Krystal Question

$$\boxed{\frac{6}{1-x}}$$

$$6\sum_{n=0}^{\infty} x^n$$

$$1-x \overline{)\,6\,}$$

$$6+6x\ldots$$

$$-(6-6x)$$

$$6x$$

$$6x-6x^2$$

$$\int 6x^n\,dx$$

From the AP Calc listserv

They still need to show a number line or sign chart. The extra step comes from making a verbal connection.. As David Bressoud points out, the student needs to state "There is a relative maximum at x = 2 BECAUSE the sign of the derivative of f(x) changes from positive to negative at x = 2." The purpose for this increased requirement is to insure that students really do understand why the critical value is a max (or a min). Over the past few years, students have been required to write **complete** sentences connecting the results of their math to what is happening in the context of the problem. This is just a logical extension of that policy.

A teacher asked the same question I think it was Hanlon or Heuss asked

The definitions of increasing and decreasing let you include those endpoints. For all x in [0,2], y(x)=x^2 is increasing because if x1>x2, then y(x1)>y(x2). That the derivative is 0 at 0 is irrelevant.

Of course y(x)=x^2 is also decreasing on [-2,0]. It is often this fact that causes confusion. How can it be increasing and decreasing at the same point? But the definitions apply to intervals.

Mark Howell
Gonzaga High School
Washington, DC

--- Tom Utsch <tom@utschresearch.com> wrote:
\> In the 2003 AB test, questions 15 and 18 both deal
\> with finding the
\> interval for which a function is decreasing based on
\> a given derivative
\> for the function. The correct answers involve a
\> closed interval that
\> includes the points where the derivative is zero at
\> the endpoints of the
\> interval. How can this be correct? I would think
\> that the correct
\> answer would be the open interval since a derivative
\> = zero is not
\> decreasing at that instant.

In general continuous functions increase or decrease on closed intervals (assuming the endpoints are in the domain). The definition of increasing (and decreasing) have nothing to do with derivatives. If function values on the left are less than those on the right the continuous function is increasing. Thus sin(x) increases from -pi/2 to pi/2 and then decreases from pi/2 to 3pi/2. The fact that pi/2 is in both intervals is not a problem. Note functions increase or decrease on intervals not at points.

There is a theorem that says if the derivative of a function is positive (negative) on an interval (not at a point), then the function is increasing (decreasing) on that interval. The function does not say what happens if the derivative is zero. The converse of this theorem is false. For example y = x^3 is increasing everywhere, even though its derivative is zero at the origin.

This is why the solutions to the problems you mention give closed intervals. In fact the AP exam do not try to trip anyone up on this point. All the answers choices are closed intervals as in #18, or, in #15 they are open only at x = 0 and x = +/- infinity because these are not in the domain.

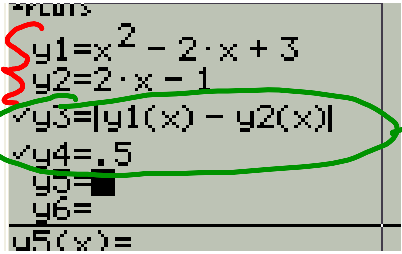
Lin.

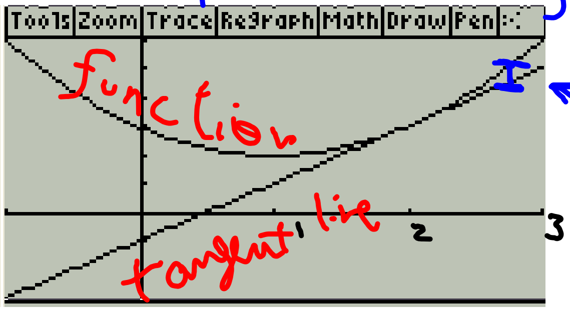
Let f be the function given by $f(x) = x^2 - 2x + 3$. The tangent line to the graph of f at $x = 2$ is used to approximate values of $f(x)$. Which of the following is the greatest value of x for which the error resulting from this tangent line approximation is less than 0.5?

(A) 2.4 (B) 2.5 (C) 2.6 (D) 2.7 (E) 2.8

1st off graph these

Error means how far apart are they

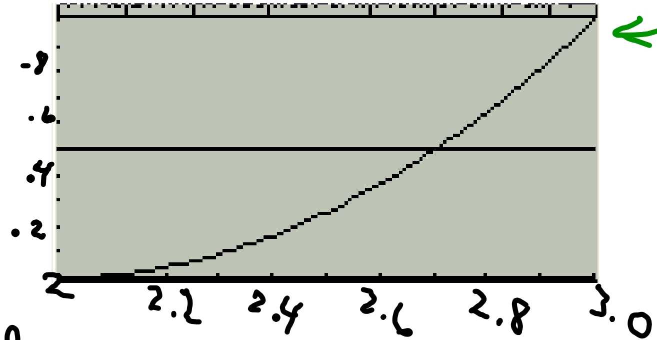




when is this .5 or less

I graphed the difference

TRACE 2.7



also reveals that it is within .5 of the function