Pre – Calculus
REVIEW: Unit A (Chapter 1)

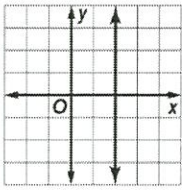
Name: Key

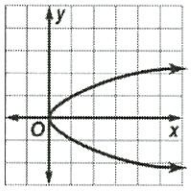
Part One: Calculator Use Allowed

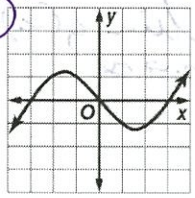
For numbers 1 – 5, circle the letter for the correct answer.

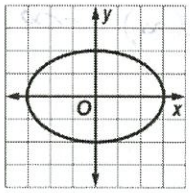
1. Which relation is a function? Circle all that apply.

Passes Vertical Line Test

a) 

b) 

c) 

d) 

2. Which function has a removable discontinuity?

hole!

a) $f(x) = \frac{x}{x+3}$ non remov

b) $f(x) = \frac{x^2-4}{x+2}$ $(x-2)(x+2)$

c) $f(x) = \frac{1}{x+3}$ non-remov

d) $f(x) = x^3 - 3$ continuous

3. Which of the following results in the graph of $f(x) = x^2$ being expanded vertically and reflected over the x–axis?

stretch

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

b) $f(x) = -3x^2$

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

d) $f(x) = -\frac{1}{3}x^2$

4. Which function has an inverse that is also a function?

a) $f(x) = |x|$ V

b) $f(x) = x^2$ U

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

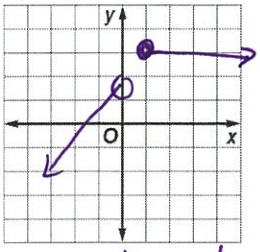
d) $f(x) = x^3$

5. Given the parent function $p(x) = x^3$, what transformation occurs in the graph of $p(x) = (-3x - 7)^3$?

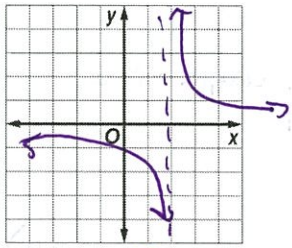
y-axis reflection Right 7

Horizontal compression

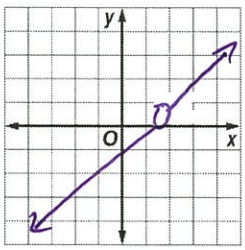
6. Create a graph that represents each type of discontinuity on the graphs below. Your graphs do not have to be based on a specific equation, rough sketches are fine.



Jump!



Infinite



Removable

7. Given $f(x) = x^2 - 2x$, find $f(4 - x)$.

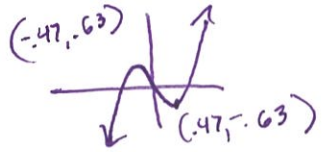
$(4-x)^2 - 2(4-x)$

$16 - 8x + x^2 - 8 + 2x$

$x^2 - 6x + 8$

8. Given the function $g(x) = 3x^3 - 2x$:

a. Describe the intervals on which the function is increasing and/or decreasing.



Increasing: $(-\infty, -0.47) \cup (0.47, \infty)$

Decreasing: $(-.47, .47)$

b. Describe the end behavior of the function.

$\lim_{x \to -\infty} g(x) = -\infty$ $\lim_{x \to \infty} g(x) = \infty$

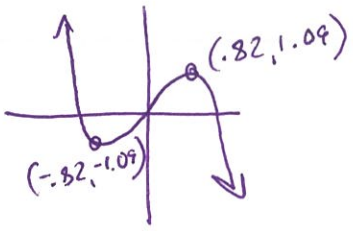
9. What is $f(-2)$ for $f(x) = \begin{cases} |4x| \text{ if } x < -2 \\ x^3 - 1 \text{ if } x \geq -2 \end{cases}$?

$(-2)^3 - 1$

$-8 - 1$

$\boxed{-9}$

10. Given the function $f(x) = -x^3 + 2x$, state: where the function is increasing/decreasing, relative maximum(s) and relative minimum(s), absolute extrema(s) and the end behavior.



