

Math 1496 Calc 1 - Homework #7

Pg. 256, #9, 11, 29 and 30

Pg. 266, #4, 15, 19, 29, 33, 39 and 41

Pg. 256, #9, 11, 29 and 30

Analyze the sketch a graph of the follow labeling relative extrema, pt.s of inflection and asymptotes. State when the function is increasing and decreasing and concave upwards and downwards.

$$\#9 \quad y = \frac{x+1}{x^2-4} \qquad \#11 \quad y = \frac{x^2}{x^2+3}$$

$$\#29 \quad y = 3x^4 + 4x^3 \qquad \#30 \quad y = -2x^4 + 3x^2$$

Pg. 266-67, #4, 15, 19, 29, 33 and 41.

4. An open box of maximum volume is to be made from a square piece of material, 24 inches on a side, by cutting equal squares from the corners and turning up the sides (see figure in book).

15. Find the points on the graph of $y = x^2$ that is closest to the the point $(0, 3)$

19. Minimum Length A farmer plans to fence a rectangular pasture adjacent to a river (see figure in book). The pasture must contain 405,000 square meters in order to provide enough grass for the herd. No fencing is needed along the river. What dimensions will require the least amount of fencing?

29. Maximum Volume A rectangular package to be sent by a postal service can have a maximum combined length and girth (perimeter of a cross section) of 108 inches (see figure). Find the dimensions of the package of maximum volume that can be sent. (Assume the cross section is square.)

33. Minimum Surface Area A solid is formed by adjoining two hemispheres to the ends of a right circular cylinder. The total volume of the solid is 14 cubic centimeters. Find the radius of the cylinder that produces the minimum surface area.

39. An offshore oil well is 2 kilometers off the coast. The refinery is 4 kilometers down the coast. Laying pipe in the ocean is twice as expensive as laying it on land. What path should the pipe follow in order to minimize the cost?

41. Minimum time A man is in a boat 2 miles from the nearest point on the coast. He is traveling to a point Q, located 3 miles down the coast and 1 mile inland (see figure in book). (a) The man rows at 2 miles per hour and walks at 4 miles per hour. Toward what point on the coast should he row in order to reach point Q in the least time?

Due: Friday Oct. 15, 2021