WINTER BREAK – ALGEBRA REVIEW

Be sure to box your answers and show your work!

Name _____ PER _____ DATE _____

For 1 – 2, expand and simplify.

1.

$y^4(6 - y)(5 + y)$

2.

$(t - 5)^2 - 2(t + 3)(8t - 1)$

For 3 – 4, perform the given operations and simplify.
3.

$$\frac{1}{x + 5} + \frac{2}{x - 3}$$

4.

$$\frac{9b - 6}{3b}$$

Simplify.

5.

$$\frac{x^2 - 1}{x^2 - 9x + 8}$$

6. Factor the four expressions below.

$5ab - 8abc$

$x^2 - x - 6$

$2x^2 + 7x - 4$

$8x^2 + 10x + 3$

WINTER BREAK – Pre-Calculus

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Find the domain of each of the following functions in 11-15.

11. $f(x) = \sqrt{1+x}$

12. $f(x) = \frac{1}{1+x}$

13. $f(x) = \frac{1}{\sqrt{x}}$

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

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

16. Given that $f(x) = x^2 - 3x + 4$, find and simplify $f(3)$, $f(a)$, $f(-t)$, and $f(x^2 + 1)$.

Factor the following quadratics

17. $x^2 - x - 20$

18. $x^2 - 10x + 21$

19. $x^2 + 10x + 16$

20. $x^2 + 8x - 105$

21. $4x^2 + 11x - 3$

22. $-2x^2 + 7x + 15$

◆Skill Q Understanding the effect of order on combining transformations

Recall To determine the order of transformations to a function, reverse the order of operations. Addition or subtraction indicates a vertical translation; multiplication or division indicates a vertical stretch; addition or subtraction within parentheses or within absolute-value symbols indicates a horizontal translation.

◆ **Example**
Describe the various transformations included in the equation $y = 2|x - 1| + 3$.

◆ **Solution**
The first operation to consider is the addition of 3. This affects the parent function by translating it vertically 3 units up. The second operation, multiplication by 2, stretches the translated function by a factor of 2. The third operation, subtraction of 1, translates the stretched function horizontally 1 unit to the right. Thus, the parent function, $y = |x|$, has been shifted 1 unit to the right, stretched by a factor of 2, and then shifted 3 units up.

Describe the transformations of the parent functions included in each equation.

1. $y = -3|x + 2| - 3$ _____

_____

_____

2. $y = 2(x - 3)^2 + 1$ _____

_____

_____

3. $y = 4|x - 1| + 2$ _____

_____

_____

4. $y = 4 \cdot 2^x - 2$ _____

_____