Increasing: $(-.82, .82)$

Decreasing: $(-\infty, -.82) \cup (.82, \infty)$

Rel min: $(-.82, -1.09)$

Rel max $(.82, 1.09)$

Abs extrema: none

End Behavior:

$\lim_{x \to \infty} f(x) = -\infty$

$\lim_{x \to -\infty} f(x) = \infty$

11. If $f(x) = x - 3$ and $g(x) = 2x - 4$, find $(f + g)(x)$ and state its domain.

$(-\infty, \infty)$ $(-\infty, \infty)$

$(x - 3) + (2x - 4)$

$\boxed{3x - 7}$ D: $(-\infty, \infty)$

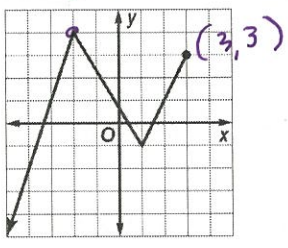
12. Describe the transformations relating the graph of $g(x) = \frac{1}{4}(x-1)^2$ to the graph of its parent function $f(x) = x^2$.

Vertical compression

Right 1

Part Two: No Calculator Allowed

13. State the domain and range of the function shown. Use interval notation.



D: $(-\infty, 3]$

R: $(-\infty, 4]$

$(-\infty,-4)\cup(-4,4)\cup(4,\infty)$

14. If $f(x) = x + 4$ and $g(x) = \frac{1}{x^2 - 16}$, find $(f \cdot g)(x)$ and its domain and $(\frac{f}{g})(x)$ and its domain.

$(-\infty,\infty)$

$(x+4)\cdot\frac{1}{(x-4)(x+4)}$ $\quad\boxed{\frac{1}{x-4}}$ $\quad D: (-\infty,-4)\cup(-4,4)\cup(4,\infty)$

15. If $f(x) = x + 4$ and $g(x) \frac{1}{x^2 - 16}$, find $g(f(x))$.

$\frac{1}{(x+4)^2-16}$ $\quad\frac{1}{x^2+8x}$

$\frac{1}{x^2+8x+16-16}$

16. Find the inverse of $f(x) = x^3 - 6$ and state its domain.

D: $(-\infty,\infty)$
R: $(-\infty,\infty)$

$x = y^3 - 6$

$\sqrt[3]{x+6} = \sqrt[3]{y^3}$

$y = \sqrt[3]{x+6}$ $\quad D: (-\infty,\infty)$

17. Given $f(x) = 5x^2 + 2$ and $g(x) = -x + 7$, find $f(g(-3))$.

$= -(-3)+7$ $\quad 5(10)^2+2$

$= 10$ $\quad 502$

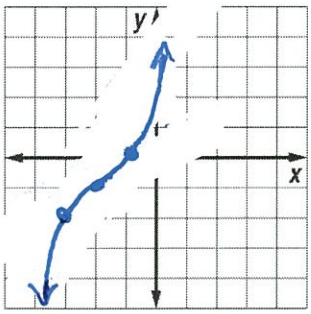
Graph each function. Remember not to utilize your graphing calculator ☺.

18. $p(x) = (x + 2)^3 - 1$

x	y
-1	-1
0	0
1	1

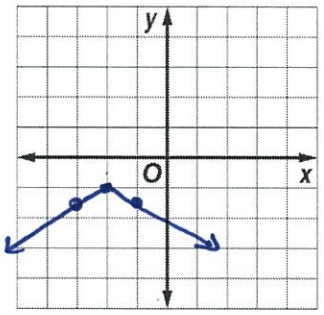
x	y
-3	-2
-2	-1
-1	0

-2 -1



sorry u ^

19. $g(x) = -\frac{1}{2}|x + 2| - 1$



$\times -\frac{1}{2}$

x	y
-1	1
0	0
1	1

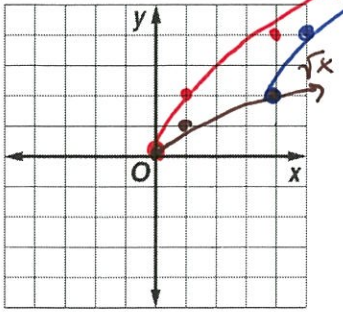
x	y
-1	$-\frac{1}{2}$
0	0
1	$-\frac{1}{2}$

-2

x	y
-3	-1.5
-2	-1
-1	-1.5

-1

20. $r(x) = 2\sqrt{x-4} + 2$



$2\sqrt{x}$ $\quad 2\sqrt{x-4}+2$ $\quad +4$ $\quad +2$ $\quad \times 2$

$\sqrt{x}$

x	y
0	0
1	1
4	2

x	y
0	0
1	2
4	4

x	y
4	2
5	4
8	6