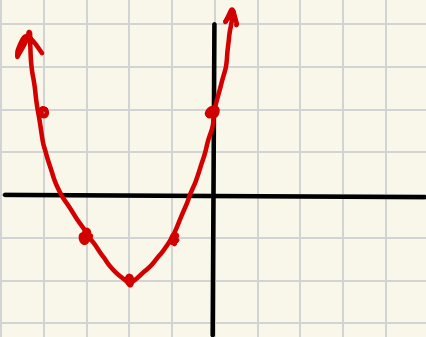


Ch. 20 - BOARD PROBLEMS

①



DOMAIN: _____

RANGE: _____

FUNCTION: _____

② write the equation for ① in VERTEX FORM

③ WRITE ABOVE EQUATION IN STANDARD FORM.

④ CONVERT POLAR COORDINATES TO RECTANGULAR.

a) $\left(2, \frac{3\pi}{2}\right)$

b) $\left(5, \frac{5\pi}{6}\right)$

⑤ TWO POINTS ARE SPECIFIED USING POLAR COORDINATES, FIND THIS DISTANCE BETWEEN THE POINTS.

$$\left(4, \frac{7\pi}{12}\right), \left(2, \frac{\pi}{12}\right)$$

Ch. 20- COMPOSITE FUNCTIONS, AND FUNCTION OPERATIONS

$$f(x) = 2x + 3 \quad g(x) = x^2 \quad h(x) = \frac{1}{x+1}$$

SUM OF TWO FUNCTIONS

a) $f(x) + g(x) :$

b) $f(x) + h(x) :$

DIFFERENCE OF TWO FUNCTIONS

c) $f(x) - g(x)$

d) $g(x) - f(x)$

e) $g(x) - h(x)$

MULTIPLYING TWO FUNCTIONS

f) $(f \cdot g)(x) = f(x) \cdot g(x) =$

g) $(h \cdot g)(x) = h(x) \cdot g(x) =$

DIVISION OF TWO FUNCTIONS

h) $f(x)/g(x) =$

i) $g(x)/h(x) =$

Ch. 20 COMPOSITE FUNCTIONS

$$f(x) = 2x + 3 \quad g(x) = x^2 \quad h(x) = \frac{1}{x+1}$$

FUNCTION OF A FUNCTION

$$f(g(x)) =$$

$$g(f(x)) =$$

$$h(g(x)) =$$

$$f(h(x)) =$$

$$f(g(z)) =$$

$$g(f(z)) =$$

$$h(g(-z)) =$$

Function Operations

Date _____ Period _____

Perform the indicated operation.

