

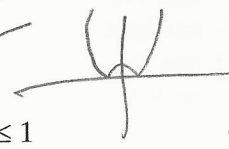
**PCH Chapter 1 and 2 (No Calculators Permitted)**

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1.  $\sqrt{x^2} =$
- a.  $-x$
  - b.  $\pm x$
  - c.  $|x|$
  - d.  $x$
  - e. none of these

- \_\_\_ 2. Rewrite  $f(x) = |x^2 - 1|$  as a piecewise function.

- a.  $f(x) = \begin{cases} x^2 - 1, x < -1 \\ -x^2 + 1, -1 \leq x \leq 1 \\ x^2 - 1, x > 1 \end{cases}$
- b.  $f(x) = \begin{cases} x^2 - 1, x \geq 1 \\ -x^2 - 1, x < 1 \end{cases}$
- c.  $f(x) = \begin{cases} x^2 - 1, x \geq 0 \\ -x^2 - 1, x < 0 \end{cases}$
- d.  $f(x) = \begin{cases} x^2 - 1, x \geq 1 \\ -x^2 + 1, x < 1 \end{cases}$
- e. none of these
- 

**Multiple Response**

Identify one or more choices that best complete the statement or answer the question.

Rational Functions. For each of the following rational functions, select all that apply.

VA = Vertical Asymptote  
HA = Horizontal Asymptote

\_\_\_ 3.  $R(x) = \frac{(x-2)(x+3)}{(x-1)}$  *diag  $x^2$*  *va*

- a. one hole
- b. no HA
- c. one oblique / slant asymptote
- d. two VA
- e. no VA
- f. one HA
- g. no holes
- h. one VA

4.  $R(x) = \frac{(x-2)(2x+3)(x-1)}{(x-1)(x^2+1)}$

- a. no VA
- b. one oblique / slant asymptote
- c. two VA
- d. one HA
- e. no holes
- f. no HA
- g. one VA
- h. one hole

5.  $R(x) = \frac{(x-2)(x+3)}{(x-1)(x+2)(x-2)}$

- a. no VA
- b. one oblique / slant asymptote
- c. no holes
- d. two VA
- e. one VA
- f. one hole
- g. one HA
- h. no HA

6.  $y = |x| - 2$

- a. even
- b. odd
- c. y-axis symmetry
- d. neither
- e. x-axis symmetry
- f. not a function
- g. symmetric about the origin
- h. no symmetry

7.  $f(x) = \frac{x^4 + 4}{x^3 - x}$

Handwritten work:  
 $f(1) = \frac{5}{0} = \infty$   
 $f(-1) = \frac{5}{-2} = -2\frac{1}{2}$   
 $f(-x) = \frac{x^4 + 4}{-x^3 - x}$

- a. neither
- b. symmetric about the origin
- c. even
- d. odd
- e. no symmetry
- f. y-axis symmetry
- g. x-axis symmetry
- h. not a function

8.  $f(x) = \frac{|x|}{x^2 + 1}$

Handwritten work:  
 $f(-x) = \frac{|-x|}{x^2 + 1} = \frac{|x|}{x^2 + 1}$

- a. odd
- b. no symmetry
- c. symmetric about the origin
- d. neither
- e. not a function
- f. x-axis symmetry
- g. even
- h. y-axis symmetry

9.  $f(x) = \sqrt[3]{x^3 + x}$

Handwritten work:  
 $f(-x) = \sqrt[3]{-x^3 - x}$   
 $f(1) = \sqrt[3]{2}$   
 $f(-1) = \sqrt[3]{-2}$

- a. neither
- b. not a function
- c. symmetric about the origin
- d. no symmetry
- e. even
- f. odd
- g. x-axis symmetry
- h. y-axis symmetry

Handwritten work for problem 9:  
 $\sqrt[3]{-x^3 - x}$   
 $\rightarrow \sqrt[3]{-(x^3 + x)}$   
 $= -\sqrt[3]{x^3 + x}$

Name: \_\_\_\_\_

Match each function with the symmetry of its graph and the term it algebraic property. Pick as many as apply

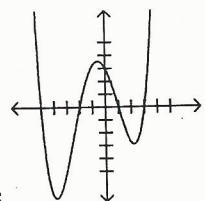
10.  $|y| = x - 2$

$y = \sqrt{(x-2)^2}$

- a. not a function
- b. odd
- c. neither
- d. y-axis symmetry
- e. symmetric about the origin
- f. even
- g. no symmetry
- h. x-axis symmetry

Matching

~~$|y| = x$~~   
 $y = +x$   
 $y = -x$



Given the graph of  $f(x)$ . Identify the following transformations.

