

*****Part I – No Calculator*****

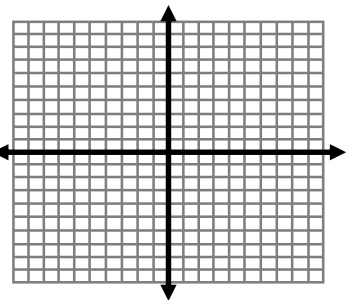
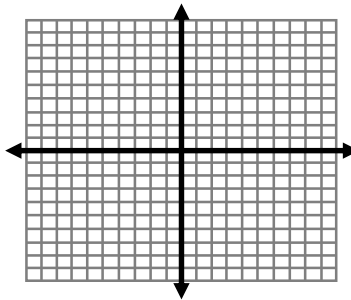
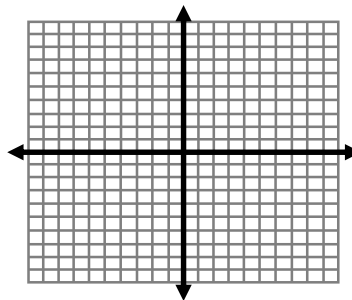
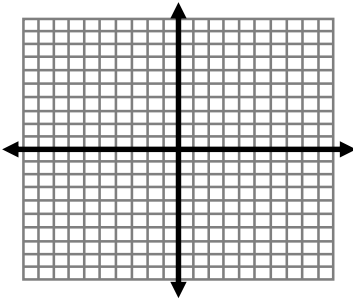
Graph each of the following parent functions.

1) $y = \frac{1}{x+1} - 3$

2) $y = x^3 - 2$

3) $y = 2\sqrt{x+2} - 3$

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



Write a rule (parent function with transformations) for the function whose graph can be obtained from the given parent function and the given transformations:

5) Parent function: $f(x) = x^3$

Transformations: shift graph 4 units up, vertically stretched by a factor of 2, reflect over the y-axis

6) Parent function: $f(x) = \sqrt{x}$

Transformations: reflect across x-axis, compress horizontally by a factor of 1/4, shift 3 units right

Describe the sequence of transformations that transform the graph of the function g from the parent function.

7) $g(x) = 4(x+1)^2 - 3$

Parent Function: _____

8) $g(x) = -\sqrt{\frac{1}{4}(x-3)}$

Parent Function: _____

Use the given to find the following. Then state the domain.

Given $f(x) = 3x+1$ and $g(x) = 2-x$:

8) $(f+g)(x) =$

Domain:

9) $(f-g)(x) =$

Domain:

10) $(fg)(x) =$

Domain:

11) $\left(\frac{f}{g}\right)(x) =$

Domain:

*****Part II – With Calculator*****

Use the given to find the following.

For $f(x) = x^2 - x$ and $g(x) = 1 + x$:

12) $(g \circ f)(-2)$

13) $f(g(2))$

14) $(g \circ g)(1)$

For $f(x) = x^2 - x$ and $g(x) = 1 + x$:

15) $f(g(x))$

16) $g \circ f =$

17) $g \circ g =$

18) $f(f(g(x)))$

Find the inverse relation of each function.

19) $f(x) = x^3 - 3$

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

20) $h(x) = \frac{3x+1}{x-2}$

Use composition to determine if these functions are inverses of each other. Show your work.

21) $f(x) = 2x - 6$ $g(x) = \frac{x}{2} + 3$

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

Find the average rate of change of the function over the given interval.

23) $f(x) = -\sqrt{2x^2 - x + 4}$ from $x = 0$ to $x = 3$

24) $f(x) = \frac{x^2 - 3}{2x - 4}$ from $x = 3$ to $x = 6$

Compute using the difference quotient.

25) $f(x) = x^2 + 6$

Using the answer from #25, find the rate of change.

26) $x = 2$ to 2.5

27) The distance s (in feet) an object falls is given by the model $s = 16t^2 + 120$, find the average distance the object fell:

a) from 0 seconds to 4 seconds

b) from 2 seconds to 6 seconds.

28) The estimated revenues r (in billions of dollars) from sales of digital music from 2002 to 2007 can be approximated by the model $r = 15.639t^3 - 104.75t^2 + 303.5t - 301$, $2 \leq t \leq 7$ where t represents the year with $t = 2$ corresponding to 2002. Find the average rate of change in revenue from 2002 to 2007.