

Group Work
Midterm III Review

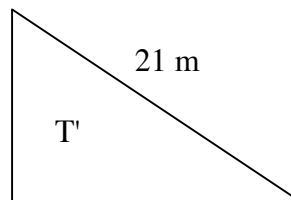
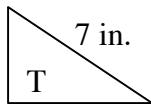
- 1.) If $F_{28} = 317,811$ and $F_{29} = 514,229$, find F_{27} and F_{30} .

- 2.) Use this formula: $F_N = F_{N-1} + F_{N-2}$ to express the following powers of F . You don't need a calculator.
 - a.) F^5
 - b.) F^{12}

- 3.) Since each Fibonacci number is close to ϕ times the previous Fibonacci number, we can approximate Fibonacci numbers pretty easily. If F_{1007} is close to 1.247×10^{215} , find an approximate value for F_{1008} . How about F_{1006} ?

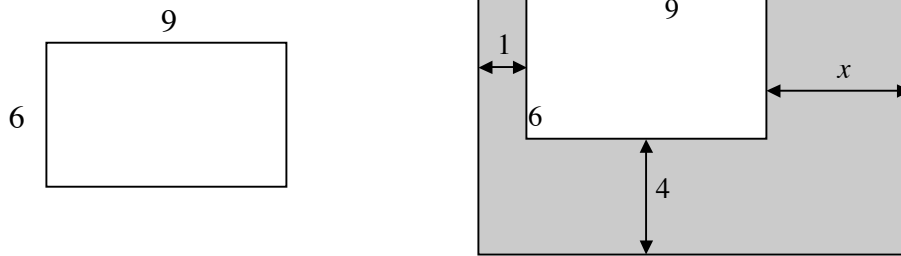
- 4.) Consider the quadratic equation $144x^2 = 89x + 55$.
 - a.) Without using the quadratic formula, find a solution to this equation. (Hint: Check some small positive integers.)
 - b.) Without using the quadratic formula, find the other solution. (Hint: The sum of the two solutions of $ax^2 + bx + c = 0$ equals $-b/a$)

- 5.) T and T' are similar triangles.



- a.) If the perimeter of T is 15 in., what is the perimeter of T' (in meters)?
(Hint: You don't have to do any conversions.)
- b.) If the area of T is 32 in^2 , what is the area of T' (in meters)?
(Hint: You don't have to do any conversions.)

- 6.) Find the value of x so that the shaded figure is a gnomon to the white rectangle.



- 7.) For each of the following rectangles, determine if the rectangle is (I) a golden rectangle, (II) almost a golden rectangle but not quite, or (III) not even close to a golden rectangle.
- A rectangle of dimensions 1 by 4.
 - A Fibonacci rectangle of dimensions 55 by 89.
 - A rectangle with dimensions 1 by \square .
 - A rectangle with dimensions \square^4 by \square^5 .
- 8.) Consider a population that grows according to the linear growth model. The initial population is $P_0 = 15$, and the population in the 8th generation is $P_8 = 103$.
- Find the common difference d .
 - Find P_{62} .
 - Give an explicit description of the population sequence.
 - How many generations will it take for the population to exceed 200?
- 9.)
- Find $4 + 7 + 10 + \dots + 301 = \underline{\hspace{2cm}}$. (Hint: There are how many terms?)
 - Find $10 + 15 + 20 + \dots + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$, if there are exactly 50 terms. (Hint: What is the last term?)
- 10.) Suppose you deposit \$5,000.00 in a savings account that pays 7.25% annual interest, with interest credited to the account at the end of each year. Assuming that no withdrawals are made, how much money will be in the account after 4 years?

11.) Complete the following table:

Annual Interest Rate	Compounded	Annual Yield
5.5%	Yearly	5.5%
5.5%	Semiannually	
5.5%	Quarterly	
5.5%	Monthly	
5.5%	Daily	
5.5%	Hourly	

12.) A population grows according to the exponential growth model. The starting population is $P_0 = 100$, and the common ratio is $r = 1.7$. If the generations happen once a year, what is the size of the population after 5 years? What if the generations happened every other month?

13.) Both of the populations below grow according to the logistic growth model. For each of them, find p_1 up to p_6 , and give a prediction of what will happen to the population in the future.

a.) $p_0 = 0.31, r = 0.6$

b.) $p_0 = 0.5, r = 2.4$

14.) 5 men and 5 women are in a line.

a.) In how many ways can they line up?

b.) In how many ways can they line up if the first person must be a woman?

c.) In how many ways can they line up if they must alternate woman, man, woman, man, with a woman always first in line?

15.) How many 5 card poker hands are there? What about 7 card poker hands?

16.) Let's say there are 202 Olympic Sprinters.

a.) How many ways are there to distribute the 3 medals?

b.) How many ways are there to choose 10 sprinters for a race?