Test 3.1-3.3; 6.1-6.6

3.1 - 3.3

Domain
Range
x-intercept(s)
y-intercept
function notation
increasing
decreasing
local min
local max
interval notation
function operations
(+, −, ×, ÷)
even/odd

6.1 - 6.2

composition of functions
one-to-one functions
inverse functions

6.3 - 6.6

evaluating logs
expand/condense logs
log properties
graph exponentials/logs with transformations
solve log/exponential equations

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#1)

Evaluate

A) $\log_4 256$

B) $\log_2 \frac{1}{8}$

C) $\log_4 4^4$

D) $e^{\ln 16}$

Switch between exponential and log form.

A) $\log_m x = y$

B) $4 = \ln r$

C) $10^p = 832$

D) $k = 5^{(x-3)}$

#2)

Expand

$$\ln\left[\frac{3x^2}{\sqrt{y}(z-4)}\right]$$

Condense

$$\log_2(m-n) - 3\log_2 m + \frac{1}{4}\log_2 n$$

#3)

- Find the parent function and transformations. Graph the function using transformations. Graph the asymptote. Find the Domain and Range.

$$y = \frac{1}{2}\log_4(-3x) + 2$$

#4)

Solve.

A) $0.4e^{\frac{1}{3}x-4} = 29$

B) $2 \cdot 49^x + 11 \cdot 7^x + 5 = 0$

#5)

Solve.

A) $\log_x 100 = 2$

B) $\log_5(x+3) = 1 - \log_5(x-1)$

① A) 4 — A) $m^y = x$

B) -3 — B) $e^4 = r$

C) 4 — C) $\log 832 = p$

D) 16 — D) $\log_5 k = x - 3$

② • $\ln 3 + 2\ln x - \frac{1}{2}\ln y - \ln(z-4)$

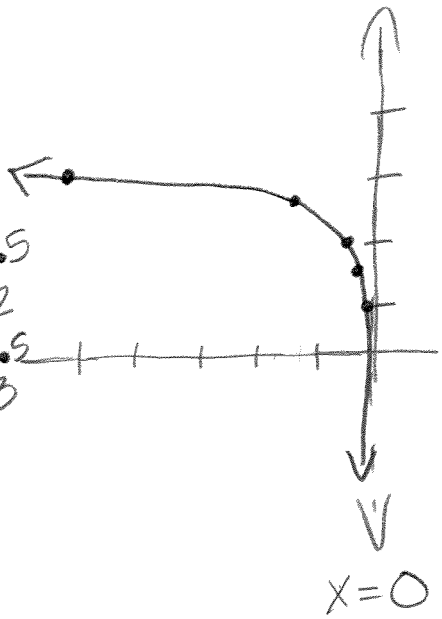
• $\log_2 \frac{(m-n)\sqrt[4]{n}}{m^3}$

③ parent: $y = \log_4 x$

$4^y = x$

x	y
$-\frac{1}{48}$	-2
$-\frac{1}{12}$	-1
$-\frac{1}{3}$	0
$-\frac{4}{3}$	1
$-\frac{16}{3}$	2

-1	1
$-\frac{1}{2}$	1.5
0	2
$\frac{1}{2}$	2.5
1	3



Transformations:
vertical shrink by $\frac{1}{2}$
reflection over y-axis
horizontal shrink of $\frac{1}{3}$
vertical shift up 2

