Warm-up: put at top of today's assignment

Write the first 8 terms of the given pattern:

$$1 + \frac{1}{1} + \frac{1}{1\cdot 2} + \frac{1}{1\cdot 2\cdot 3} + \quad \cdots \quad + \frac{1}{}$$

$a_1 \quad a_2 \quad a_3 \quad a_4$

Fill in the actual values on your hw paper!!!

Warm-up
(put at top of today's assignment)

$$1+\frac{1}{1}+\frac{1}{1\cdot 2}+\frac{1}{1\cdot 2\cdot 3}+\quad\cdots\quad+\frac{1}{}$$

Fill in the actual values on your hw paper!!!

Now simplify using fractions:

$$1+1+\frac{1}{2}+\frac{1}{6}+\frac{1}{}+\frac{1}{}+\frac{1}{}+\frac{1}{}\approx \boxed{}$$

Round off to the nearest millionth !

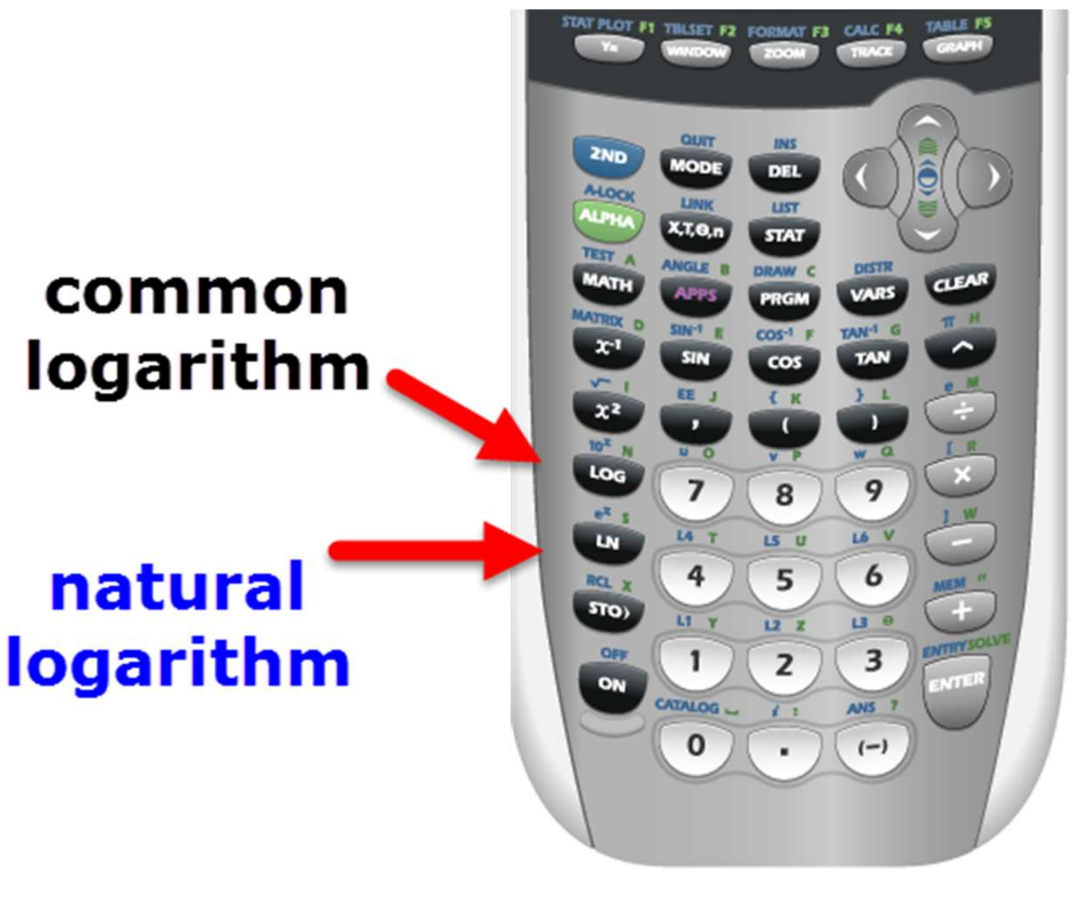
The answer for the first 8 terms:

2.718254

$$e = 2.7182818284590452353603$$

y = logx → common logarithm (base 10)

y = lnx → natural logarithm (base e)

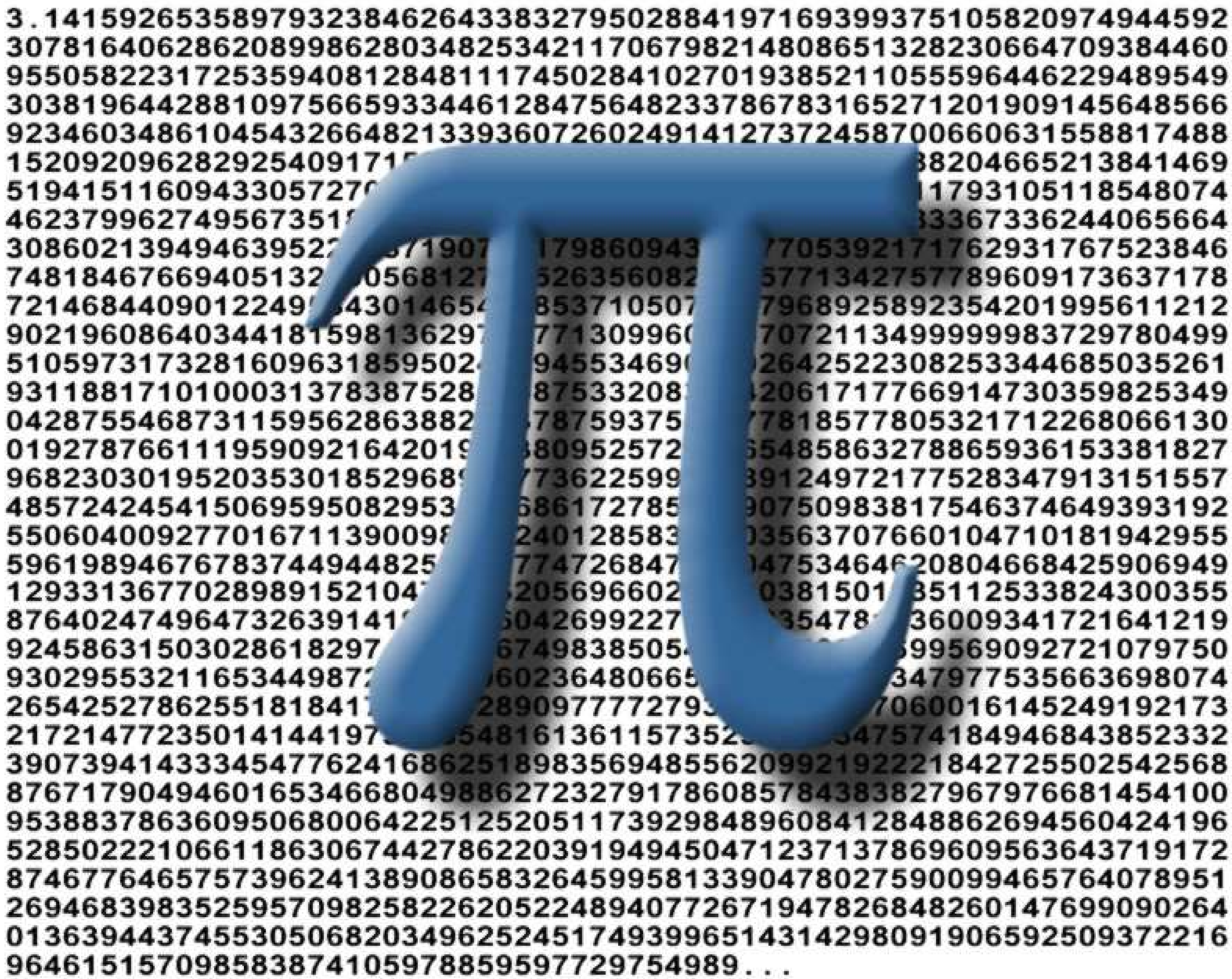


e is often called **Euler's number** after Leonhard Euler, a famous Swiss mathematician from the 1700's