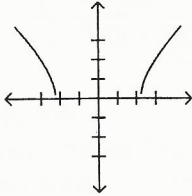
- a.
- b.
- c.
- d.
- e.
- f.
- g.
- h. none of these.

- d 11.  $1/f(x)$
- b 12.  $-f(x)$
- f 13.  $f(|x|)$

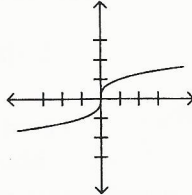
- g 14.  $f(-x)$
- c 15.  $|f(|x|)|$
- \_\_\_\_\_ 16.  $|f(x)|$
- e 17.  $-f(-x)$

Match the parent function with its graph

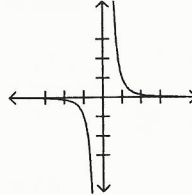
a.



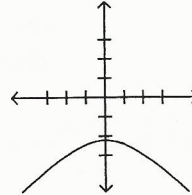
b.



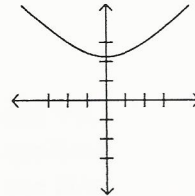
c.



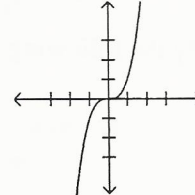
d.



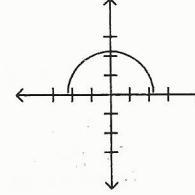
e.



f.



g.



h. none of these

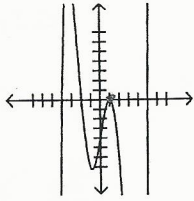
c 18.  $f(x) = \frac{1}{x^3}$

e 19.  $f(x) = \sqrt{x^2 + c}, c > 0$

b 20.  $f(x) = x^{1/3}$

h 21.  $f(x) = x^{2/3}$  bird ✗

Given the graph of  $f(x)$ ;



Note the graph of  $f$  is tangent to the  $x$ -axis at  $x = 1$ , and continuous for all real numbers.

- a.  $(-4, \infty)$
- b.  $(-4, -2) \cup (5, \infty)$
- c.  $(-\infty, -4) \cup (-2, 1) \cup (1, 5)$
- d.  $(5, \infty)$
- e.  $[-4, -2] \cup [1, 1] \cup [5, \infty)$
- f.  $(-4, -2] \cup [5, \infty)$
- g.  $(-\infty, \infty)$
- h. none of these

e 22. solve  $f(x) \geq 0$   $[-4, -2] \cup [1, 1] \cup [5, \infty)$

c 23. solve  $f(x) < 0$   $(-\infty, -4) \cup (-2, 1) \cup (1, 5)$

~~b~~ 24. find the domain of  $\sqrt{\frac{1}{f(x)}}$

$(-\infty, -4) \cup (-4, -2) \cup (-2, 1)$

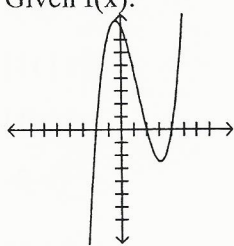
$\sqrt{\frac{1}{x}}$   $x \neq 0$

$x \neq -c$

$x > 0$

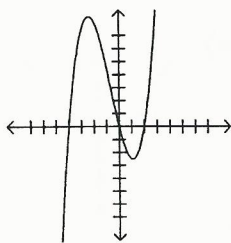
$(-4, -2) \cup (5, \infty)$

Given  $f(x)$ :

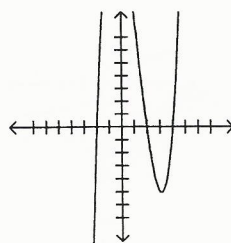


Identify the graph of the following transformations.

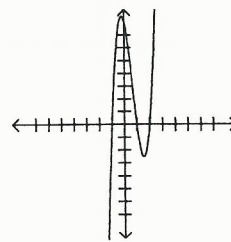
a.



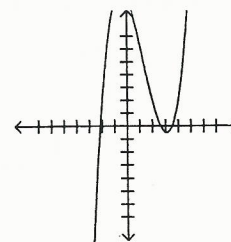
b.



