Name: _ANSWERS_

Instructions: No calculators! Answer <u>all</u> problems in the space provided! Do your rough work on scrap paper.
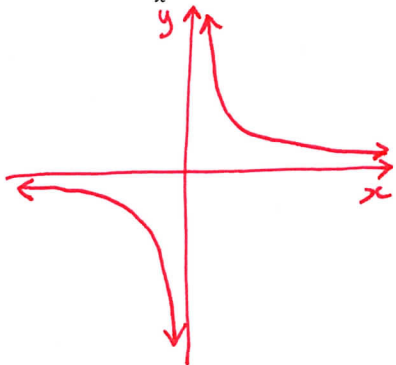
1. Expand and simplify:
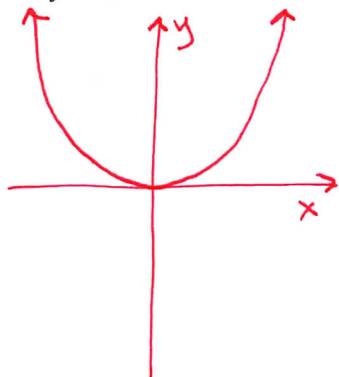   (a) $(a-b)^2 = $ _$a^2 - 2ab + b^2$_   (b) $(x+y)(a+b) = $ _$ax + bx + ay + by$_

   (c) $a(x+2) = $ _$ax + 2a$_   (d) $(a+b)c = $ _$ac + bc$_
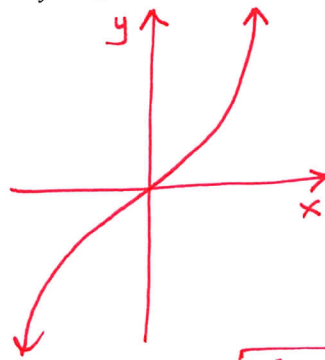
2. Sketch the following:

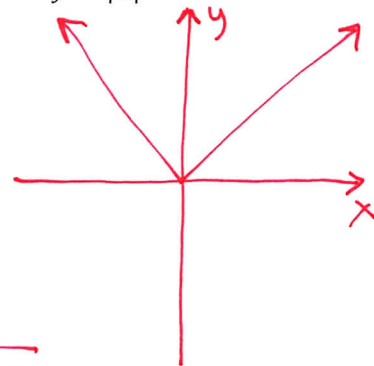 $y = \dfrac{1}{x}$ $y = x^2$ $y = x^3$ $y = |x|$

3. For $ax^2 + bx + c = 0$, state the quadratic formula: _$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$_
   (Note: the quadratic formula is an equation.)

4. Find the x- and y-intercepts of $y = 6x^2 + x - 1$: x-int: _$x = -\frac{1}{2}$, $x = \frac{1}{3}$_ , y-int: _$y = -1$_

5. If $f(x) = x^2 - x + 1$, compute and simplify $\dfrac{f(x+h) - f(x)}{h} = $ _$2x - 1 + h$_

6. Factor: $2x^3 - 2x^2 - 4x = $ _$2x(x+1)(x-2)$_

7. Simplify: $\dfrac{x^3 + 2x^2 - 25x - 50}{x - 5} = $ _$(x+5)(x+2)$_

8. Complete the rules:

   (a) $a^x \cdot a^y = $ _a^{x+y}_   (b) $\dfrac{a^x}{a^y} = $ _a^{x-y}_   (c) $(a^x)^y = $ _a^{xy}_

Bonus:

1. Find the domain of $f(x) = \dfrac{4}{\sqrt{x^2 - 9}}$ in interval notation. $dom(f) = $ _$(-\infty, -3) \cup (3, \infty)$_

2. If $f(x) = \begin{cases} 2 - x^2 & if & x < 3 \\ 7 & if & 3 \le x < 5 \\ 1 + x & if & x \ge 5 \end{cases}$, what is $f(2)$? $f(2) = $ _-2_

3. If $f(x) = \sqrt{x^3 + 1}$ and $g(x) = 3x^2 - 4$, find and simplify $g \circ f(x) = $ _$3x^3 - 1$_