

2.4B: Transformations of Functions Cont'd

- I can describe transformations from a rule, graph, or function equation
- I can graph parent functions and transform them on a graph
- I can write a function equation for a transformation rule or graph

Rules and Equations (cont'd)

- General form of an equation: $y = a \cdot \text{function}(x - h) + k$

a : vertical stretch/shrink
 vertical reflection
 h : horizontal shift
 k : vertical shift

- Note $(x - h)$: This means when writing the equation, h becomes OPPOSITE the rule
 - Right in the rule $(x + 1)$ becomes MINUS in the equation $(x - 1)$
 - Left in the rule $(x - 3)$ becomes PLUS in the equation $(x + 3)$

The difference between a RULE and an EQUATION

Ex9: RULE: $(x, y) \rightarrow (x - 3, y + 4)$
 EQUATION: $y = (x + 3)^2 + 4$

biggest difference

Ex10: RULE: $(x, y) \rightarrow (x + 1, -2y)$
 EQUATION: $y = -2\sqrt{x - 1}$

Transformation: _____

left 3, up 4

Transformation: _____

stretched vertically by 2
right 1, reflected over x axis

Quick Check:

D: $(x, y) \rightarrow (x + 4, 3y - 1)$
 $y = 3|x - 4| - 1$

E: $(x, y) \rightarrow (x, -\frac{4}{3}y + 7)$
 $y = -\frac{4}{3}\sqrt{x} + 7$

Transformation: _____

right 4, down 1, vertical stretch of 3

Transformation: _____

reflected down
stretched by $\frac{4}{3}$, up 7

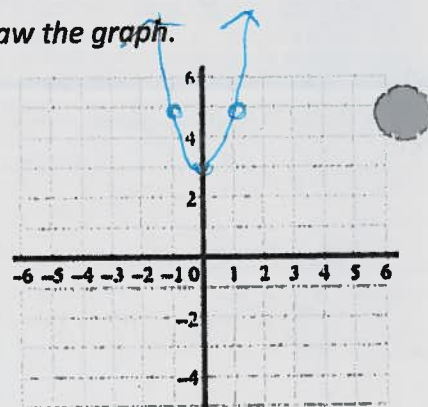
Equations and Graphs

Given an equation and parent function, describe the transformation and draw the graph.

Ex11: Equation: $y = 2x^2 + 3$

Transformation: up 3 vertex: (0,3)
vertical stretch of 2

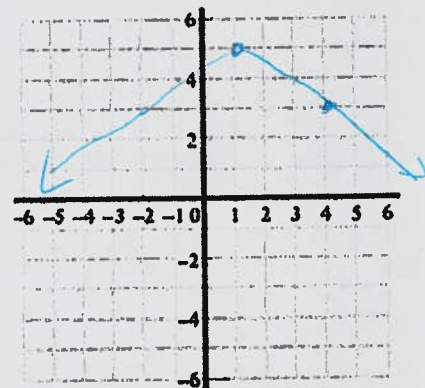
Rule: $(x, y) \rightarrow (x, 2y + 3)$



Ex12: Equation: $y = -\frac{2}{3}|x - 1| + 5$ vertex: (1, 5)

Transformation: reflected down, shrunk $\frac{2}{3}$
right 1, up 5

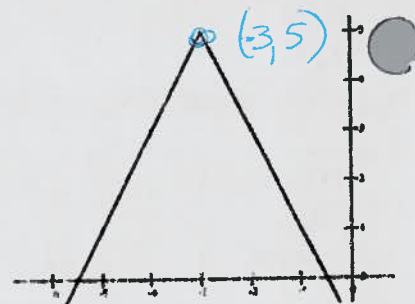
Rule: $(x, y) \rightarrow (x + 1, -\frac{2}{3}y + 5)$



Given the graph, describe the transformation and write the equation

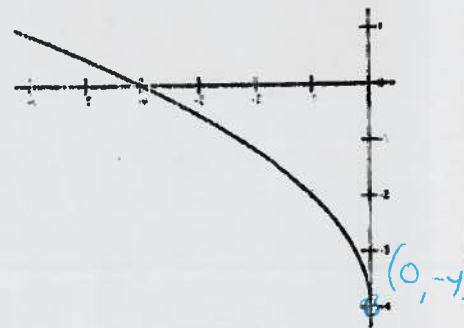
Ex13: Transformation: reflect down, scale 2
3 left, 5 ~~down~~ ^{up}

Equation: $y = -2|x + 3| + 5$



Ex14: Transformation: reflected over y-axis
stretched by 2, down 4

Equation: $y = 2\sqrt{-x} - 4$



| I can... | NO | Iffy | YES |
|---|----|------|-----|
| Write a rule and describe the transformation given a graph | | | |
| Draw a graph and describe the transformation given a rule | | | |
| Write a rule and describe the transformation given an equation | | | |
| Write an equation and describe the transformation given a rule | | | |
| Draw a graph and describe the transformation given an equation | | | |
| Write an equation and describe the transformation given a graph | | | |