**Math 1130
Spring
Sample Exam 1a**

This exam contains 8 pages (including this cover page) and 7 problems. Check to see if any pages are missing. The exam is worth 100 points. The value of each question is listed below.

The following rules apply:

- You have **55 Minutes** to complete this exam.

- You may **not** use your books or notes on this exam.

- Please write clearly.

- You are required to show your work on Problems 1, 5, 6, and 7.
  No work is required for Problems 2, 3, or 4.

- **Partial Credit**: Incorrect answers with supporting work may receive partial credit.
  Problems 1, 5, 6, and 7 will receive no credit if there is no supporting work.
  Partial credit may not be awarded on some problems.

- Calculators are permitted with the exception of calculators that have symbolic algebra or calculus capabilities. In particular, the following calculators (and their upgrades) are not permitted: TI-89, TI-92, TI-Nspire CX CAS, and HP-49. In addition, neither PDAs, laptops, nor cell phones are permitted.

- Unless otherwise specified, make sure your answers are in **exact form** (i.e. not a decimal approximation).

- Please write your answers in the boxes provided unless otherwise instructed.

- A random sample of graded exams will be copied before being returned.

Page	Points	Score
2	22	
3	12	
4	15	
5	15	
6	20	
7	16	
Total:	100	

1. Solve the equations. Show all of your work. **Solutions by calculator will receive no credit.**

    (a) (8 points) $\sqrt{x} + \sqrt{x+2} = 3$. Write your answer as a fraction. Separate multiple solutions with a comma.

    $x =$ ⬚
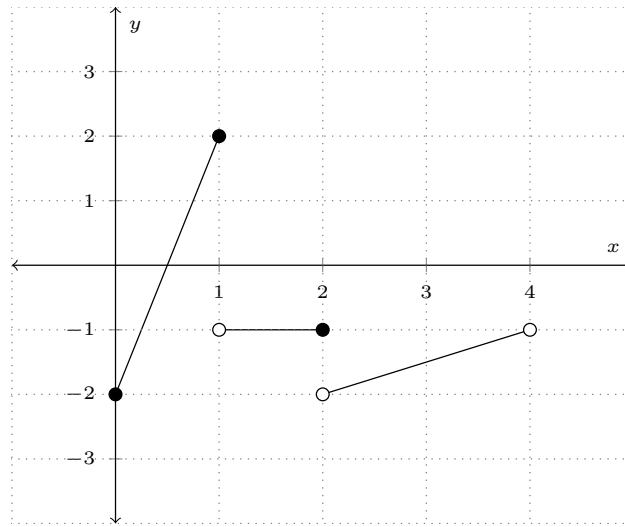
    (b) (8 points) $\dfrac{2}{x-2} - \dfrac{x+1}{x+4} = 0$. Write your answer as a fraction. Separate multiple solutions with a comma.

    $x =$ ⬚

    (c) (6 points) Solve for r in the equation $S = P(1+r)^9$

    $r =$ ⬚

2. Below is the graph of $y = f(x)$.

(a) (4 points) What is the domain of f? Give your answer in interval notation.

Domain =

(b) (4 points) What is the range of f? Give your answer in interval notation.

Range =

(c) (4 points) What is the x-intercept of f?

x-intercept =

3. Answer the following multiple choice questions. No need to show work. **Circle the correct answer**

   (a) (5 points) Which of the following lines is parallel to the line $4x + 9y - 5 = 0$?

   (a) $y - 3 = \dfrac{4}{9}(x - 2)$ (b) $y - 3 = \dfrac{-4}{9}(x - 2)$ (c) $y + 3 = \dfrac{9}{4}(x - 4)$

   (d) $y - 1 = \dfrac{-9}{4}(x + 3)$ (e) $y = 4/9$ (f) None of the above

   (b) (5 points) Which of the following lines is vertical and passes through the point (-2, 5)?

   (a) $y = -2$ (b) $y = 5$ (c) $x = -2$

   (d) $x = 5$ (e) $y = \dfrac{5}{-2}$ (f) None of the above

   (c) (5 points) Find the domain of $f(t) = \dfrac{t}{\sqrt{2t - 3}}$.

   (a) All real numbers except 1.5   (b) $(0, 1.5)$ (c) $[1.5, \infty)$

   (d) All real numbers except 1.5 and 0   (e) $(1.5, \infty)$ (f) None of the above

4. Suppose $f(x) = (1-x)^3$ and

$$G(x) = \begin{cases} x+3 & x > 1 \\ 4 - x^2 & x \le 1 \end{cases}$$

(a) (3 points) Determine $G(-2)$.

$$G(-2) = \boxed{}$$

(b) (3 points) Determine $G(1)$.

$$G(1) = \boxed{}$$

(c) (4 points) Determine $\frac{G}{f}(2)$.

$$\frac{G}{f}(2) = \boxed{}$$

(d) (5 points) Determine $(G \circ f)(2)$.

$$(G \circ f)(2) = \boxed{}$$

5. (10 points) Let $f(x) = \dfrac{1}{2x - 3}$. Determine the expression for $\dfrac{f(x+h) - f(x)}{h}$. You must simplify your result.

$$\frac{f(x+h) - f(x)}{h} = \boxed{}$$

6. (10 points) An electric utility company charges residential customers $0.15 per kilowatt-hour plus a base charge each month. One customer's monthly bill comes to $55.72 for 320 kilowatt-hours. Find a linear function that describes the total monthly charges for electricity if x is the number of kilowatt-hours used in a month.

Monthly charges = $\boxed{}$

7. To produce one bike tire, a company determines the cost for material to be \$3.50 and the cost of labor to be \$2.00. The fixed cost, regardless of sales volume, is \$5000. The price the company charges is \$8.50 per tire. Suppose the company produces and sells q tires.

   (a) (4 points) What is the total cost to produce q tire?.

   $$\text{Cost} = \boxed{}$$

   (b) (4 points) What is the revenue when selling q tires?

   $$\text{Revenue} = \boxed{}$$

   (c) (8 points) Determine the least number of tires that must be solve by company to realize a profit.

   $$q = \boxed{}$$

Scrap work