

MATH 132 Fall 02 Second Exam Name:

(Each problem is worth 10 points.) Give exact answers and simplify your answers.

Problem 1: (a) Consider the following Fibonacci fractions:

$$\frac{8}{60} = \frac{2}{15}, \quad \frac{13}{60}, \quad \frac{21}{60} = \frac{7}{20}.$$

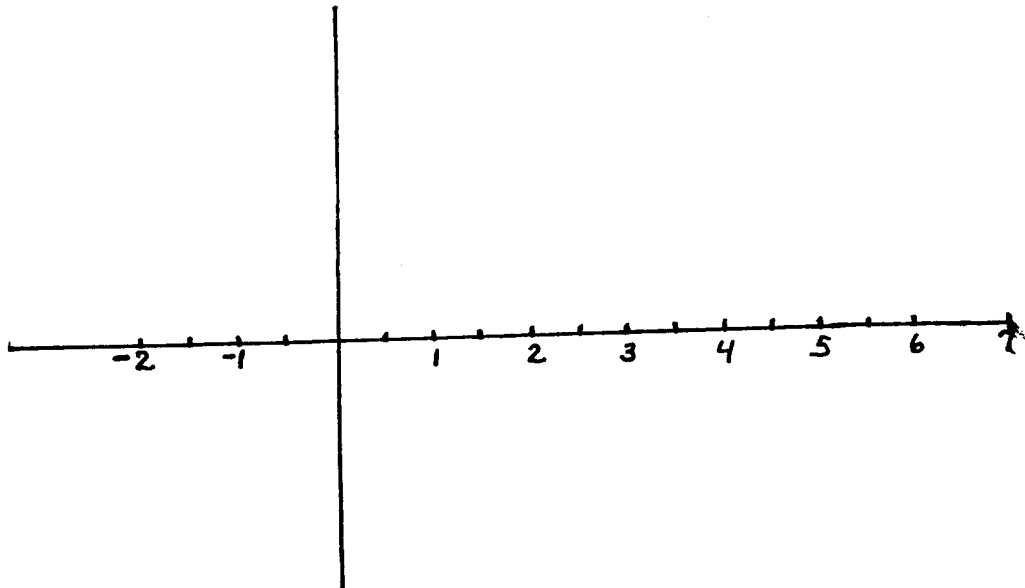
Write the next 3 fractions in this sequence - be sure your fractions are reduced.

(b) Some students want to know what numbers satisfy $G_{n+1} = G_n - G_{n-1}$ and $G_1 = 1, G_2 = 1$. Determine the next 4 numbers G_3, G_4, G_5, G_6 in this sequence for them.

Problem 2: Draw a graph that has the following properties:

- (a) It is concave up and decreasing between $x = -1$ and $x = 1$
- (b) It is concave down and decreasing between $x = 2$ and $x = 3$.
- (c) It is concave up and increasing between $x = 3$ and $x = 5$.
- (d) It is concave down and increasing between $x = 5$ and $x = 6$.

Be sure to label those x values on your graph.



Problem 3: A trajectory goes through the points $(-4, 1)$, $(0, k)$, $(2, -4)$. Determine the concavity of that trajectory for each of the following values of k :

(a) $k = 0$

(b) $k = -2$

(c) $k = -3$.

Problem 4: You are dealt three cards from a deck of 52. What is the probability that all of them are face cards (i.e. a jack, queen, or king)? Write your answer as a fraction in lowest terms.

Problem 5: You choose a card from a deck of 52.

(a) What is the probability of choosing a diamond or a queen?

(b) What is the probability of choosing the queen of diamonds or the queen of hearts?

Problem 6: For

$$f(x) = \frac{x}{x+1}.$$

Compute $f(f(f(2)))$.

Problem 7: Ants have 6 legs and spiders have 8, and each has two antennae. You count a total of 80 antennae and 270 legs. How many ants and spiders are there?

Problem 8: (a) Write down the next 10 Fibonacci numbers after 1,2,

(b) If you select two of those 12 Fibonacci numbers at random, what is the probability that both of them are even?

(c) Given that you picked an odd number from them, what is the probability the number chosen is divisible by 3?

Problem 9: Here are some statistics gathered by an epidemiologist concerning a particular disease: The test for the disease is 95% accurate, and has a false positive rate of 3%. Some of the figures are given in the chart below. Fill in the chart so that the figures are consistent with the reliability of the test.

	Have the disease	Don't have the disease
Test positive	285	
Test negative		
Totals		900

Problem 10: You roll two fair dice. If you get two equal numbers on the dice, you are paid their sum. If you get two unequal numbers, you are paid nothing. What is the expected value (payoff)?