

Test 1 Solution, Math 1111, Fall 1998, Dr. Howard

1. Express each statement using an appropriate inequality. (8 points)

a. z is at least 10.

Answer: $z \geq 10$

b. The distance between x and 6 is no more than 2. (Use absolute value notation)

Answer: $|x - 6| \leq 2$.

2. Simplify each expression. (8 points)

a. $(-5a^2b^3)(2ab^2) = -10a^3b^5$

b. $(2x^2y)^3 = 8x^6y^3$

3. Evaluate and simplify each expression. (8 points)

a. $\sqrt[3]{-27} = -3$

b. $8^{2/3} = 4$

4. Rewrite each expression in simplified form, using **no negative exponents**. (8 points)

a. $(\frac{1}{25})^{-1/2} = \sqrt{25} = 5$

b. $\frac{12a^3b^{-4}}{4a^{-2}b} = 3\frac{a^5}{b^5}$

5. Simplify each expression by removing all possible factors from the radical. (8 points)

a. $\sqrt{49x^2y^3} = 7|xy|\sqrt{y}$

b. $\sqrt[3]{16x^7} = 2x^2\sqrt[3]{2x}$

6. Perform the indicated polynomial operation and write the result in standard form. (12 points)

a. $(2x - 1)(3x + 5) = 6x^2 + 7x - 5$

b. $(3x + 2)^2 = 9x^2 + 12x + 4$

Test 1, Math 1111

Fall 1998, Dr. Howard

c. $(3x^2 - 6x + 2) - (x^2 - 2) = 2x^2 - 6x + 4$

7. Factor each trinomial. (8 points)

a. $x^2 - x - 6 = (x + 2)(x - 3)$

b. $2x^2 - x - 1 = (2x + 1)(x - 1)$

8. Completely factor each expression. (12 points)

a. $2x^3 - 8x^2 = 2x^2(x - 4)$

b. $5x^3 - 10x^2 + 3x - 6 = (x - 2)(5x^2 + 3)$

c. $6x^2 - 54 = 6(x - 3)(x + 3)$

9. Perform the indicated operation and simplify your answer. (12 points)

a. $\frac{x}{x-2} - \frac{2}{3x+1} = \frac{3x^2 - x + 4}{(x-2)(3x+1)}$

b. $\frac{(x-9)(x+7)}{x+1} \div \frac{9-x}{x} = (x-9) \frac{x+7}{(x+1)(9-x)} \cdot x = -x \frac{x+7}{x+1}$

c. $\frac{\frac{x-1}{2}}{3 - \frac{1}{2x}} = (x-2) \frac{x}{6x-1}$

10. Determine if the graph of $y = x^6 - x^2 + 3$ has x-axis symmetry, y-axis symmetry, origin symmetry, or no symmetry. (3 points)

Answer: y-axis symmetry

11. Find an equation for the circle with center (2,3) and radius 5. (3 points)

Answer: $(x - 2)^2 + (y - 3)^2 = 25$

12. Solve each equation (if possible) and check your solution. (10 points)

a. $2x - 9 = 3$, Solution is : $\{x = 6\}$

b. $\frac{1}{x-2} = \frac{3}{x+2} - \frac{6x}{x^2-4}$

Answer: there are no solutions (just an extraneous solution)

c. $x + 7 = 3(x - 2) - 2x$

Test 1, Math 1111
Fall 1998, Dr. Howard

Answer: $x + 7 = x - 6$, which has no solutions.