1) $g(n) = n^2 + 4 + 2n$
 $h(n) = -3n + 2$
Find $(g \cdot h)(1)$

2) $f(x) = 4x - 3$
 $g(x) = x^3 + 2x$
Find $(f - g)(4)$

3) $h(x) = 3x + 3$
 $g(x) = -4x + 1$
Find $(h + g)(10)$

4) $g(a) = 3a + 2$
 $f(a) = 2a - 4$
Find $\left(\frac{g}{f}\right)(3)$

5) $g(x) = 2x - 5$
 $h(x) = 4x + 5$
Find $g(3) - h(3)$

6) $g(a) = 2a - 1$
 $h(a) = 3a - 3$
Find $(g \cdot h)(-4)$

7) $g(t) = t^2 + 3$
 $h(t) = 4t - 3$
Find $(g \cdot h)(-1)$

8) $g(n) = 3n + 2$
 $f(n) = 2n^2 + 5$
Find $g(f(2))$

9) $g(x) = -x^2 - 1 - 2x$
 $f(x) = x + 5$
Find $(g - f)(x)$

10) $f(x) = 3x - 1$
 $g(x) = x^2 - x$
Find $\left(\frac{f}{g}\right)(x)$

11) $g(a) = -3a - 3$
 $f(a) = a^2 + 5$
Find $(g - f)(a)$

12) $h(t) = 2t + 1$
 $g(t) = 2t + 2$
Find $(h - g)(t)$

13) $f(x) = 2x^3 - 5x^2$
 $g(x) = 2x - 1$
 Find $(f \cdot g)(x)$

14) $h(n) = 4n + 5$
 $g(n) = 3n + 4$
 Find $(h - g)(n)$

15) $g(a) = -3a^2 - a$
 $h(a) = -2a - 4$
 Find $\left(\frac{g}{h}\right)(a)$

16) $f(n) = 2n$
 $g(n) = -n - 4$
 Find $(f \circ g)(n)$

17) $h(a) = 3a$
 $g(a) = -a^3 - 3$
 Find $\left(\frac{h}{g}\right)(a)$

18) $g(n) = 2n + 3$
 $h(n) = n - 1$
 Find $(g \circ h)(n)$

19) $h(x) = x^2 - 2$
 $g(x) = 4x + 1$
 Find $(h \circ g)(x)$

20) $g(t) = 2t + 5$
 $f(t) = -t^2 + 5$
 Find $(g + f)(t)$

21) $g(x) = 2x - 2$
 $f(x) = x^2 + 3x$
 Find $(g \circ f)(-2 + x)$

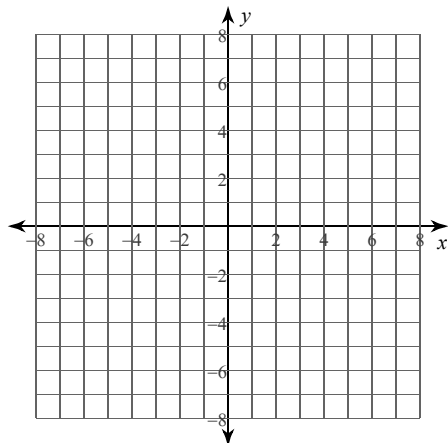
22) $g(a) = 2a + 2$
 $h(a) = -2a - 5$
 Find $(g \circ h)(-4 + a)$

Piecewise Functions

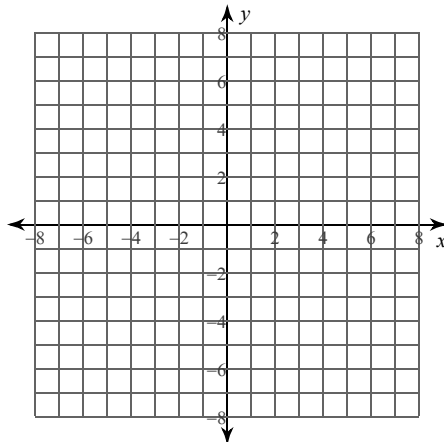
Date _____ Period _____

Sketch the graph of each function.

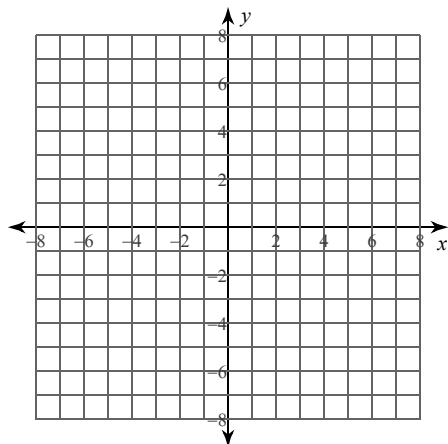
$$1) f(x) = \begin{cases} -2x - 1, & x \leq 2 \\ -x + 4, & x > 2 \end{cases}$$



