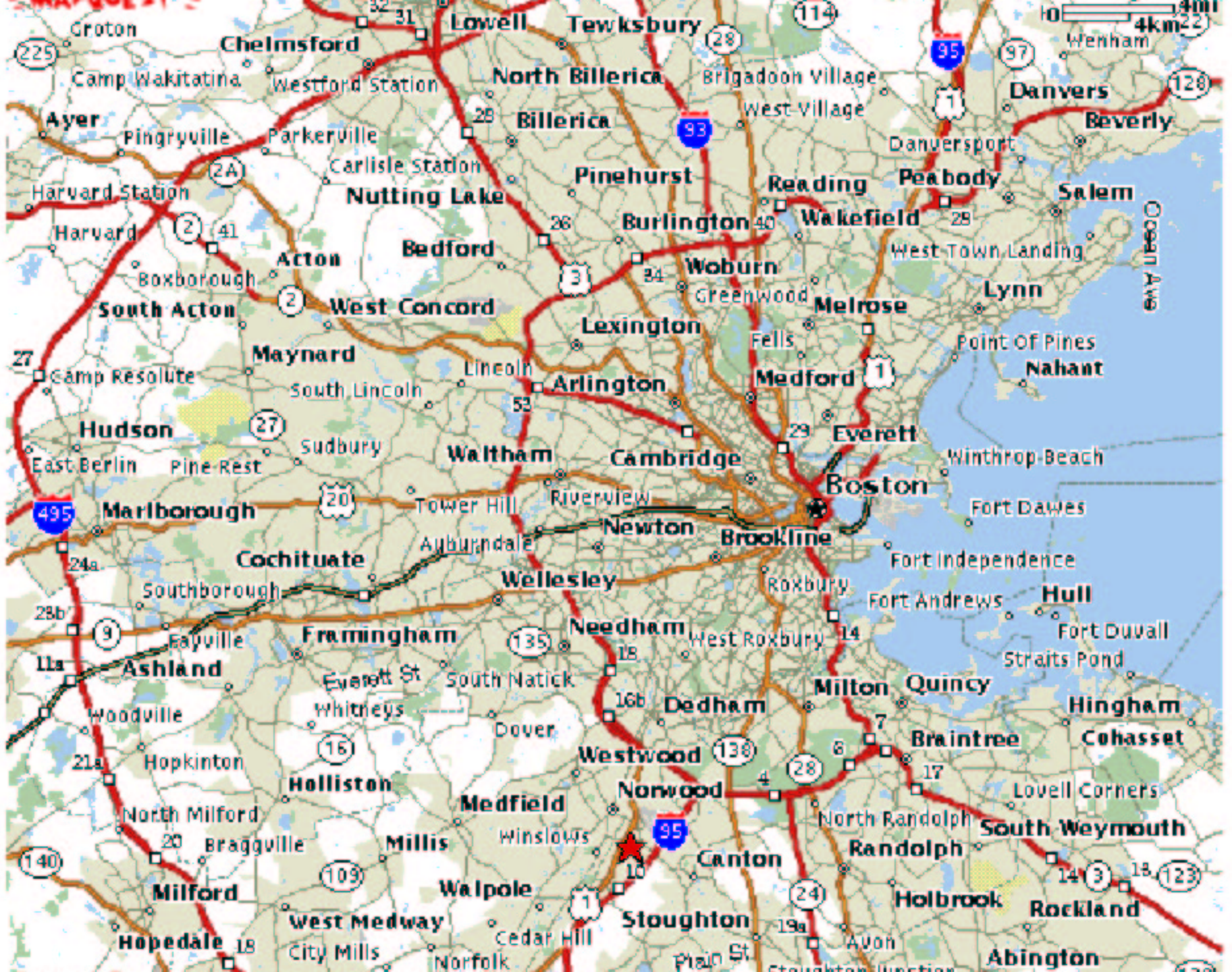
$$y = 2x^2 - 10$$

$$y = x$$

Greater Boston can be approximated by a semicircle of radius eight miles with its center on the coast. Moving away from the center along a radius, the population density is constant for the first mile. Beyond that, the density starts to decrease according the table given in the table, where $\rho(r)$, in thousands of people per mi^2, is the population density at a distance r miles from the center.

