Algebra 2   7.7
Evaluate expressions involving the natural base and natural logarithms
Solve exponential equations and inequalities using logarithms
Compute continuously compounding interest

common logarithm
e
exponential growth
exponential decay
natural logarithm
ln
whiteboards
speed dating (if time)

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

$$A = Pe^{rt} \quad \text{continuous int}$$

Quiz 7.5-7.6

GuidedPractice

Solve each equation or inequality. Round to the nearest ten-thousandth.

5A. $5(\ln 6x) = 8$

$$\frac{5}{5} \qquad \frac{}{5}$$

$$\ln_e 6x = 1.6$$

$$e^{1.6} = 6x$$

$$4.9530 = 6x$$

$$0.8255 = x$$

5B. $\ln (2x - 3)^3 > 6$

$$e^{\ln(2x-3)^3}$$

$$2x - 3 > 0$$
$$2x > 3$$
$$x > 1.5$$

$$(2x-3)^3 > e^6$$

$$e^6 < (2x-3)^3$$

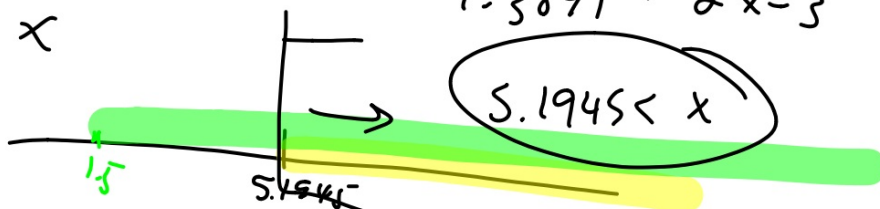$$403.4288 < (2x-3)^3$$

$$7.3891 < 2x - 3$$

$$\boxed{5.1945 < x}$$

my power is higher...

1.5

5.1945

b. $\ln_e (x - 8)^4 < 4$

$x - 8 > 0$

$(x-8)^4 < e^4$

My power is lower...

Not quarterly, not monthly, not daily,....

KeyConcept **Continuously Compounded Interest**

Calculate continuously compounded interest using the following formula:

$$A = Pe^{rt},$$

where A is the amount in the account after t years, P is the principal amount invested, and r is the annual interest rate.

Stock market, mutual funds, investments...

FINANCIAL LITERACY When Angelina was born, her grandparents deposited $3000 into a college savings account paying 4% interest compounded continuously.

a. Assuming there are no deposits or withdrawals from the account, what will the balance be after 10 years?

$$A = Pe^{rt}$$

$$A = 3000e^{0.04 \cdot 10} = 3000e^{0.4}$$

$$\$4475.47$$

b. How long will it take the balance to reach at least $10,000?

$$10,000 = 3000 \left(e^{0.04T} \right)$$

$$\ln 3.3333 = \ln e^{0.04T}$$

$$1.20397 = 0.04T \, (\, 1 \,)$$

$$T \approx 30 \, yrs$$

c. If her grandparents want Angelina to have $10,000 after 18 years, how much would they need to invest?

GuidedPractice

6. Use the information in Example 6 to answer the following.

A. If they invested $8000 at 3.75% interest compounded continuously, how much money would be in the account in 30 years?

B. If they could only deposit $10,000 in the account above, at what rate would the account need to grow in order for Angelina to have $30,000 in 18 years?

C. If Angelina's grandparents found an account that paid 5% compounded continuously and wanted her to have $30,000 after 18 years, how much would they need to deposit?

$$\ln 3x + \ln 2x = 9$$
$$\ln(6x^2) = 9$$
$$e^9 = 6x^2$$