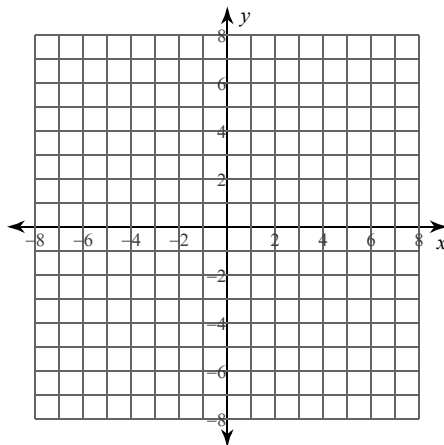
$$2) f(x) = \begin{cases} -4, & x \leq -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \geq 2 \end{cases}$$



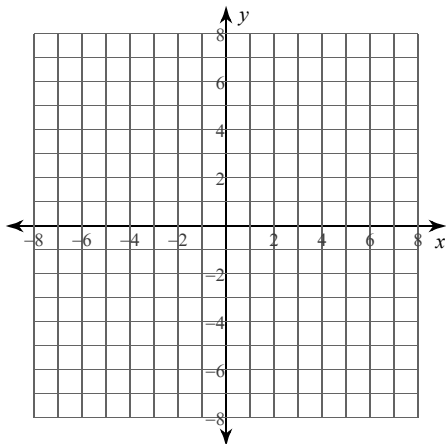
$$3) f(x) = \begin{cases} -2^x, & x < -4 \\ -|x|, & -4 \leq x \leq 0 \\ 4 - x^2, & x > 0 \end{cases}$$



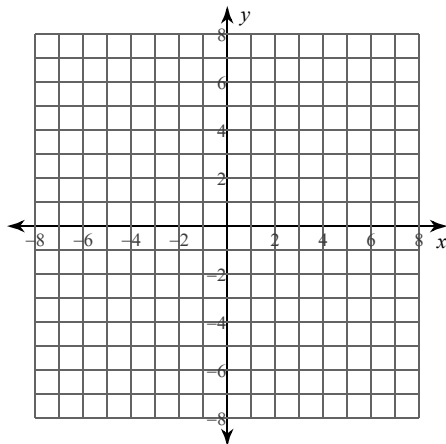
$$4) g(x) = \begin{cases} -6, & x < -2 \\ (x + 1)^4, & x \geq -2 \end{cases}$$



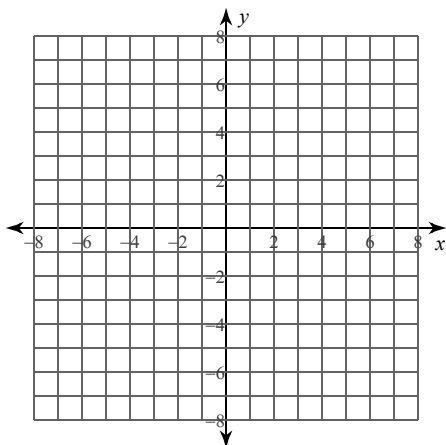
$$5) f(x) = \begin{cases} \frac{1}{x-4}, & x \leq 4 \\ -4, & x > 4 \end{cases}$$



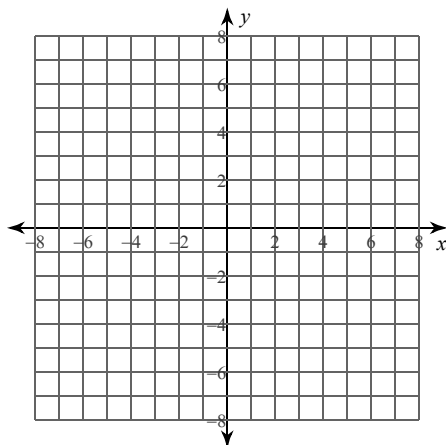
$$6) h(x) = \begin{cases} 2^x, & x < -3 \\ \frac{3}{x}, & x \geq -3 \end{cases}$$



$$7) w(x) = \begin{cases} \frac{|x|}{2}, & x \leq -4 \\ \sqrt{-x}, & -4 < x < 2 \\ |x-2|, & x \geq 2 \end{cases}$$