Summation notation→ $$e = \sum_{n=0}^{\infty} \frac{1}{n!} = 1 + \frac{1}{1} + \frac{1}{1 \cdot 2} + \frac{1}{1 \cdot 2 \cdot 3} + \cdots$$

Calculus notation→ $$e = \lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$$

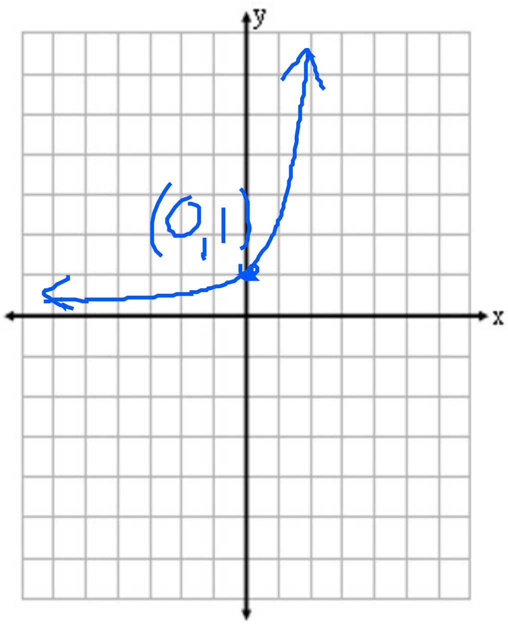
2.7182818284590452353602874713526624
977572470936999595749669676277240766
303535475945713821785251664274274663
919320030599218174135966290435729003
342952605956307381323286279434907632
338298807531952510190115738341879307
021540891499348841675092447614606680
822648001684774118537423454424371075
390777449920695517027618386062613313
845830007520449338265602976067371132
007093287091274437470472306969772093
101416928368190255151086574637721112
523897844250569536967707854499699679
4686445490598793163688923009879312...

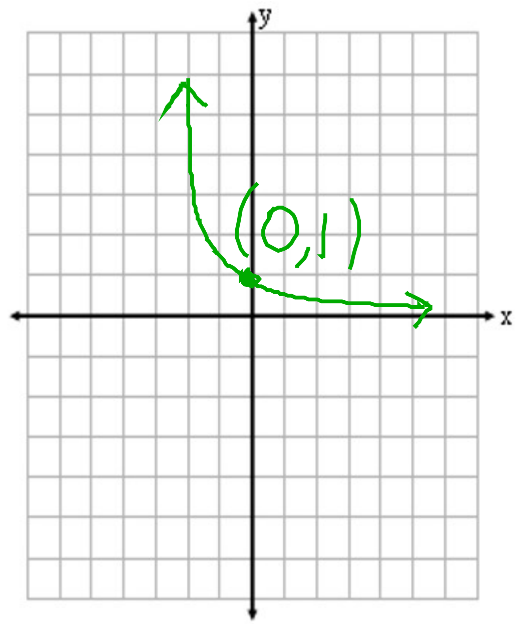

3.141592653589793238462643383279502884197169399375105820974944592
307816406286208998628034825342117067982148086513282306647093844460
955058223172535940812848111745028410270193852110555964462294895549
303819644288109756659334461284756482337867831652712019091456485669
923460348610454326648213393607260249141273724587006606315588174881
390739414333454776241686251898356948556209921922218427255025425688
876717904946016534668049886272327917860857843838279679766814541000
953883786360950680064225125205117392984896084128488626945604241965
528502221066118630674427862203919494504712371378696095636437191728
874677646575739624138908658326459958133904780275900994657640789512
269468398352595709825822620522489407726719478268482601476990902640
013639443745530506820349625245174939965143142980919065925093722169
6461515709858387410597885959772975498 9...