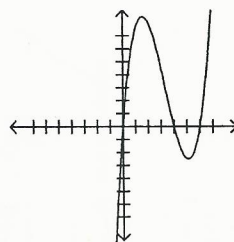
c.



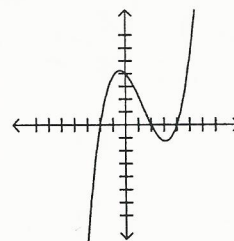
d.



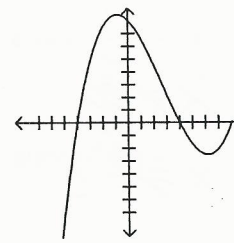
e.



f.



g.



h. none of these

a 25.  $f(x+2)$

e 26.  $f(x-2)$

h 27.  $f(2-x)$

b 28.  $2f(x)$

f 29.  $\frac{1}{2}f(x)$

c 30.  $f(2x)$



d 31.  $f(x)+2$

g 32.  $f(1/2x)$

Given  $f(x) = ax^2 + bx + c$

~~a.~~  $\frac{-b}{2a}$

~~b.~~ parabola opens downward

c. parabola opens upward

~~d.~~  $y = 0$

~~e.~~  $x = 0$

~~f.~~ one x-intercept

~~g.~~ x-intercepts

h. none of these

h 33.  $x =$  *doesn't make any sense. 😊*

f 34. If  $b^2 - 4ac = 0$

a 35. The x-coordinate of the vertex is

g 36. The real zeros are

d 37. To find the x-intercepts

e 38. To find the y-intercepts let

b 39. If  $a < 0$

Match the function with its domain

a.  $(-\infty, 0) \cup (0, 2]$

b.  $(-\infty, 2]$

c.  $(-\infty, -2] \cup [2, \infty)$

d.  $(-\infty, 0) \cup (0, 2)$

e. none of these

f.  $[0, 2]$

g.  $(-\infty, 2) \cup (2, \infty)$

h.  $[-3, 2]$

h 40.  $f(x) = \sqrt{2-x} + \sqrt{x+3}$   $[-3, 2]$

d 41.  $g(x) = \frac{1}{\sqrt{2-x}} - \frac{1}{x}$   $(-\infty, 0) \cup (0, 2)$

c 42.  $f(x) = \sqrt{x^2 - 4}$   $(-\infty, -2] \cup [2, \infty)$

a 43.  $f(x) = \frac{\sqrt{2-x}}{x}$   $(-\infty, 0) \cup (0, 2]$

f 44.  $f(x) = \sqrt{x} - \sqrt{2-x}$   $[0, 2]$

Use the following functions:

$$f(x) = \sqrt{9-x^2}, \quad g(x) = \sqrt{5-x}, \quad h(x) = \frac{1}{x^2-1}$$

- a.  $[4,5]$
- b.  $(-\infty,5]$
- c.  $(-\infty,4]$
- d.  $(4,\infty)$
- e.  $(-\infty,4) \cup (4,5]$
- f.  $(5,\infty)$
- g.  $(-\infty,4)$
- h. none of these

h 45. Find the domain of  $(f \circ g)(x)$

e 46. Find the domain of  $h(g(x))$

$$D_{\text{combined}} = D_{\text{simplified}} \cap D_{\text{inner}}$$

$$(f \circ g)(x) = \sqrt{9 - (\sqrt{5-x})^2} = \sqrt{9 - (5-x)} = \sqrt{9-5+x} = \sqrt{4+x}$$

$$D = [-4, \infty)$$

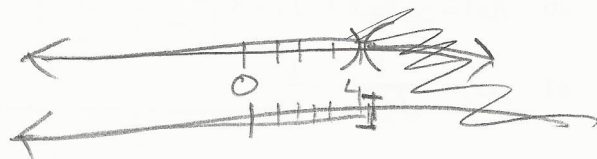
$$g(x) = \sqrt{5-x} \quad D = (-\infty, 5]$$

$$D = [-4, 5]$$

$$h(g(x)) = \frac{1}{(5-x)-1} = \frac{1}{5-x-1} = \frac{1}{4-x}$$

$$D = (-\infty, 4) \cup (4, \infty)$$

$$g(x) = \sqrt{5-x} \quad D = (-\infty, 5]$$

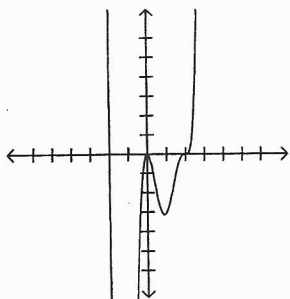


$$(-\infty, 4) \cup (4, 5)$$

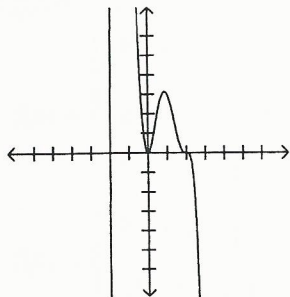


Match the polynomial function with its graph. (Note graphs represent continuous functions even though not all of the graph is visible.)

