

FUNCTIONS TEST STUDY GUIDE

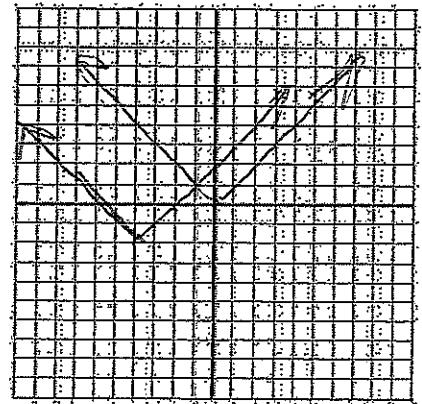
Test covers:

- Graphing using transformations
- Analyzing functions, including finding domain/range in interval and/or set builder notation, identifying asymptotes, identifying intercepts, and working with composition of functions. Be able to find inverses of functions, and to determine whether the inverse of a function is a function itself.

Practice Questions:

- 1) Describe the transformations done to parent function $y = |x|$ to graph $y = |x+4| - 2$. Then graph both functions.

left 4, down 2

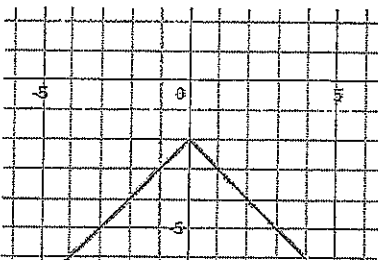


- 2) Write the equation of the graphs shown, using your knowledge of transformations. For each graph, identify the parent function and transformations made.

a) parent function: $|x|$

transformation(s): Down 2, Vertical reflection

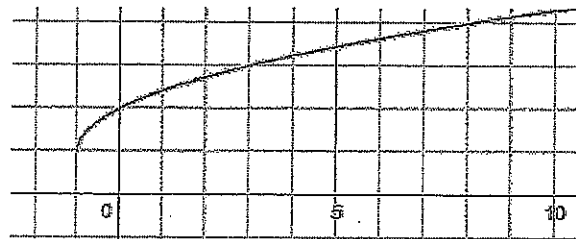
function: $-|x| - 2$



b) parent function: \sqrt{x}

transformation(s): left 1, up 1

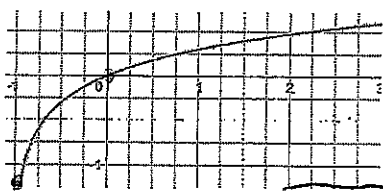
function: $\sqrt{x-1} + 1$



c) parent function: \sqrt{x}

transformation(s): left 1, down 1.25 stretched

function: $1.25\sqrt{x+1} - 1.25$



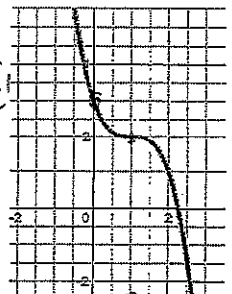
$y = a\sqrt{x+1} - 1.25$
 $0 = a\sqrt{0+1} - 1.25$
 $1.25 = a \cdot 1$

d) parent function: x^3

transformation(s): Flip, right 1, up 2

function: _____

$y = a(x-1)^3 + 2$
 $3 = a(0-1)^3 + 2$
 $-2 = a(-1)^3$
 $\frac{1}{-1} = a$
 $y = -(x-1)^3 + 2$



3) Sketch the graphs using transformations. List the parent function and the transformations you are making. Where requested, provide asymptotes and domain/range.

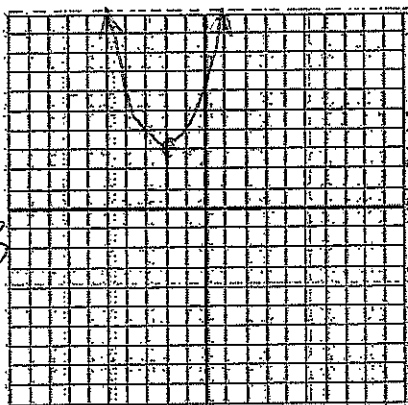
a) $f(x) = (x+2)^2 + 3$

parent function

x^2

transformation(s):

left 2, up 3



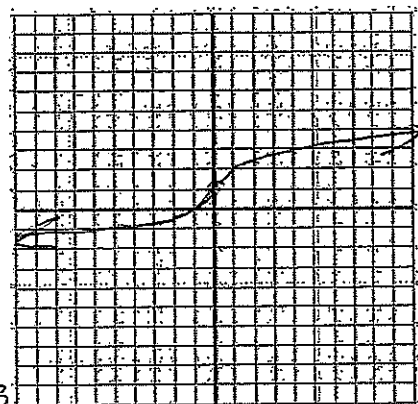
b) $f(x) = \sqrt[3]{x} + 1$

parent function

$\sqrt[3]{x}$

transformation(s):

up 1



c) $f(x) = -1\left(\frac{1}{x-2}\right) + 3$

parent function

$\frac{1}{x}$

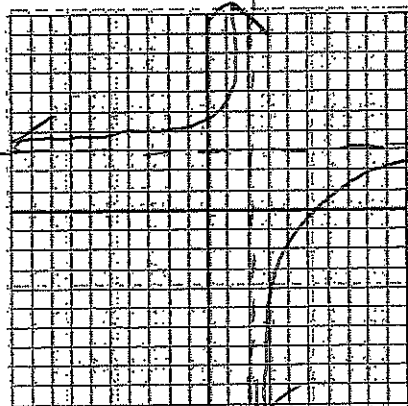
transformation(s):

right 2, up 3
vertical reflect

asymptotes:

$x=2$
 $y=3$

domain/range:



d) $f(x) = \frac{1}{2}(x+2)^3 - 5$

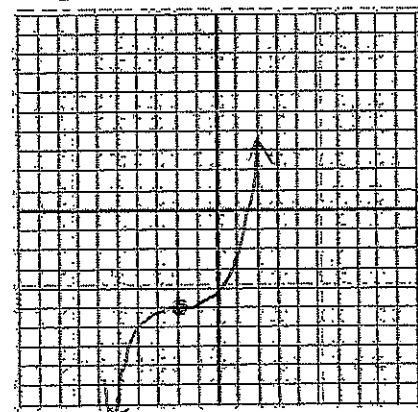
parent function

x^3

transformation(s):

Half as tall
left 2
down 5

domain/range:



4) For each relation below, state the domain, range, whether the relation is a function, whether the relation is continuous or not, the zero(s) (if any), and the y-intercept(s) (if any). Supply asymptotes if requested.

a) domain: \mathbb{R}

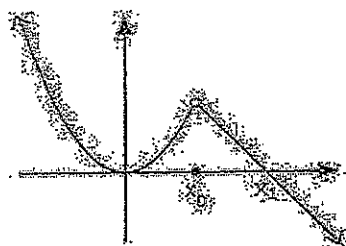
range: \mathbb{R}

function? Yes

continuous? Yes

zero(s): 0, x, 1

y-intercept(s): 0



b) domain: $x \neq 3$

range: $y \neq 0$

function? Yes

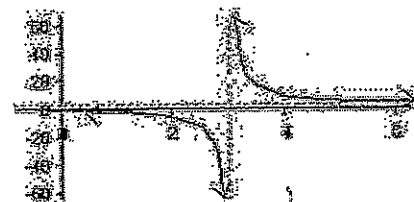
continuous? No

zero(s): None

y-intercept(s): $-\frac{1}{3}$

asymptotes:

$x=3$
 $y=0$



$y = \frac{1}{x-3}$

$y = \frac{1}{0-3} = -\frac{1}{3}$