

Name: ANSWERSInstructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

1. Complete the following rules:

$$(a) x^n \cdot x^m = \overset{n+m}{X} \quad (b) x^{-a} = \frac{1}{X^a} \quad (c) x^{m/n} = \sqrt[n]{X^m} \quad (d) \frac{x^n}{x^m} = \overset{n-m}{X}$$

$$(e) x^2 - y^2 = (x-y)(x+y) \quad (f) x^3 - y^3 = (x-y)(x^2 + xy + y^2)$$

2. Solve the following equations:

$$(a) \frac{1}{3}x - 2 = \frac{5}{3}x + 7 \Rightarrow x = \frac{-27}{4} \quad (b) x^2 + 3x - 4 = 0 \Rightarrow x = -4; 1$$

$$(c) 4x^2 - 4x - 15 = 0 \Rightarrow x = \frac{-3}{2}; \frac{5}{2} \quad (d) x^3 - x^2 - x + 1 = 0 \Rightarrow x = -1; 1$$

Bonus (after attempting the problems above, do these for extra credit):

1. Solve the following equations:

$$(a) \sqrt{5-x} + 1 = x - 2 \Rightarrow x = 4$$

$$(b) \frac{3}{x+1} - \frac{1}{2} = \frac{1}{3x+3} \Rightarrow x = \frac{13}{3}$$

2. Solve the following inequality, write your answer in interval notation:

$$x^2 - 3x - 18 \leq 0 \Rightarrow x \in [-3, 6]$$