

Name _____ Date _____ Period _____

DIRECTIONS: For #1-12, simplify. Show work. No answer should use negative or zero exponents.

1. $\frac{21x^4}{49x}$

$$\frac{3x^3}{7}$$

2. $\frac{y^{4+k}}{y^{2+k}}$

$$y^2$$

3. $\frac{(3a^2b)^3}{(9ab^2)^2}$

$$\frac{a^4}{3b}$$

4. $\frac{(xy^2z^3)^2}{(x^3y^2z)^3}$

$$\frac{z^3}{x^7y^2}$$

5. $\frac{(3ab^2)^2}{bc} \cdot \left(\frac{c^2}{ab}\right)^2$

$$9bc^3$$

6. $-(8n)^0$

$$-1$$

$$7. \frac{5p^{-1}q^{-1}}{p}$$

$$\frac{5}{p^2q}$$

$$8. \frac{(c^{-1}d^2)^3}{(cd)^{-1}}$$

$$\frac{d^7}{c^2}$$

$$9. \left(\frac{m^{-1}n^{-1}}{p}\right)^2 \cdot \left(\frac{m^2}{n^{-3}p^{-1}}\right)^{-1}$$

$$\frac{1}{m^4n^5p^3}$$

$$10. (8^{-1}xy^{-1})^2 \cdot (2xy^{-1})^{-3}$$

$$\frac{y}{512x}$$

$$11. \frac{(4a^4b^3)^2}{-32a^2b^5}$$

$$-\frac{a^6b}{2}$$

$$12. (-2^{-4})^{-1}$$

$$-16$$

DIRECTIONS: For #13-18, simplify. Show work.

13. $\frac{16x^2-25}{8x+10}$

$$\frac{4x-5}{2}$$

14. $\frac{4mn^2+4mn}{4mn^2-4mn}$

$$\frac{n+1}{n-1}$$

15. $\frac{5a-5b}{5b-5a}$

$$-1$$

16. $\frac{2c^3-2d^3}{7c^2+7cd+7d^2}$

$$\frac{2(c-d)}{7} \text{ or } \frac{2c-2d}{7}$$

17. $\frac{w^2-14w+49}{w^2-7w}$

$$\frac{w-7}{w}$$

18. $(p^2 + 3p - 10)(p - 2)^{-2}$

$$\frac{p+5}{p-2}$$

DIRECTIONS: For #19-20, use the following function. Show work.

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

19. Find the **domain** of the function

$$x \neq -3, 0$$

20. Find the **zeros** (if any) of the function

$$x = 1$$