

Snacks & Introduction

ppt 10 min

Hot topic - assessment

10 min *discussion*

CAS time *activity*

- chain rule
- show minimum path prob
- ellipse

Activity

4:40 Discussion & sharing ideas or trouble shooting, Q & A

4:55 Next Meeting Discussion

Resource Listing:

<http://cs3.covenantchristian.org/bird/TTT.htm>

Activities

http://education.ti.com/educationportal/activityexchange/activity_list.do?cid=us

Discussion Groups

<http://www-s.ti.com/cgi-bin/discuss/sdbmessage.cgi?databasetoopen=tinspire>

TI-Nspire website

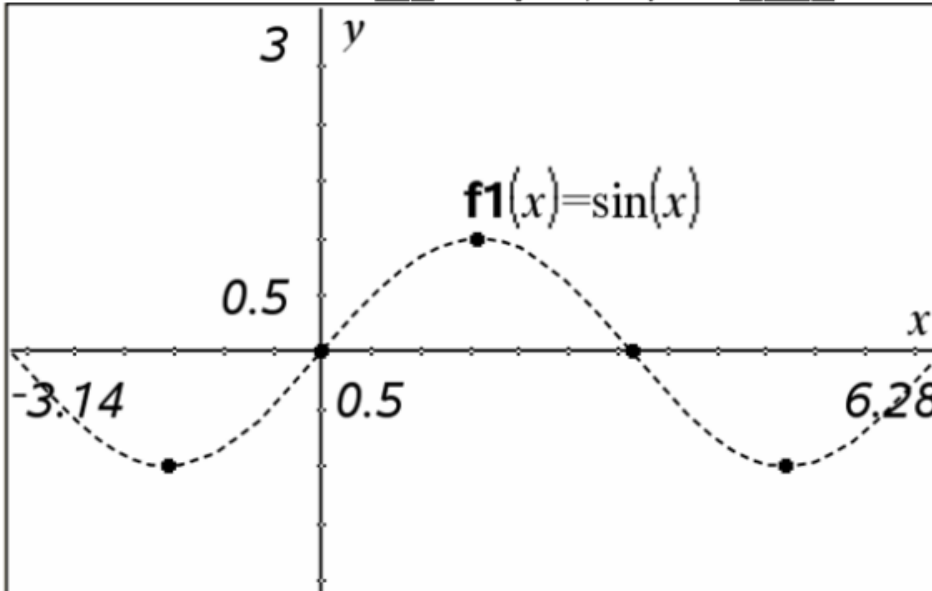
www.ti-nspire.com <http://www.ti-nspire.com>

Name _____ Date _____ per _____

Rate of change of sine **User Group Meeting**

Objective: Graphically determine the derivative of sine of x and discover the chain rule using ChainRule.tns

1. The derivative is the instantaneous _____ of change. Graphically it is the _____ of the tangent line.



Consider the 5 points indicated on the graph above.

2. What is the slope of the tangent at a maximum or minimum? _____
At that x location plot the value of the slope.

3. What does the slope appear to be when the graph crosses the origin? _____
Plot that number where x equals zero.

4. The next time $\sin(x)$ crosses the x -axis, the slope is not positive.
What does the slope appear to be? _____
Plot that value.

5. Draw a smooth line that passes through all these points you plotted.
What does the derivate of $\sin(x)$ appear to be? _____

6. Advance to the next page, 2.1, of the TI-Nspire document.
Repeat the process to graphically determine the derivative of $\cos(x)$. _____

7. Look at $f_2(x)=\sin(2x)$ on page 2.2. What is the slope at the origin? _____
What is the derivative of $\sin(2x)$?

$$\frac{d}{dx}(\sin(2x)) = \underline{\hspace{2cm}}$$

Using TI-Nspire CAS find the solution to the following derivatives to discover the chain rule.

$$8. \frac{d}{dx}(\sin(2 \cdot x)) =$$

$$9. \frac{d}{dx}(\sin(3 \cdot x)) =$$

$$10. \frac{d}{dx}(\sin(5 \cdot x)) =$$

$$11. \frac{d}{dx}(\sin(\pi \cdot x)) =$$

$$12. \frac{d}{dx}(\sin(x^2)) =$$

$$13. \frac{d}{dx}(\sin(x^3)) =$$

The CAS on the calculator will give you the general rule for what has been happening.

$$14. \frac{d}{dx}(\sin(u(x))) =$$

15. Before entering the next derivative into the calculator, write down what you think the answer will be based on your observations from above.

$$\frac{d}{dx}(\sin(\sin(3 \cdot x))) =$$

Try it on the calculator. Can you reconcile the two answers?

Now do a couple with cosine.

$$16. \frac{d}{dx}(\cos(x)) =$$

$$17. \frac{d}{dx}(\cos(2 \cdot x)) =$$

$$18. \frac{d}{dx}(\cos(-3 \cdot x)) =$$

$$19. \frac{d}{dx}(\cos(\pi \cdot x)) =$$

20. Take the derivative of the previous answer. If $y = \cos(\pi x)$, then $\frac{d^2 y}{dx^2} =$

$$21. \frac{d}{dx}((2x+5)^3) =$$

$$22. \frac{d}{dx}((u(x))^3) =$$

23. EXPLAIN THE CHAIN RULE