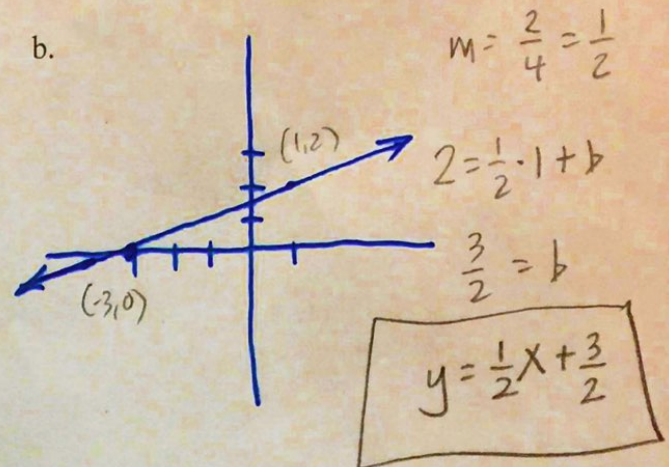
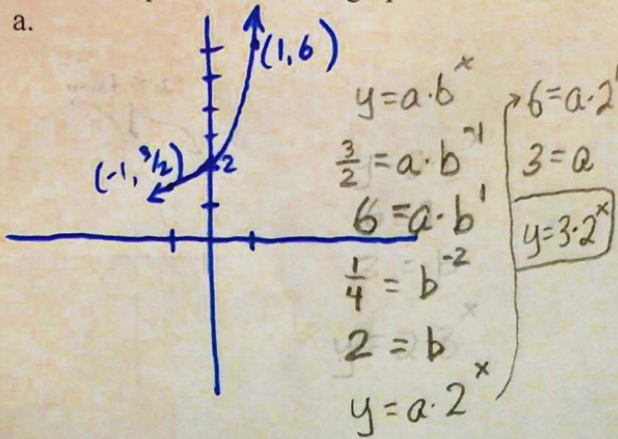


Calculus Chapter 1 Practice Test

Name: Key
 Show all work.

1. Find the equation for each graph:



2. When text messaging was new to cell phones, carriers would charge per message for your monthly bill. If RipUOff cell phones charged \$32 for 100 messages and \$33 for 150 messages, find:

- a linear equation relating cost, C, and number of messages, m.
- what is the slope of the line and what does it mean?
- What would you pay if you had 1200 messages in a month?
- How many messages could you send if your budget is \$60 per month for your phone?

a) (100, 32)
 (150, 33)
 $m = \frac{1}{50} = \$0.02$
 $32 = .02 \cdot 100 + b$
 $30 = b$
 $C = 0.02m + 30$

b) $m = 0.02$
 \$0.02 per message

c) $C = 0.02(1200) + 30$
 $C = \$54$

d) $60 = .02m + 30$
 $30 = .02m$
 1500 messages

3. Solve for x:

a. $35 = 700e^{x+1}$
 $.05 = e^{x+1}$
 $-2.996 = x+1$
 $-3.996 = x$

b. $3^x = 11$
 $x \ln 3 = \ln 11$
 $x = \frac{\ln 11}{\ln 3}$

$x = 2.183$

4. Find k so the following function is continuous: $f(x) = \begin{cases} kx - 3 & x < -3 \\ x^2 + 9 & x \geq -3 \end{cases}$

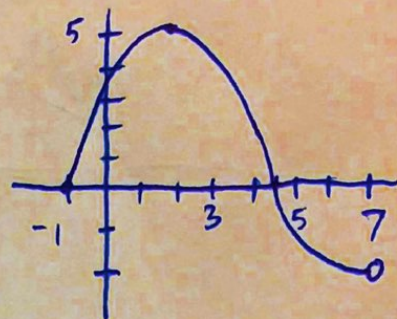
$$-3k - 3 = 9 + 9$$

$$-3k = 21$$

$$k = -7$$

5. The entire graph of $f(x)$ is shown in the figure:

- What is the domain of $f(x)$? $[-1, 7]$
- What is the range of $f(x)$? $[-2, 5]$
- List all roots of $f(x)$. $-1, 4.5$
- List all intervals on which $f(x)$ is decreasing. $(2, 7)$
- Is $f(x)$ concave up or concave down at $x = 6$? up
- Is the function invertible? no



6. A town has a population of 1000 people at time $t=0$. In each of the following cases, write a formula for the population, P , of the town as a function of year t .

- The population increases by 50 people a year.
- The population increases by 5% per year.
- In each case, find the number of people in the town after 10 years.

a) $P = 1000 + 50t$

b) $P = 1000(1.05)^t$

c) 1500 for linear, 1629 for exponential

7. Given $f(x) = 4x^2 - x + 7$, find:

a. $f(-2)$

$$16 + 2 + 7 = 25$$

b. $f(-2+h)$

$$4(-2+h)^2 - (-2+h) + 7$$

$$4(4 - 4h + h^2) + 2 - h + 7$$

$$16 - 16h + 4h^2 + 2 - h + 7 = 4h^2 - 17h + 25$$

c. $f(-2+h) - f(-2)$

$$4h^2 - 17h$$

d. $\frac{f(-2+h) - f(-2)}{h}$

$$4h - 17$$