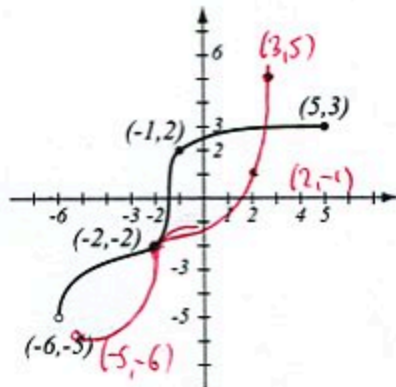


1. (6pts) The graph of a function f is given.
a) Is this function one-to-one? Justify.
b) If the function is one-to-one, find the graph of f^{-1} , labeling the relevant points.



a) Yes - it passes the horizontal line test
b)

2. (12pts) Let $f(x) = x^2 - 7$, considered for domain $x \leq 0$.
a) Find the formula for f^{-1} .
b) Find the ranges of f and f^{-1} .

a) $y = x^2 - 7$

$y + 7 = x^2$

$x = \pm \sqrt{y + 7}$

Since $x \leq 0$ we take the - sd.

$f^{-1}(y) = -\sqrt{y + 7}$

b) Range of f
= domain of f^{-1}

Must have

$y + 7 \geq 0$

$y \geq -7$

$[-7, \infty)$

Range of f^{-1}
= domain of f

$= (-\infty, 0]$

3. (8pts) Evaluate without using the calculator. Show how you got the numbers.

$\log_2 64 = 6$

$\log_4 \frac{1}{256} = -4$

$\log_{27} 9 = \frac{2}{3}$

$\log_{b^2} \sqrt[3]{b^4} = \frac{2}{3}$

$2^? = 64$

$4^? = \frac{1}{256} = \frac{1}{4^4} = 4^{-4}$

$27^? = 9 = 3^2 = \sqrt[3]{27^2} = 27^{\frac{2}{3}}$

$(b^?)^? = \sqrt[3]{b^4} = b^{\frac{4}{3}}$

4. (4pts) Use the change-of-base formula and your calculator to find $\log_4 18$ with accuracy 6 decimal places. Show how you obtained your number.

$\log_4 18 = \frac{\log 18}{\log 4} = 2.084963$

$2 \cdot ? = \frac{4}{3}$

5. (7pts) How much should you invest in an account bearing 2.25%, compounded monthly, if you wish to have \$3,000 in two years?

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

$$3000 = P(1.001875)^{24}$$

$$3000 = P \cdot 1.045984$$

$$P = \frac{3000}{1.045984} = 2868.11$$

6. (6pts) Find the domain of $f(x) = \frac{\log_5(3-2x)}{6x-25}$.

Must have: $3-2x > 0$

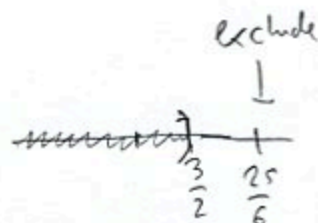
$$2x < 3$$

$$x < \frac{3}{2}$$

Can't have: $6x-25=0$

$$6x = 25$$

$$x = \frac{25}{6}$$



$$\left(-\infty, \frac{3}{2}\right)$$

7. (8pts) An object weighing 2000 kilograms moving at velocity v meters per second has kinetic energy $E(v) = 1000v^2$ Joules.

- a) Determine the kinetic energy of the object if it is traveling at 10 and 20 meters per second.
 b) Find a formula for the inverse function and explain what it represents.
 c) Determine the velocity of the object if its kinetic energy is 150,000 and 300,000 Joules.

a) $E = 1000v^2$

v	E
10	100,000
20	400,000

b) $E = 1000v^2$

$$v^2 = \frac{E}{1000}$$

$$v = \sqrt{\frac{E}{1000}}$$

($v > 0$)
 $v(E) = \sqrt{\frac{E}{1000}}$

E	v
150,000	$\sqrt{150} = 5\sqrt{6} = 12.247449$ <small>6.25</small>
300,000	$\sqrt{300} = 10\sqrt{3} = 17.320508$ <small>100.3</small>

8. (9pts) Using transformations, draw the graph of $f(x) = 7 - e^{0.5x}$. 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.