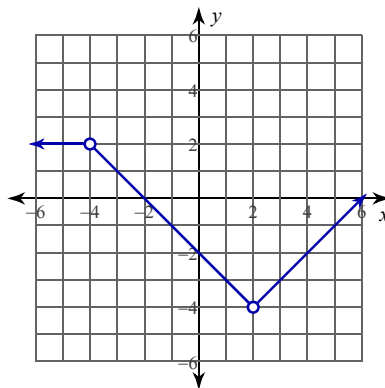
$$8) w(x) = \begin{cases} |x-3|, & x < 1 \\ (x-1)^4, & x = 1 \\ \sqrt{4x}, & x > 1 \end{cases}$$



Critical thinking questions:

- 9) Write a rule for the sign function $s(n)$:
 $s(n)$ is -1 when n is negative, $+1$ when n is positive, and 0 otherwise.

- 10) Write a rule for the function shown.

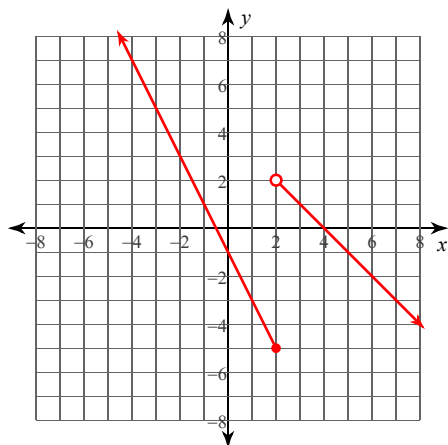


Piecewise Functions

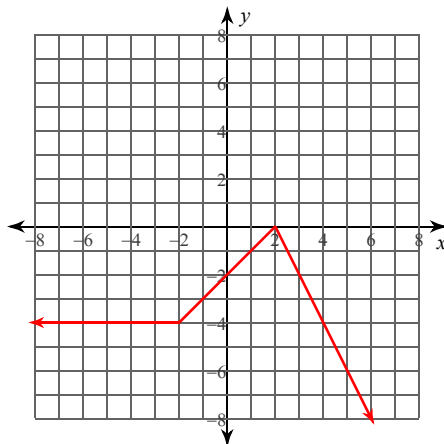
Date _____ Period _____

Sketch the graph of each function.

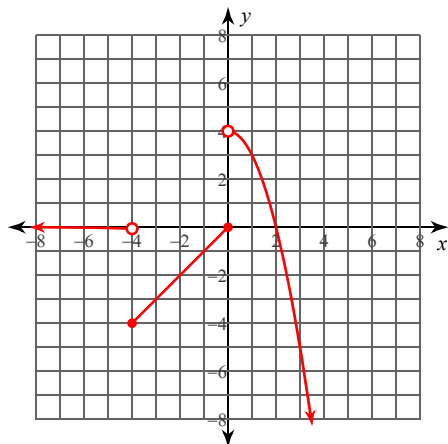
$$1) f(x) = \begin{cases} -2x - 1, & x \leq 2 \\ -x + 4, & x > 2 \end{cases}$$



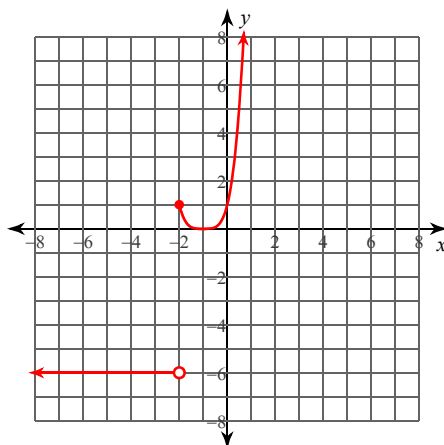
$$2) f(x) = \begin{cases} -4, & x \leq -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \geq 2 \end{cases}$$



