

Advanced Math

1-3

(Day 2)

Functions and Their Graphs

Find the difference quotient and simplify.

$$71) f(x) = x^2 - x + 1 \quad \frac{f(2+h) - f(2)}{h}, h \neq 0$$

$$\frac{[(2+h)^2 - (2+h) + 1] - [(2)^2 - (2) + 1]}{h}$$

$$\frac{(4 + 4h + h^2 - 2 - h + 1) - (4 - 2 + 1)}{h}$$

$$\frac{(h^2 + 3h + 3) - 3}{h} = \frac{h^2 + 3h}{h} = h + 3$$

79) Express the area, A , of a circle as a function of its circumference, C .

Output A Input C

$$A(r) = \pi r^2 \quad C = \pi d = 2\pi r \quad C(r) = 2\pi r$$

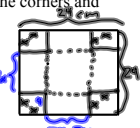
$$\text{input: } C \quad \text{output: } A \quad A(C) = \pi \left(\frac{C}{2\pi}\right)^2 \quad \frac{C}{2\pi} = r$$

$$A(C) = \pi \left(\frac{C^2}{4\pi}\right)$$

$$A(C) = \frac{C^2}{4\pi}$$

79) An open box of maximum volume is to be made from a square piece of material, 24 cm on a side, by cutting equal squares from the corners and turning up the sides.

a) Draw and label a picture to represent this scenario.



$$V(x) = (24-2x)(24-2x)x$$

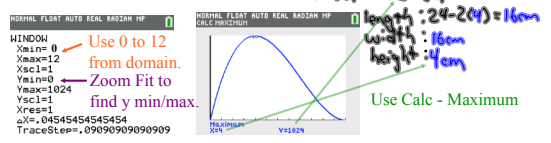
length width height

$$V(x) = x(24-2x)^2$$

b) Write the volume, V , as a function of the length of the side of one of the squares that is to be cut from the corners.

c) What is the domain of this function? $D = (0, 12)$ 12 or bigger, there is no box.

d) Find the maximum volume of the box, and the dimensions that yield the maximum volume. max Vol: 1024 cm^3



e) What is the range of the function?

$$(0, 1024]$$

Assignment:

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81-86, 89

