

MAC 1140 Test I Review Spring 2011
L1 through L6

1. (a) Simplify the complex fraction:

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

- (b) Evaluate the expression

$$(0.25)^{-2.5} \cdot \left(\frac{125}{8}\right)^{2/3} \div (5^{1/2})^4$$

2. Find the domain and the solution set of each equation in the real number system:

a) $(3x+7)^2 = 2$

b) $\frac{5-x}{x} = \frac{7}{x} - \frac{3}{4}$

c) $\frac{x-4}{x} = \frac{15}{x+4}$

d) $\frac{2x}{x^2-9} = \frac{1}{x^2-9} - \frac{4}{x+3}$

e) $\frac{1}{2(x+1)} - \frac{2}{3(x-2)} = \frac{1}{5(x+1)}$

3. What's the domain of the following equation? Simplify and find the solution set of the equation. Check your answer: $\frac{3}{x^2-3x} + \frac{1}{3-x} = -\frac{4}{x}$

4. Solve each inequality. Express your answer in interval notation and graph on a number line.

a. $-3 \leq 1 - 2(x+5) \leq 5$ b. $9 - |2x+8| \leq 7$ c. $7 - |2x-3| \geq 1$

5. Solve each compound inequality. Write your solution in interval notation and graph on a number line. If there is no solution, say so.

a. $4x+5 \geq 4$ and $3x-1 < 7$ b. $3x-1 < -7$ and $4x+3 > 9$

6. Use the discriminant to determine the type of solution of each equation. Use the Quadratic Formula to find the solution set.

a) $3x(x-1) = -1$ b) $4x^2 + \frac{4}{3}x + \frac{1}{9} = 0$ c) $2x^2 + 7 = 0$ d) $x^2 + 3x = 6$

7. Find k so that the equation $2x^2 + 2x - k = 0$ has exactly one real solution.

8. Solve by factoring:

a) $2x^3 + x^2 - 8x - 4 = 0$ b) $x^4 - 50x^2 + 49 = 0$ c) $x^{1/2} - 5x^{1/4} + 6 = 0$
d) $(x-1)^{2/3} + (x-1)^{1/3} - 12 = 0$ e) $x^6 - 6x^3 + 9 = 0$ f) $16(x+1)^2 + 8(x+1) + 1 = 0$
g) $(3x+1)^{-1/2} + 2(3x+1)^{1/2} = 0$

9. Solve each equation in the real number system. Be sure to check your answers.

a) $\sqrt{12 - 2x} + 2 = x$ b) $\sqrt{2x + 3} - \sqrt{x + 1} = 1$ c) $\sqrt{x} + x = 90$

10. If $\sqrt[3]{4x - 5} + 4 = 2$, find $4x - 1$.

11. Indicate whether each of the following statements is true or false:

(a) $(x + y)^4 = x^4 + y^4$ (b) $\frac{1}{x} + \frac{1}{y} = \frac{2}{x + y}$
(c) $\sqrt[4]{4x^4} = \sqrt[4]{4}x$ (d) If $x > 0, y < 0$, then $xy - x$ is negative.

12. Given the set $\left\{-\frac{4}{9}, -\sqrt{16}, \frac{\pi}{6}, 0, -2, \sqrt{0.09}, 0.\bar{8}, 3^3, \sqrt{5}, 12.2\right\}$, list all members of the set that are

(a) rational numbers

(d) irrational numbers.

13. Rationalize the denominator (a) $\frac{5}{\sqrt[4]{8}}$ (b) $\frac{\sqrt{2} - \sqrt{3}}{5 - \sqrt{10}}$

14. Using distributive rule, evaluate $356 \times 0.23 - 523 \times 0.92 + 644 \times 0.23 - 477 \times 0.92$

15. Let $a > 0$, if $a^{1/2} + a^{-1/2} = 3$, find $a^2 + a^{-2}$.

16. Find the domain of the expression $\sqrt{-5 - |3x + 1|}$

17. Assume $x < 0$, evaluate (a) $x - \sqrt{\sqrt[3]{x^6}}$ (b) $\frac{1}{2}\sqrt{x^2} - |x|$