***AAT**

Chapter 3: 3-5 Graphs of Functions (IC/HW)-Day 1

Name: Key

Date: _____ Period: _____

Determine whether f is even, odd, or neither even nor odd.

1. $f(x) = 5x^3 + 2x$

$f(-x) = 5(-x)^3 + 2(-x)$
$= -5x^3 - 2x$
$= -(5x^3 + 2x) = -f(x)$
odd

2. $f(x) = 3x^4 + 2x^2 - 5$

$f(-x) = 3(-x)^4 + 2(-x)^2 - 5$
$= 3x^4 + 2x^2 - 5 = f(x)$
even

3. $f(x) = 8x^3 - 3x^2$

$f(-x) = 8(-x)^3 - 3(-x)^2$
$= -8x^3 + -3x^2$
$\neq \pm f(-x)$
neither

4. $f(x) = \sqrt{x^2 + 4}$

$f(-x) = \sqrt{(-x)^2 + 4} = \sqrt{x^2+4} = f(x)$
even

5. $f(x) = \sqrt[3]{x^3 - x}$

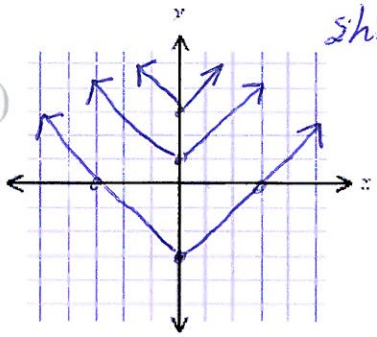
$f(-x) = \sqrt[3]{(-x)^3 - (-x)}$
$= \sqrt[3]{-x^3 + x} = \sqrt[3]{-1(x^3 - x)}$
$= \sqrt[3]{-1}\sqrt[3]{x^3 - x} = -\sqrt[3]{x^3 - x} = -f(x)$
odd

6. $f(x) = x^3 - \frac{1}{x}$

$f(-x) = (-x)^3 - \frac{1}{(-x)}$
$= -x^3 + \frac{1}{x} = -(x^3 - \frac{1}{x})$
$= -f(x)$ odd

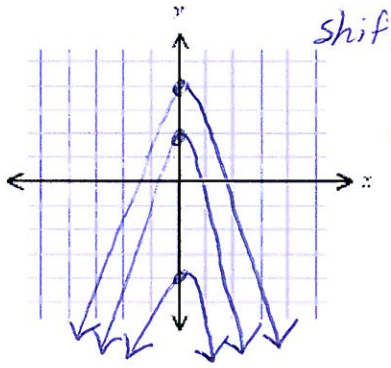
Sketch, on the same coordinate plane, the graphs of f for the given values of c. (Make use of symmetry, shifting, stretching, compressing, or reflecting.)

7. $f(x) = |x| + c$; $c = -3, 1, 3$



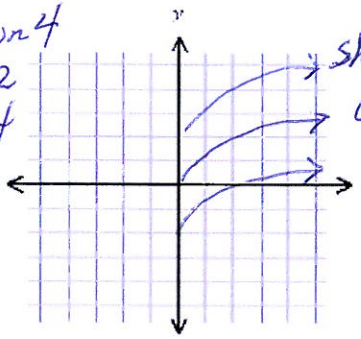
shift down 3
up 1
up 3

8. $f(x) = -x^2 + c$; $c = -4, 2, 4$



shift down 4
up 2
up 4

9. $f(x) = 2\sqrt{x} + c$; $c = -3, 0, 2$



shift down 3
up 2

If the point P is on the graph of a function f, find the corresponding point on the graph of the given function.

