

Math 80 Spring 2019 Take Home Test

Name:

This take home test will be due at the beginning of class on April 11th.

If you can't make it to class please send a scan or pictures of your answers.

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1. Simplify and then check your work by writing in exponential form. Try **not** to use a calculator.  
(3 pts each)

a) $\log_2 16$  $4$  $2^4 = 16$	b) $\log_3 \left( \frac{1}{9} \right)$	c) $\log_8 1$	d) $\log 10$
e) $\log_6 36$	f) $\log \left( \frac{1}{100} \right)$  $-2$  $10^{-2} = \frac{1}{10^2}$  $= \frac{1}{100}$	g) $\log_2 \left( \frac{1}{32} \right)$	h) $\log_{60} \left( \frac{1}{60} \right)$

2. Simplify. You'll need to use a calculator. If necessary round to the **ten-thousandths place**.  
(The ten-thousandths place is 4 places to the right of the decimal.) (1 pt each)

a) $\log(16)$ $1.2041$	b) $\ln 16$
c) $\ln(1.5)$	d) $\ln(5,000)$
e) $\log \left( \frac{1}{2} \right)$	f) $\ln(148.4132)$
g) $\ln(0.1353)$	h) $\log(0.0316)$

3. Simplify. You'll need to use a calculator. If necessary round to the **ten-thousandths place**.  
(1 pt each)

a) $10^{1.5}$ 31.6228	b) $e^2$
c) $e^{-1}$	d) $e^{-4.5}$ 0.0111
e) $10^{-0.7}$	f) $e^{2.4849}$
g) $e^{4.6052}$	h) $10^{1.699}$

4. Simplify **using the change of base formula**. You **need** to show your work. You only need to round to the **hundredths place**. (2 pts each)

a) $\log_6 50$ $\frac{\ln 50}{\ln 6}$ 2.18	b) $\log_{10}(100)$
c) $\log_2\left(\frac{1}{4}\right)$	d) $\log_4(15)$
e) $\log_5\left(\frac{1}{2}\right)$	f) $\log_{0.5}(0.5)$

5. Simplify. Try **not** to show your work. Instead, try to put the whole expression in your calculator at once. If necessary, round to the **hundredths place**. (2 pts each)

a) $5e^2$	b) $10,000e^{0.5}$
c) $\frac{\ln(2^3)}{3\ln 2}$	d) $\ln\left(\frac{8,000}{5,000}\right)(0.05^{-1})$ 9.4
e) $250,000e^{-0.1(190)}$	f) $\ln\left(\frac{6}{7}\right) - (\ln 6 - \ln 7)$

6. Answer the following questions. Show your work. (3 points each)

a) Use the future value formula  $A = Pe^{rt}$  to find the amount you'd have if you invested \$10,000 for 20 years at 4%.

The known values are

$$P = 10,000$$

$$t = 20$$

$$r = 0.04$$

Answer the question. (Use the proper label.)

$$A = 10,000e^{20 \times 0.04}$$

$$\$22,255.41$$

b) Use the present value formula  $P = Ae^{-rt}$  to find how much you'd need to save today if you wanted \$5,000 in 4 years. Assume you can get a rate of 3%.

The known values are

Answer the question. (Use the proper label.)

c) Use the rate formula  $r = \frac{\ln(A/P)}{t}$  to find the interest rate I'd need if I wanted \$5,000 to become \$6,000 in 2 years. Make sure to express the rate as a percent.

The known values are

Answer the question. (Use the proper label.)

d) Use the time formula  $t = \ln\left(\frac{A}{P}\right)r^{-1}$  to find how long it will take to double \$100,000 at 6%.

The known values are

Answer the question. (Use the proper label.)

e) Use the future value formula  $A = Pe^{rt}$  to find the amount you'd have if you invested \$75,000 for 2 years at 1.5%.

The known values are

Answer the question. (Use the proper label.)

f) Use the present value formula  $P = Ae^{-rt}$  to find how much you'd need to save today if you wanted \$750,000 in 30 years. Assume you can get a rate of 5%.

The known values are

Answer the question. (Use the proper label.)

g) Use the rate formula  $r = \frac{\ln(A/P)}{t}$  to find the rate you'll need to double \$250,000 in 12 years.  
Make sure to express the rate as a percent.

The known values are

$$A = 500,000$$

$$P = 250,000$$

$$t = 12$$

Answer the question. (Use the proper label.)

$$r = \frac{\ln\left(\frac{500,000}{250,000}\right)}{12}$$

$$0.0578$$

$$5.78\%$$

h) Use the time formula  $t = \ln(A/P)r^{-1}$  to find how long it will take for your \$100,000 to become \$250,000 at 5%.

The known values are

Answer the question. (Use the proper label.)

7. Using a two-column table solve  $2e^t - 15 = 3$ . Keep your answer exact. (6 pts)

Oper	Inv
$e^t$	$\ln$
$\times 2$	$\div 2$
$-15$	$+15$

$$2e^t - 15 = 3$$

$$+15 +15$$

$$\frac{2e^t}{2} = \frac{18}{2}$$

$$e^t = 9$$

$$\ln(e^t) = \ln(9)$$

$$t = \ln(9)$$

8. Using a two-column table solve  $\frac{-3e^t + 1}{2} = -7$ . Keep your answer exact. (6 pts)

Oper	Inv

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9. Using a two-column table solve  $e^{2t} - 1 = 9$ . Keep your answer exact. (6 pts)

Oper	Inv



10. Using a two-column table solve  $4(e^x + 6) - 11 = 29$ . Keep your answer exact. (6 pts)

Oper	Inv

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11. Using a two-column table solve  $\frac{e^{k+10}}{2} + 40 = 48$ . Keep your answer exact. (6 pts)

Oper	Inv