Pre-Calculus **Name**_____

Unit 1 Review

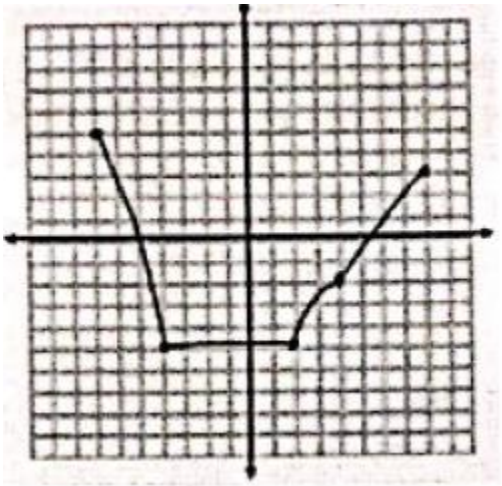
Name the parent function and written the transformations of each of the following.

1) $\boldsymbol{f(x) = -\frac{1}{x-2} + 11}$

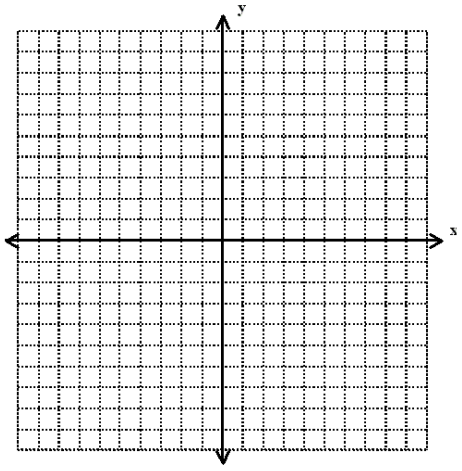
2) $f(x) = \frac{1}{2}(3x + 6)^3$

3) $f(x) = 2(5)^{-x+4} + 1$

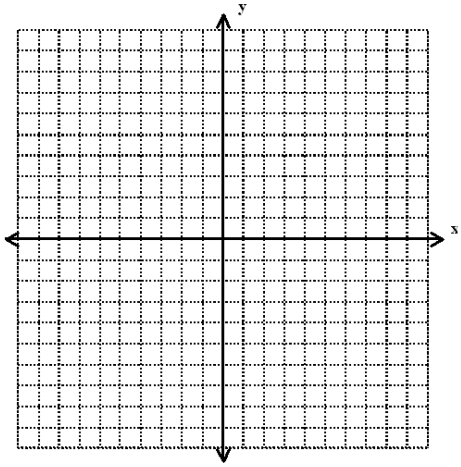
Sketch the transformation from the parent function given below.



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



4) $2f(x - 1) + 4$

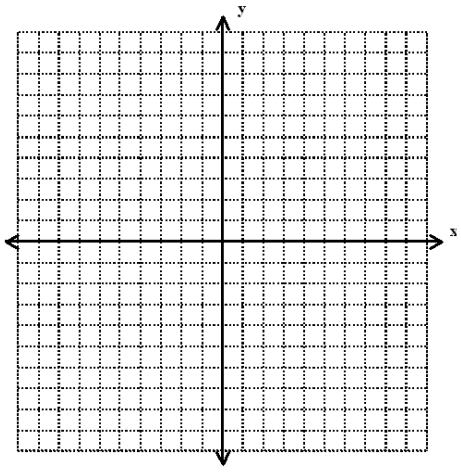


6) Write the equation of the line that goes through the point $(6, 7)$ and is parallel to $2x + 3y = -11$

7) Find the equation of the line that passes through the points $(3, -8)$ and $(-9, 5)$.