4.2 Notes: The Natural Exponential Function

Sketch a graph of

$y = e^{x}$ and $y = e^{-x}$





NOTES:

Domain→ $(-\infty, \infty)$

Range→ $(0, \infty)$

Asymptote at y=0

4-2 notes:

Continuously Compounded Interest

$$A = Pe^{rt}$$

A = final amount

P= principal (initial investment)

r = interest rate

t = # of years

4-2 notes:

Compounded:

- Annually→ **n = 1**
- Semi-annually→ **n = 2**
- Quarterly→ **n = 4**
- Monthly→ **n = 12**
- Daily→ **n = 365**

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

5% = .05

change % to a decimal

A = final amount

P= principal (initial investment)

r = annual (yearly) interest rate

n = # times interest is paid per year (compounded)

t = # of years

Special Instructions for 4.2 #37a-c

compare interest rate options by assuming a $10,000 investment earning interest for 5 years.

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

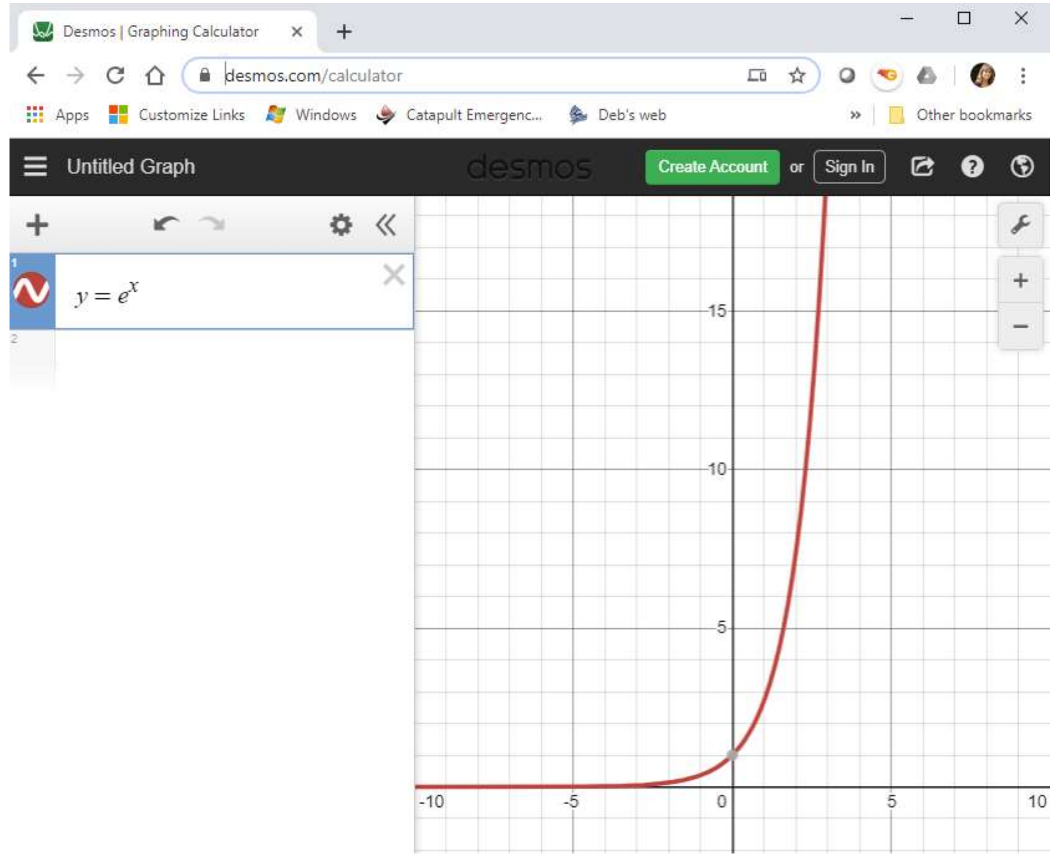
versus

Continuously Compounded Interest

$$A = Pe^{rt}$$

4.2 #25c and 29b

use a graphing calculator or Desmos to help with your sketch



https://www.desmos.com/calculator