Name: _____ _____ **/ 20**

No aids (calculator, notes, text, etc.) are permitted. Show all work for full credit and box your final answer.

1. [2 points]

a. Give a **full** definition of the absolute value of a real number a.

b. Simplify the following set expression: $\mathbb{Z} \cup \mathbb{R}$.

2. [2 points] Order each of the following expressions:

a. $3^5 \cdot 3^3 \qquad 3^{15}$

b. $3^3 \cdot 5^3 \qquad 15^3$

3. [2 points] Evaluate the expression for $x = -4$ and $y = 3$:

$|x - 7y| + 5x + 3y =$

4. [2 points] Simplify the following expression and write a final answer **only with positive exponents**:

$\frac{12m^{-7}n^9p^{-6}}{3n^{-2}p^4} =$

5. [2 points] Rationalize the denominator and simplify:

$\frac{7}{2\sqrt{3}+4} =$

6. [2 points] Simplify each expression:

a. $\sqrt{242x^5t^3} =$

b. $(3.2 \times 10^4)(5 \times 10^{-6}) =$

7. [4 points]

a. Factor the following expression **completely**:
$64x^7y^2 - 100xy^2 =$

b. Factor the following algebraic expression:
$(8x+6)^{-\frac{7}{2}} - (8x+6)^{-\frac{1}{2}} =$

8. [4 points]

a. Simplify the following rational expression, indicating which real values of the variable **must be excluded**:

$$\frac{x^4 - x^3}{x^2 - 3x + 2} =$$

b. Simplify the following complex rational expression:

$$\frac{1 + xy}{x^{-2} - y^2} =$$