8) Given $f(x) = \begin{cases} -2|x+1| & x < 1 \\ 2 & 1 \le x < 3 \\ 5 - \frac{1}{2}x & x \ge 3 \end{cases}$

a) Graph $f(x)$



b) State the domain.

c) State the range.

d) Find $f(-3)$

e) Find $f(3)$

d) Find $f(1)$

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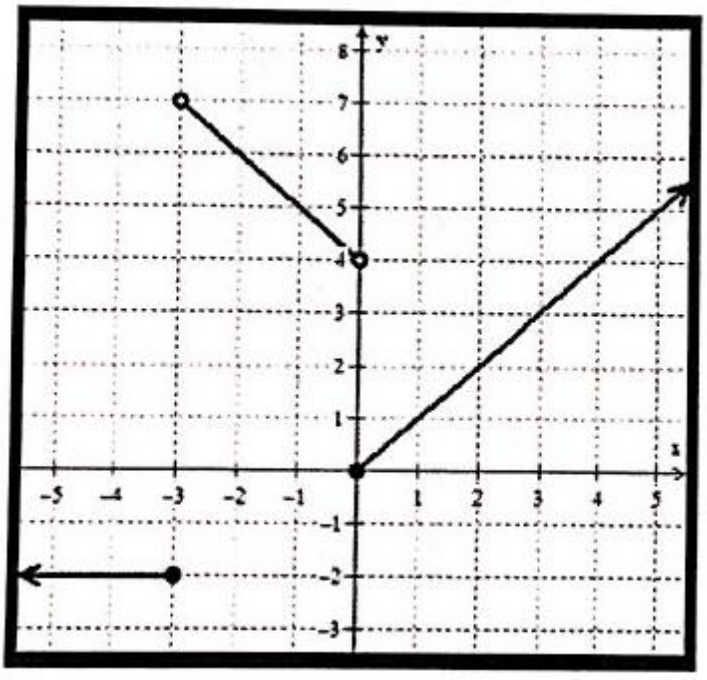
9) Write the piecewise function for the graph below.



Write the piecewise function to model each of the following situations.

10) An SUV was purchased for $35,750. The value of the vehicle decreases by $2400 a year for the first four years and $1700 per year for the next 6 years.

11) You have a summer job that pays double time for overtime. That means if you work more than 40 hours a week, you get paid twice you hourly wage of $8.25.

12) The zoo charges $15 per person for groups of fewer than 50 people. Groups of 50 or more are charged a reduced rate of $10 per person.

Determine if the function is even, odd, or neither algebraically. (Use your calculator to check it graphically.)

13) $f(x) = \frac{x}{x^2+1}$

14) $g(x) = \sqrt{1-x^2}$

15) $f(x) = \frac{4\sqrt[3]{x-x^3}}{x}$

Find the domain in interval notation for each of the following functions.

16) $f(x) = \frac{2x}{x+11}$

17) $f(x) = \frac{\sqrt{x+1}}{x+1}$

18) $f(x) = x^2 - 3x - 54$

19) $f(x) = \frac{x+2}{x^2+11x+30}$

20) $f(x) = \frac{\sqrt{6x+1}}{x-5}$

21) $f(x) = \frac{\sqrt{x^2-1}}{x+3}$

Determine each of the following and state the domain.

$f(x) = x^2 - 4$ $g(x) = \sqrt{x}$ $h(x) = \frac{3}{x}$ $k(x) = 2x + 3$

22) $f\big(g(x)\big)$

23) $(g \circ f)(x)$

24) $(h \circ g)(x)$

25) $\left(\frac{k}{h}\right)(x)$

26) $\left(\frac{g}{k}\right)(x)$

27) $f\big(k(x)\big)$

28) $(f - k)(x)$

29) $k\big(f(x)\big)$

30) $g\big(h(x)\big)$

31) $f^{-1}(x)$

32) $(g \circ g)(x)$

33) $k^{-1}(x)$

For each of the following.

a) **Determine if the function is one-to-one.**
b) **Find the inverse of the function of the function.**
c) **Then state the domain and range of the function and the inverse.**

34) $f(x) = \frac{x+1}{x-5}$

35) $g(x) = \sqrt[3]{\frac{x-2}{4}} - 5$

36) $j(x) = \sqrt{x-2}$

Sketch each function and State the domain and range.

37) $f(x) = x$

38) $g(x) = -\sqrt{x+2}$

39) $f(x) = e^x + 3$

40) $h(x) = (x-2)^2 + 5$

41) $m(x) = \frac{1}{x} - 2$

42) $y = -|x+1| + 4$