Name: _____

1. The following are unrelated: (9 pts)

   (a) Arrange the following numbers in ascending (increasing) order

   $\{-3^0, (-3)^0, 4^{-2}, 3-\pi, 0\}$

   (b) Express the quantity without using absolute value.

   i. $\left|\sqrt{3}-3\right|$

   ii. $|4-x|$ when $x < 4$

2. The following are unrelated: (14 pts)

   (a) Use the two values, $-\mathbf{5}$ and $\mathbf{6}$, to answer the following.

   i. Graph the two values on the real number line.

   ii. Find the distance between the two values.

   (b) Simplify: $\dfrac{|-6-5|+|2|}{3|-3|}$

   (c) Add and simplify: $\dfrac{2}{\frac{3}{7}} - \dfrac{1}{5} - 8^0$

3. The following are unrelated: (22 pts)

(a) Simplify (give your answer without negative exponents): $\dfrac{4x^{-2}y^3z^{-1}}{14(x^3y^2)^2}$

(b) Evaluate the expression: $\sqrt{27}\sqrt{3}$

(c) Simplify the expression: $\sqrt{4x^2+4}$

(d) Multiply and simplify: $\sqrt[3]{x}\left(\dfrac{1}{x^{1/3}}+\dfrac{x^{2/3}}{2}\right)$

(e) Simplify: $\sqrt[3]{27x^6y^3}$

(f) Rewrite with rational exponent(s): $\dfrac{\sqrt[3]{y^2}+\sqrt{x^5}}{y-2}$

4. The following are unrelated: (10 pts)

   (a) Subtract: $\dfrac{1}{x^2+x} - \dfrac{1}{x^2+3x+2}$

   (b) Simplify the complex fraction: $\dfrac{\frac{1}{x} - \frac{1}{x^2}}{1 + \frac{1}{x-1}}$

5. For what value of c is the number $x = 9$ a solution of the equation $\sqrt{x} + cx = 4c$? (5 pts)

6. Solve each of the following equations utilizing the properties of equations to justify your answers: (20 pts)

(a) $x^3 = 8x^2 - 16x$

(b) $|3x - 1| = 4$

(c) $\sqrt{-1 - x} - x = 3$

(d) Solve for h: $S = 2l^2 + 4lh$

7. Solve the following inequalities. To receive credit, be sure to justify answers with a real number line or sign chart when appropriate. Express all answers in interval notation. (12 pts)

(a) $x^2(x+1)(x-2) \geq 0$

(b) $|x-1| \leq 4$

(c) $\dfrac{-2x}{x-5} \geq 0$

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8. The height of an object can be calculated for any time t from 0 seconds to 3 seconds by evaluating the expression: $-16t^2 + 48t$ for a specific time t. The height is measured in feet.

   (a) Express all times for which it's possible to calculate a height. Give your answer in interval notation. (3 pts)

   (b) What is the height of the object at time $t = \frac{1}{2}$ seconds? (5 pts)

END OF EXAM