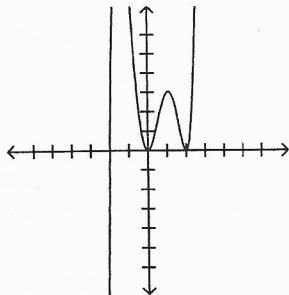
a.



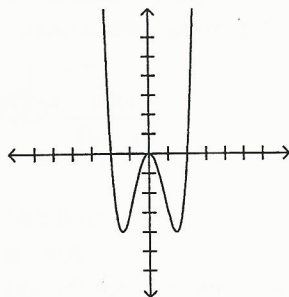
b.



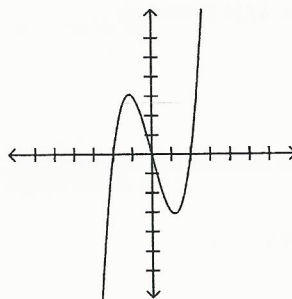
c.



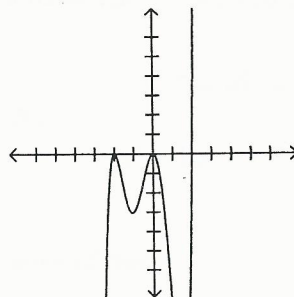
d.



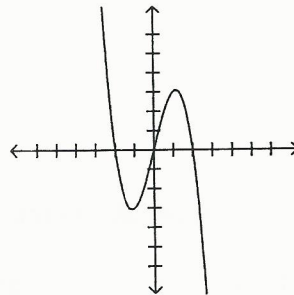
e.



f.



g.



h. none of these

a 47.  $f(x) = x^2(x-2)^3(x+2)$

c 48.  $f(x) = x^2(x-2)^2(x+2)$

f 49.  $f(x) = x^2(x-2)(x+2)^2$

Name: \_\_\_\_\_

ID: D

**True/False**

Indicate whether the statement is true (A) or false (B).

- \_\_\_ 50. An even function has x-axis symmetry.
- \_\_\_ 51.  $|x| = x$
- \_\_\_ 52. The horizontal line test is used to determine if a graph is a function.
- \_\_\_ 53.  $f(f^{-1}(x)) = x$  and  $f^{-1}(f(x)) = x$
- \_\_\_ 54. The domain and range of  $f$  and  $f^{-1}$  are interchanged.
- \_\_\_ 55. If  $(a, b)$  is on  $f$ , then  $(-a, -b)$  is on  $f^{-1}$

# Student Grade Report

**Legend:**    Incorrect:

**Student: Vestil, Keanu**

	Grade	Total Score	Score (%)
Overall	A	53.00 / 55.00	96.36 <div style="width: 50px; height: 10px; background-color: black; display: inline-block;"></div>

**Responses**

Question	Response	Correct Answer	Question	Response	Correct Answer	Question	Response	Correct Answer
Question1	C		Question20	B		Question39	B	
Question2	A		Question21	H		Question40	H	
Question3	(B,C,G,H)		Question22	E		Question41	D	
Question4	(A,D,H)		Question23	C		Question42	C	
Question5	(D,F,G)		Question24	B		Question43	A	
Question6	(A,C)		Question25	A		Question44	F	
Question7	(A,E) (B&D)		Question26	E		Question45	H	
Question8	(G,H)		Question27	H		Question46	E	
Question9	(C,F)		Question28	B		Question47	A	
Question10	(C,G) (A&C&H)		Question29	F		Question48	C	
Question11	D		Question30	C		Question49	F	
Question12	B		Question31	D		Question50	B	
Question13	F		Question32	G		Question51	B	
Question14	G		Question33	H		Question52	B	
Question15	C		Question34	F		Question53	A	
Question16	A		Question35	A		Question54	A	
Question17	E		Question36	G		Question55	B	
Question18	C		Question37	D				
Question19	E		Question38	E				