r	0	1	2	3	4	5	6	7	8
P(r)	75	75	67.5	60	52.5	45	37.5	30	22.5

1.   Using these data and a Riemann sum, estimate the total population living in the eight-mile radius.

2.   Determine a possible formula for $\rho(r)$. Use this to make another estimate of the population.

Groton
225
Chelmsford
32 31
Lowell
Tewksbury
114
95
97
Wenham
Camp Wakitatina
Westford Station
North Billerica
Brigadoon Village
Danvers
128
Ayer
Pingryville
Parkerville
28
Billerica
93
West Village
Danversport
Beverly
2A
Carlisle Station
Pinehurst
Reading
Peabody
Salem
Harvard Station
Nutting Lake
26
Burlington
40
Wakefield
28
West Town Landing
2
41
Bedford
3
Woburn
34
Greenwood
Melrose
Lynn
Harvard
Acton
Point Of Pines
Boxborough
2
West Concord
Lexington
Fells
Nahant
South Acton
Maynard
Lincoln
Medford
1
27
Camp Resolute
South Lincoln
Arlington
53
Everett
Winthrop Beach
Hudson
27
Sudbury
Waltham
29
Fort Dawes
East Berlin
Pine Rest
20
Tower Hill
Riverview
Cambridge
Boston
495
Marlborough
Newton
Brookline
Fort Independence
24a
Auburndale
Roxbury
Fort Andrews
Hull
Southborough
Wellesley
Fort Duvall
23b
9
Framingham
135
Needham
West Roxbury
14
Straits Pond
11a
Sayville
Ashland
South Natick
18
Dedham
Milton
Quincy
Hingham
Woodville
Everett St
Whitneys
16b
7
Braintree
Cohasset
21a
Hopkinton
16
Dover
Westwood
138
8
17
Lovell Corners
Holliston
28
4
North Milford
20
Braggville
Medfield
Winslows
Norwood
95
Canton
North Randolph
South Weymouth
140
109
Millis
Walpole
1
24
Randolph
Holbrook
3
18
123
Milford
West Medway
Cedar Hill
Stoughton
19a
Avon
Rockland
Hopedale
18
City Mills
Norfolk
Plain St
Abington
4mi
4km 22
Ocean Ave

The population of Boston is about 4.4 Million

Find the area between the curves

$$y = e^x \text{ and } y = x^3 + 3x^2 + 2x$$

Find the length of the piece of the arctangent curve from x=-1 to x=1

Find the volume generated when the region bounded by the x-axis and the curve $y = 3x - x^2$ is rotated about the x-axis

Find the volume generated when the region bounded by the curves

$$y = 2x^2 - 10$$

$$y = x$$

Is rotated about the line $x = -4$

Is rotated about the line $y = -15$

Find the volume determined by rotating the region bounded above by the line y=9 and below by the curve

$$y = x^2$$

About the x-axis

About the line y=12

About the line x=12

A closed region to the right of the y-axis is determined by

the y axis, the line $\quad y = \dfrac{1}{2}$

And the curve $\quad y = \cos(x)$

Find the volume of the solid determined by rotating this region about the x-axis and also the volume determined by rotating it about the y-axis

$$y = 2x^2 - 10$$

$$y = x$$

A solid is formed by constructing squares with bases in the x-y plane, perpendicular to the plane, using the distance between the curves at each x value as the length of a side of the square. Find its volume.

REVIEW : Find equations of all lines tangent to the curve with equation $x^2y - y^2x + xy = 4$ when $x = 2$

Find the dimensions of the cylinder of largest volume that can be inscribed in a sphere with radius R

Gravel is being dumped form a conveyor belt at a rate of 30 cubic feet per minute. The gravel forms a pile that is conical in shape and has height equal to base diameter. Find the rate at which the height is increasing when the pile is ten feet high.