10. P(0, 5); $y = f(x+2) - 1$

{ $x+2$ → subtract 2 from x → (-2,5)
{ -1 → subtract 1 from y → (-2,4)

11. P(3, -1); $y = 2f(x) + 4$

{ $\times 2$ → mult. y by 2 → (3,-2)
{ $+4$ → add 4 to y → (3,2)

12. P(3,-2); $y = 2f(x-4) + 1$

{ $x-4$ → add 4 to x → (7,-2)
{ $\times 2$ → mult. y by 2 → (7,-4)
{ $+1$ → add 1 to y → (7,-3)

Explain how the graph of the function compares to the graph of y = f(x). For example, for y = 2f(x+3), the graph of f is shifted 3 units to the left and stretched vertically by a factor of 2.

13. $y = 3f(x-1)$

shift 1 unit to right
stretched vertically by factor of 3

14. $y = f(x+3)$

shift 3 units left

15. $y = f(x) + 3$

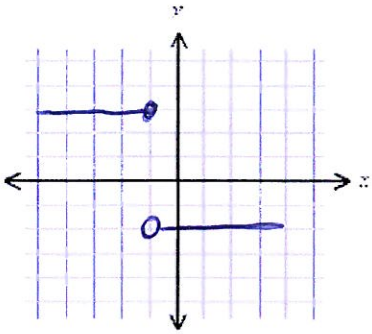
shift 3 units up

16. $y = f(x) - 3$

shift 3 units down

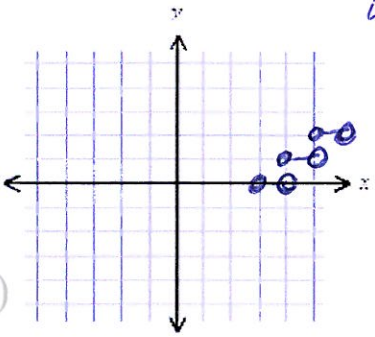
Sketch the graph of f.

17. $f(x) = \begin{cases} 3 \text{ if } x \le -1 \\ -2 \text{ if } x > -1 \end{cases}$

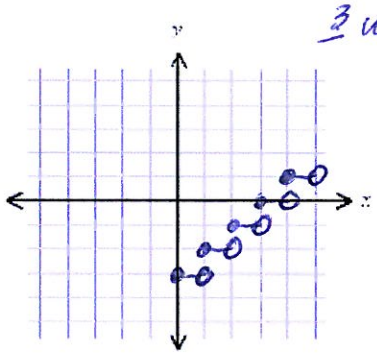


The symbol $[\![x]\!]$ denotes values of the greatest integer function. Sketch the graph of f.

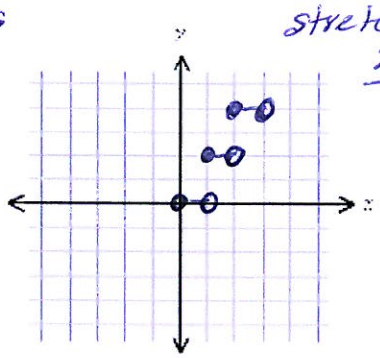
18. $f(x) = [\![x-3]\!]$ shift right 3 units



19. $f(x) = [\![x]\!]-3$ shift down 3 units

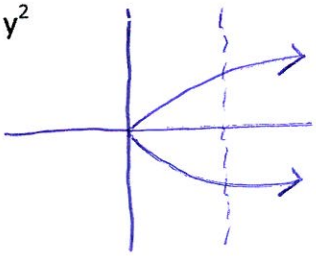


20. $f(x) = 2[\![x]\!]$ Vertically stretch by 2



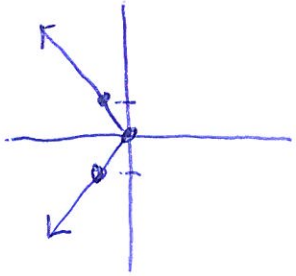
Explain why the graph of the equation is not the graph of a function.

21. $x = y^2$



doesn't pass vertical line test
or
2 diff pts. on graph have x-coord x.

22. $x = -|y|$



doesn't pass vertical line test
or
2 diff. pts. on graph have x-coord x.