

MATH 7
ASSIGNMENT 27: FIBONACCI NUMBERS

Definition 1. The Fibonacci numbers is the sequence of numbers constructed by the following rule: $F_1 = F_2 = 1$ and for $n > 1$, $F_{n+1} = F_n + F_{n-1}$. Here are the first several Fibonacci numbers: 1, 1, 2, 3, 5, 8, 13, 21, (Some people also define $F_0 = 0$.)

HOMEWORK

1. Solve the following equations and inequalities:

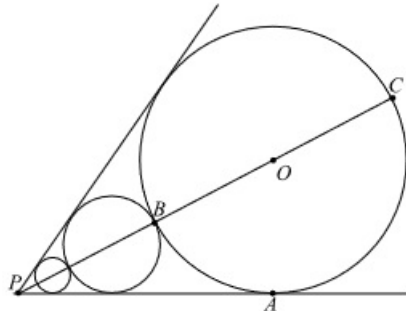
(a) $\frac{x+1}{x+2} < 5$ (b) $\sqrt{x+4} = x+2$ (c) $\frac{1}{x} = x-2$ (d) $x^2 - 5x + 6 > 0$

2. Solve $|3x - 5| = 10$

3. Solve the inequality $|x - 4| < 7$

4. Solve $(x+1)(x-2)^2(x-4)^3 \leq 0$

5. Consider the sequence of circles inscribed in a 60° angle as shown below.



- (a) Prove that radii of these circles form a geometric progression, and find the common ratio r (hint: if $PO = x$, what is PA ? PB ?).
- (b) If the picture contains 10 circles, and the smallest circle has radius 1, what is the total area of all these circles?
6. Find the sum $1 + 11 + 111 + \cdots + 11 \dots 11$, where the last number contains 57 ones. [Hint: find the sum $9 + 99 + 999 + \cdots + 99 \dots 99$ and divide by 9.]
7. On Halloween, Mark has collected 779 pieces of candy. If he starts eating them on November 1st, eating one piece on the first day, two pieces on the second day, three pieces on the third day and so on, how long will his candy last?