

Group #: _____ Name: _____

1. (16 points, 4 points each) Fill in the blanks:

- (a) $\sqrt[7]{13}$ translates to _____ in exponential form.
- (b) $4^{1/3}$ is the same as _____ in radical form.
- (c) $\frac{1}{4^5}$ translates to _____ in exponential form.
- (d) 7^{-5} is the same as _____ in fraction form.

2. (24 points, 3 points each) Find all real solutions to the following equations. If there are none, say so. In each case, verify that your solution makes sense. For example, if you think the solution to the equation $x^{1/4} = -2$ is 16, verify by replacing the x with 16 to see if the equation makes sense, i.e., does $16^{1/4} = -2$?

- (a) $x^5 = 32$
- (b) $x^6 = 64$
- (c) $x^5 = -32$
- (d) $x^6 = -64$
- (e) $x^{1/2} = 4$
- (f) $x^{1/2} = -4$
- (g) $x^{1/3} = 4$
- (h) $x^{1/3} = -4$

3. (8 points each) Find all real solutions of the following equations.

- (a) $x^8 - 8x^4 + 7 = 0$
- (b) $4x^6 - 12x^3 + 9 = 0$
- (c) $x^{4/3} - 5x^{2/3} + 6 = 0$
- (d) $\left(\frac{x+1}{x}\right)^2 + 4\left(\frac{x+1}{x}\right) + 3 = 0$
- (e) $2x^3 + x^2 - 18x - 9 = 0$
- (f) $x^3 - 5x^2 + 6x = 0$

4. Make up a quadratic equation that has the following number of solutions. Be sure to show clearly how you obtain them.

- (a) (4 points) Two real solutions
- (b) (4 points) Exactly one real solution
- (c) (4 points) No real solution.