



March 10

Given a function and an x -value,
explain how to find an equation of
the tangent line.



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Students will verbally explain how to
count the number of arrangements
(using the words:
combinations, permutations...)



x	0	1	2	3
f(x)	2	4	6	8
f'(x)	-1	5	7	4
g(x)	-1	-3	6	9
g'(x)	3	-2	5	10

Find $\frac{d}{dx}(g(x)+f(x))$ at $x=1$

3

Find $\frac{d}{dx}(g(x) \cdot (x^2+7x))$ at $x=3$

417

Find $\frac{d}{dx}\left(\frac{5x^2}{f(x)}\right)$ at $x=0$

0

Find $\frac{d}{dx}\left(\frac{g(x)+x^4}{f(x)}\right)$ at $x=2$

17/9 = 1.889

Find $\frac{d}{dx}\left(\frac{f(x)}{x^2-10x+7}\right)$ at $x=0$

13/49 = .265

Find $\frac{d}{dx}\left(\frac{f(x)}{x^2 \cdot g(x)}\right)$ at $x=1$

17/9 = 1.889

If $101! = (99!)x$,
then $x =$

Factorial

$$\frac{101!}{99!} = \frac{99! \cdot x}{99!}$$

$$\frac{101(100)(99)(98)(97) \cdots (2)(1)}{99(98)(97) \cdots (2)(1)} = 101(100) = 10,100$$

Notation is an exclamation mark !

Multiply by every number until you get to 1

$$5! = 5(4)(3)(2)(1)$$

$$7! = 7(6)(5)(4)(3)(2)(1)$$

$$0! = 1$$

Five different books are on a shelf. In how many different ways could you arrange them?



$$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 =$$

$$5! = 120$$

Multiplication
Principle for
Counting

The total number of outcomes is the product of the number of outcomes for each choice:

$$n_1 \cdot n_2 \cdot n_3 \cdots$$

3 classes
1st period

5 classes
2nd period

2 classes
3rd period

$$3 \cdot 5 \cdot 2 = 30$$

How many different arrangements are there of the letters of the word "numbers"?

$$5040 = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

How many of those arrangements have b as the first letter?

$$720 = 1 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

$$1 \cdot 6!$$

Permutation

The number of arrangements of n objects taken r at a time - order of the objects matters

$${}_n P_r - n \text{ "Place" } r = \frac{n!}{(n-r)!}$$

Combination

The number of arrangements of n objects taken r at a time - order of the objects does not matter

$${}_n C_r - n \text{ "Choose" } r = \frac{n!}{(n-r)! \cdot r!}$$

10 horses run in a race. How many ways can they finish in the top three?



$${}_{10}C_3 = 120$$

How many ways can they finish 1st, 2nd and 3rd?

$${}_{10}P_3 = 720$$

There are 15 students in a class. How many ways can they select a committee of 4 students?



$${}_{15}C_4 = 1,365$$

How many ways can they select a president, vice-president, secretary and treasurer?

$${}_{15}P_4 = 32,760$$

Volunteers to work TCAP Carnival:

Set up (1:30 - 1:45)

Raymond C.

CYRUS B.

Louis

Shift 1 (1:45 - 2:05)

Sydney E

Quinn R

Peter G

Shift 2 (2:05 - 2:25)

Tyler M

Ami H.

Ezra B.

Shift 3 (2:25 - 2:45)

Alisse F.

Sarah Puckett

Rafi Taffy

Clean up (2:45 - 3:00)

Julice T.

Sip