D: $(-\infty, 0)$

R: $(-\infty, \infty)$

④ A) $\frac{.4e^{\frac{1}{3}x-4}}{.4} = \frac{29}{.4}$

$e^{\frac{1}{3}x-4} = 72.5$

$\ln 72.5 = \frac{1}{3}x - 4$

$4.284 = \frac{1}{3}x - 4$

$+4 \quad +4$

$(3)8.284 = \frac{1}{3}x\,(3)$

$x \approx 24.851$

B) $2 \cdot 49^x + 11 \cdot 7^x + 5 = 0$

$2 \cdot 7^{2x} + 11 \cdot 7^x + 5 = 0$

$(2 \cdot 7^x + 1)(7^x + 5) = 0$

$2 \cdot 7^x + 1 = 0$ $\qquad$ $7^x + 5 = 0$

$7^x = -\frac{1}{2}$ $\qquad$ $7^x = -5$

no solution

(5) A) $\log_x 100 = 2$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

B) $\log_5(x+3) = 1 - \log_5(x-1)$

$\log_5(x+3) + \log_5(x-1) = 1$

$\log_5(x^2+2x-3) = 1$

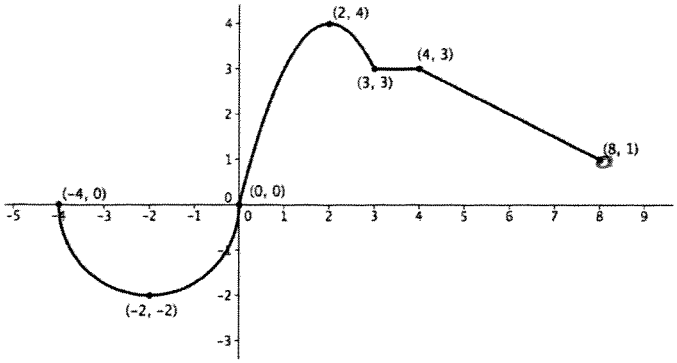
$5^1 = x^2+2x-3$

$0 = x^2+2x-8$

$0 = (x+4)(x-2)$

$x \neq -4$ or $\boxed{x=2}$

The function f is pictured to the below. Use it to answer 1-11



1. Domain:
2. Range:
3. Local Maximum(s):
4. Local Minimum(s):
5. Intervals increasing:
6. Intervals decreasing:
7. $f(4)$
8. For what values of x does $f(x) = 0$?
9. x-intercept(s):
10. y-intercept(s):

1. $[-4, 8)$
2. $[-2, 4]$
3. At $x = 2$ the max is 4
4. At $x = -2$ the min is -2
5. $(-2, 2)$
6. $(-4, -2) \cup (2, 3) \cup (4, 8)$
7. 3
8. 0 and -4
9. $(-4, 0)$ and $(0, 0)$
10. $(0, 0)$

7. Find the domain of the function.

a) $g(x) = \sqrt{12 - 4x}$

b) $h(x) = \dfrac{3x - 1}{x^2 - 7x + 10}$

c) $f(x) = 5x^2 + 8$

a) $12 - 4x \geq 0$
$12 \geq 4x$
$3 \geq x$
$(-\infty, 3]$

b) $(x - 5)(x - 2) \neq 0$
$x \neq 5 \quad x \neq 2$
$(-\infty, 2) \cup (2, 5) \cup (5, \infty)$

c) $(-\infty, \infty)$

8. Determine if the function is EVEN, ODD, or NEITHER. Explain.

a) $k(x) = x^3 - 4x$

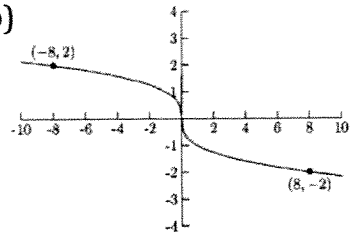
odd

a) $k(-x) = (-x)^3 - 4(-x)$

$= -x^3 + 4x$

b) odd, sym about origin

b)



1. Let $f(x) = \sqrt{2x-5}$ and $g(x) = 3x^2 - 4$.

a.) find $(f \circ g)(2)$

b.) find $(g \circ g)(-3)$

c.) find $(g \circ f)(x)$

d.) Domain of $(g \circ f)(x)$

a) $f(g(2)) = f(3(2)^2 - 4) = f(8) = \sqrt{2(8)-5}$

$= \sqrt{11}$

b) $g(g(3)) = g(3(3)^2 - 4) = g(23) = 3(23)^2 - 4$

$= 1583$

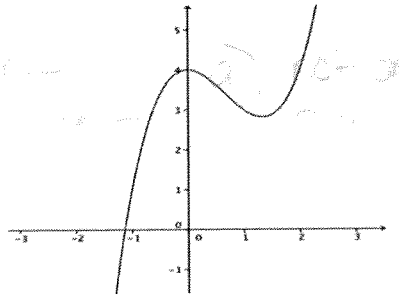
c) $g(f(x)) = 3(\sqrt{2x-5})^2 - 4 = 3(2x-5) - 4$

$= 6x - 19$

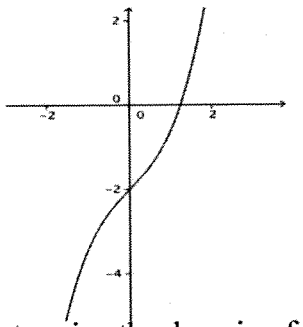
d) D: $[\frac{5}{2}, \infty)$

2. Determine if each is a one-to-one function or not a one-to-one function.

a)



b)



a) not one-to-one

fails horiz line test

b) one-to-one

passes horiz line test

3. Determine the domain of $f(x)$, then find its inverse.
Find the domain and range of both $f(x)$ and its inverse.

$f(x) = \dfrac{x+4}{x-2}$

$x = \dfrac{y+4}{y-2}$

$(y-2)x = y+4$

$xy - 2x = y+4$

$xy - y = 2x + 4$

$y(x-1) = 2x+4$

$y = \dfrac{2x+4}{x-1}$

$f^{-1}(x) = \dfrac{2x+4}{x-1}$

	D	R
f	$\{x \mid x \neq 2\}$	$\{y \mid y \neq 1\}$
f^{-1}	$\{x \mid x \neq 1\}$	$\{y \mid y \neq 2\}$