

Chapters 6 and 7 Practice problems

November 10, 2016

Chapter 6

Warning: The difference between chapter 6 and chapter 5 is that we are using the number e , and the *natural logarithm*, \ln . When appropriate, leave your answer in terms of e and \ln .

1. Solve for x :

$$2e^{2x} - 8e^x + 1 = -5$$

2. Solve for x :

$$\ln(2x + 9) = 2$$

3. Solve for x :

$$\ln(x + 5) + \ln(x - 1) = 2$$

4. Solve for x :

$$\ln(x + 5) - \ln(x - 1) = 2$$

5. Find f^{-1} if

$$f(x) = 3 - \ln(x - 5)$$

6. Find the domain and range of the functions f and f^{-1} from the previous problem.
7. Suppose you deposit \$5,000 into a bank account has an annual interest rate of 8%. How much money will the account have after 10 years if the interest is compounded:

- (a) once a year.

- (b) twice a year.
 - (c) monthly.
 - (d) daily.
 - (e) continuously.
8. Suppose you deposit \$5,000 into a bank account that has an annual interest rate of 8%. After how many years will the account have \$10,000 if interest is compounded continuously?
 9. Suppose you deposit \$5,000 into a bank account that compounds interest continuously at a rate of r . Suppose that after 7 years, the account grew to \$7,500. What is the interest rate r ?
 10. Suppose a deer population has a continuous exponential growth rate of 1.5%. How long does it take for the deer population to double?
 11. For extra practice, do every odd problem in Section 6.3 from #1 to #32.

Chapter 7

1. Find all solutions to the following systems of equations:

(a)

$$\begin{aligned}x + y &= 1 \\xy &= 5\end{aligned}$$

(b)

$$\begin{aligned}x^2 - y^2 &= 7 \\3x^2 + 5y^2 &= 3\end{aligned}$$

(c)

$$\begin{aligned}2^x + y^2 &= 11 \\3 \cdot 2^x - 2y^2 &= 3\end{aligned}$$

2. Write an example of a system of two linear equations in two variables that has:
 - (a) zero solutions.
 - (b) 1 solution.

(c) infinitely many solutions.

3. Sketch graphs for the examples you found in the previous question.
4. Find all solutions to the following systems of *linear* equations (you may use any method you like):

(a)

$$\begin{aligned}3x + 2y &= 1 \\ -3x - 5y &= 13\end{aligned}$$

(b)

$$\begin{aligned}5x - 6y &= 7 \\ -15x + 18y &= 3\end{aligned}$$

(c)

$$\begin{aligned}x + y + z &= 11 \\ -2x - y + 2z &= 3 \\ 4x + 3y - z &= 0\end{aligned}$$

Miscellaneous old problems

1. Find all possible x -values such that

$$2x^2 - 8x + 6 \leq 0$$

Write your solution as an interval, or a union of intervals.

2. Find all values of x for which

$$|3x - 1| \geq 10$$

3. Find the equation passing through the points $(-1, 4)$, $(-10, 16)$.
4. Find the equation of a line that is parallel to the line you found in the previous problem.
5. Find the equation of a line that is perpendicular to the line you found in the previous problem.