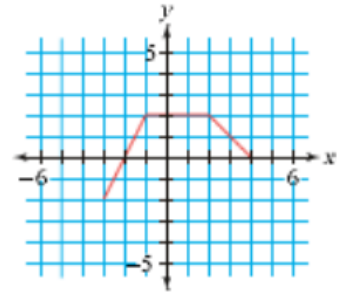1. What is the difference between "find $f(5)$" and "find the value of x when $f(x) = 5$?"

Use the following functions to answer the questions below.

$$f(x) = 2x + 1 \qquad g(x) = x^2 - 3 \qquad h(x) \text{ is pictured at right}$$

Evaluate and Show Work

2. $f(9)$

5. $g(f(2))$

8. x when $h(x) = 0$

3. x when $f(x) = 9$

6. $f(g(2))$

9. Domain and Range of $h(x)$

4. $g(f(x))$

7. $h(-1)$

10. Domain and Range of $g(x)$

For #11 – 16, identify the function family (linear, quadratic, cubic, exponential, square root, cubic root, absolute value, or reciprocal of linear), describe how the function would be different than the parent graph, and state the domain and range of the function.

11. $f(x) = (x + 1)^3$

Family:

Description:

D: R:

13. $j(x) = \frac{1}{2}|x| + 5$

Family:

Description:

D: R:

15. $m(x) = \frac{1}{x-3} + 10$

Family:

Description:

D: R:

12. $g(x) = -2\sqrt{x} - 5$

Family:

Description:

D: R:
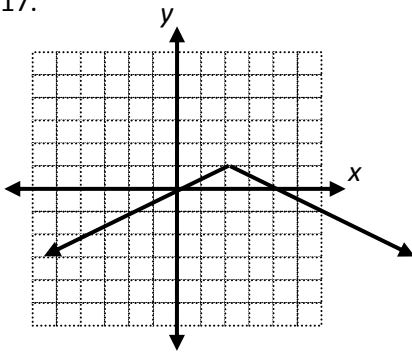
14. $h(x) = -(0.5x)^2$

Family:

Description:

D: R:

16. $n(x) = 4\sqrt[3]{x} - 6$
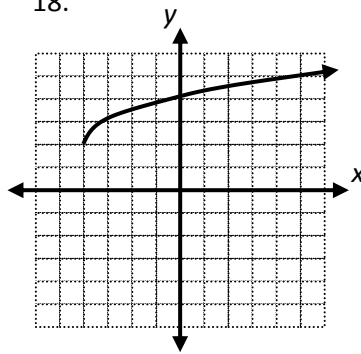
Family:

Description:

D: R:

For #17-19, identify the function family of each graph (linear, quadratic, cubic, exponential, square root, cubic root, absolute value, or reciprocal of linear), state the domain and range of the graph, and then use your understanding of function transformations to write an equation of the function.
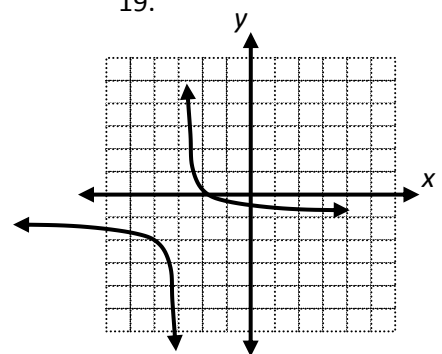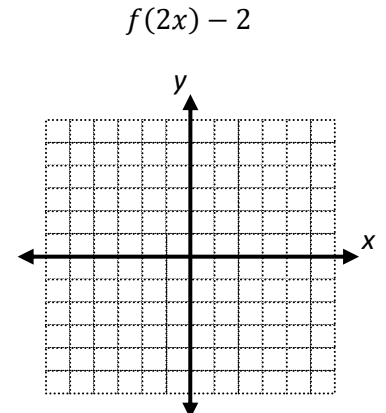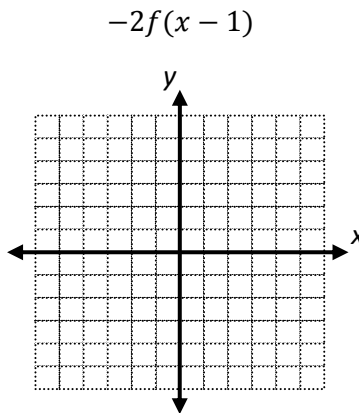
17.

Family:
D: R:
Equation:

18.

Family:
D: R:
Equation:

19.

Family:
D: R:
Equation:

20. Given f(x). Graph the given transformations.

$$f(x)$$

$$-2f(x-1)$$

$$f(2x) - 2$$
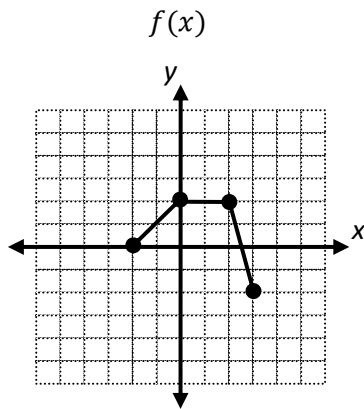
21. **Level 7-8**   A box <u>without</u> a top has a square base and is made with 120 square centimeters of material. Find the maximum volume. Recall that $V_{BOX} = l \times w \times h$ and $SA_{BOX} = sum\ of\ the\ areas\ of\ the\ 5\ faces$
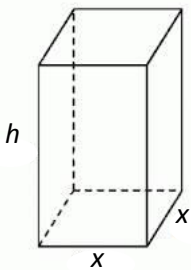
Steps: Create a surface area equation in terms of h and x. Then use the value of 120 cm^2 to isolate the height. Next, use that relationship to substitute out the h in the volume formula so you have volume in terms of x only. Use your calculator to find the maximum. Bonus: What is the realistic domain of x?