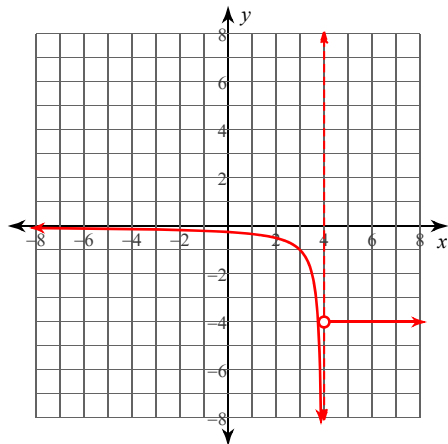
$$3) f(x) = \begin{cases} -2^x, & x < -4 \\ -|x|, & -4 \leq x \leq 0 \\ 4 - x^2, & x > 0 \end{cases}$$



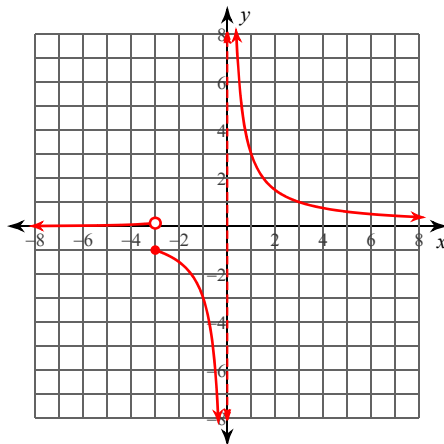
$$4) g(x) = \begin{cases} -6, & x < -2 \\ (x + 1)^4, & x \geq -2 \end{cases}$$



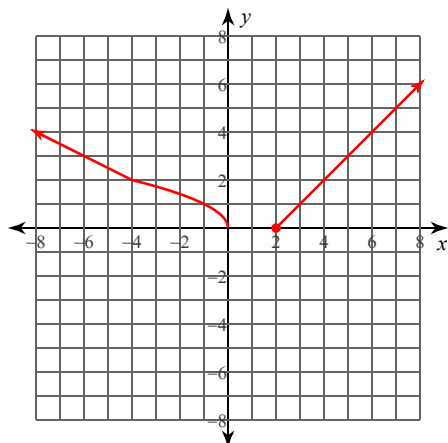
$$5) f(x) = \begin{cases} \frac{1}{x-4}, & x \leq 4 \\ -4, & x > 4 \end{cases}$$



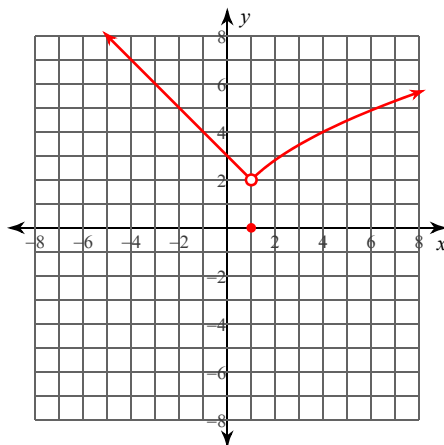
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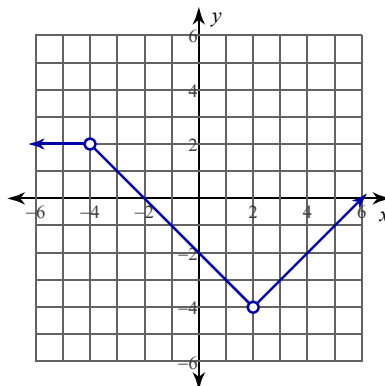


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 $s(n)$ is -1 when n is negative, $+1$ when n is positive, and 0 otherwise.

$$s(n) = \begin{cases} -1, & n < 0 \\ 0, & n = 0 \\ 1, & n > 0 \end{cases}$$

- 10) Write a rule for the function shown.



$$f(x) = \begin{cases} 2, & x < -4 \\ -x-2, & -4 < x < 2 \\ x-6, & x > 2 \end{cases}$$