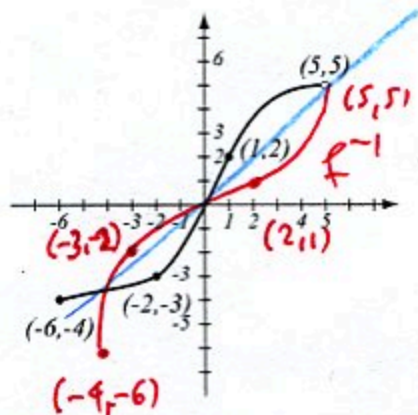


1. (6pts) The graph of a function f is given.
a) Is this function one-to-one? Justify.
b) If the function is one-to-one, find the graph of f^{-1} , labeling the relevant points.



a) yes, it passes the horizontal line test

2. (12pts) Let $f(x) = \frac{x}{2x-1}$. Find the formula for f^{-1} . Find the domain and range of f^{-1} .

$$y = \frac{x}{2x-1} \quad f^{-1}(y) = \frac{y}{2y-1}$$

$$y(2x-1) = x$$

$$2xy - y = x$$

$$2xy - x = y$$

$$x(2y-1) = y$$

$$x = \frac{y}{2y-1}$$

Domain of f^{-1} : Can't have $2y-1=0$
 $y = \frac{1}{2}$

$$(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$$

Range of f^{-1} = Domain of f :

Can't have $2x-1=0$
 $x = \frac{1}{2}$

$$(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$$

3. (8pts) Evaluate without using the calculator:

$$\log_3 81 = 4$$

$$\log_2 \frac{1}{16} = -4$$

$$\log_8 16 = \frac{4}{3}$$

$$\log_6 \sqrt[5]{6^5} = \frac{5}{8} \quad 6^{\frac{5}{8}} = \sqrt[8]{6^5} = 6^{\frac{5}{8}}$$

$$3^4 = 81$$

$$2^{-4} = \frac{1}{16} = \frac{1}{2^4} = 2^{-4}$$

$$8^{\frac{4}{3}} = 16 = 2^4 = (\sqrt[3]{8})^4 = (8^{\frac{1}{3}})^4 = 8^{\frac{4}{3}}$$

4. (4pts) Use your calculator to find $\log_3 33$ with accuracy 6 decimal places. Show how you obtained your number.

$$\log_3 33 = \frac{\ln 33}{\ln 3} = 3.182658$$

5. (12pts) Investigate the effect of increased frequency of compounding: for a deposit of \$10,000 and annual interest rate of 4%, calculate the amount in the account after 1 year for the frequencies of compounding below.

- a) Write the general formula for the amount, replacing the variables by numbers, if known.
 b) Use the table feature on your calculator to quickly compute amounts after 1 year and enter them below.
 c) Does compounding more often make a big difference?

Frequency: every	n	Amount after 1 year
year	1	10,400
quarter	4	10,406.04
month	12	10,407.42
day	365	10,408.08
hour	$365 \cdot 24 = 8760$	10,408.11
second	$365 \cdot 24 \cdot 3600 = 3,153,600$	10,408.11

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

$$A = 10000 \left(1 + \frac{0.04}{n}\right)^{n \cdot 1}$$

c) Initially, it makes some difference, but compounding more often than monthly makes only little difference.

6. (3pts) Find the domain of $f(x) = \log_4(3 - 6x)$.

Must have $3 - 6x > 0$

$$3 > 6x$$

$$\frac{1}{2} > x$$

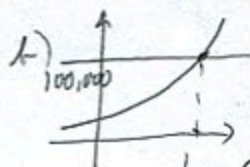
Domain = $(-\infty, \frac{1}{2})$

7. (6pts) The number of students from India enrolled in U.S. universities is modeled by the function $I(t) = 9000(1.0878)^t$, where t is the number of years since 1980.

- a) Estimate the number of students from India in 1992. According to the model, what will be the number of students from India in 2020? (Round to whole numbers.)
 b) Use the intersect feature on the calculator to estimate in what year the number of students from India went past 100,000.

a)

year	t	$I(t)$
1992	12	24,708 students
2020	40	260,738



In about 29 years, so, in 2009.

$$t = 28.612436$$

8. (9pts) Using transformations, draw the graph of $f(x) = 4 - \log_3(x + 5)$. Explain how you transform the graph of a basic function in order to get the graph of f . Show at least one point on the graph, and asymptotes to the graph, if any.

