MTH 207 - Calculus I
Due: Tuesday (at the start of class), June 19, 2018

Instructions: *Include all relevant work to get full credit.*

Homework 1 - Algebra Review (20-points)

1. Evaluate each expression without using a calculator.

- **a.** $(-2)^3$
- **b.** -2^3
- **c.** 2^{-3}
- **d.** $\dfrac{3^{25}}{3^{21}}$
- **e.** $\left(\dfrac{2}{3}\right)^{-2}$
- **f.** $16^{-3/4}$

2. Simplify each expression. Write your answer without negative exponents.

- **a.** $\sqrt{300} - \sqrt{48}$
- **b.** $(3a^3b^4)(2a^2b)^2$
- **c.** $\left(\dfrac{3x^{3/2}y^3}{x^2y^{-1/2}}\right)^2$

3. Expand and simplify.

- **a.** $3(x+6) + 4(2x-5)$
- **b.** $(x+3)(3x-2)$
- **c.** $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b})$
- **d.** $(2x-3)^2$
- **e.** $(x-2)^3$

4. Factor each expression.

- **a.** $9x^2 - 25$
- **b.** $2x^2 + 5x - 12$
- **c.** $x^3 - 3x^2 - 4x + 12$
- **d.** $x^4 + 27x$
- **e.** $3x^{3/2} - 9x^{1/2} + 6x^{-1/2}$
- **f.** $x^3y - 4xy$

5. Simplify the rational expression.

- **a.** $\dfrac{x^2+3x+2}{x^2-x-2}$
- **b.** $\dfrac{2x^2-x-1}{x^2-9} \cdot \dfrac{x+3}{2x+1}$
- **c.** $\dfrac{x^2}{x^2-4} - \dfrac{x+1}{x+2}$
- **d.** $\dfrac{\frac{y}{x} - \frac{x}{y}}{\frac{1}{y} - \frac{1}{x}}$

6. Rationalize the expression and simplify.

a. $\dfrac{\sqrt{10}}{\sqrt{5}-2}$

b. $\dfrac{\sqrt{4+h}-2}{h}$

7. Solve the equation. Find only the real solutions.

a. $x+5=14-\frac{1}{2}x$

b. $\dfrac{2x}{x+1}=\dfrac{2x-1}{x}$

c. $x^2+x-12=0$

d. $2x^2+4x+1=0$

e. $x^4-3x^2+2=0$

f. $4|x-3|=10$

g. $2x(4-x)^{-1/2}-3\sqrt{4-x}=0$

8. Solve each inequality. Write your answer using interval notation.

a. $-7<5-3x\leq 20$

b. $x^2<x+12$

c. $x(x-1)(x+2)>0$

d. $|x-5|<4$

e. $\dfrac{2x-3}{x+1}\leq 1$

9. State whether each equation is true or false.

a. $(p+q)^2=p^2+q^2$

b. $\sqrt{ab}=\sqrt{a}\sqrt{b}$

c. $\sqrt{a^2+b^2}=a+b$

d. $\dfrac{1+TC}{C}=1+T$

e. $\dfrac{1}{x-y}=\dfrac{1}{x}-\dfrac{1}{y}$

f. $\dfrac{1/x}{a/x-b/x}=\dfrac{1}{a-b}$