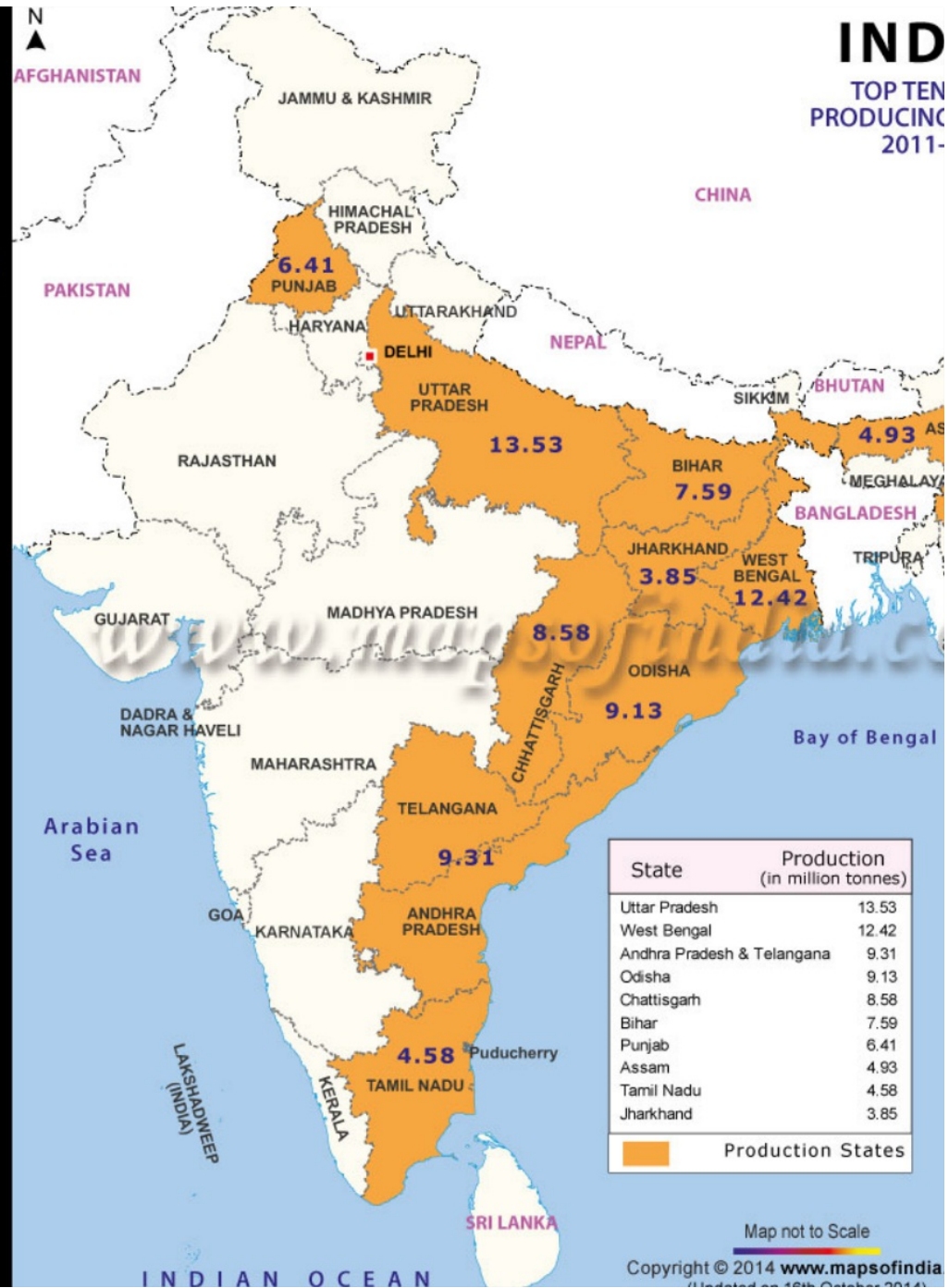


How much do you know about rice?

How much do you know about rice production in India?



A story of rice from Meghalaya:

$$u_1 = 1$$

Today's learning objective:

By the end of class, I will be able to calculate infinite and finite geometric series.

Today's language objective:

Infinite

Finite

The intersection of infinite and finite

There are two ways to express an infinite series...

$$S_n = \frac{5500 \downarrow (1.07^{40} - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

finite (rice) (1.07 - 1)

less than

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

$$S_{30} = \frac{1(2^{30} - 1)}{2 - 1}$$

$$= 1,073,741,823 \text{ grains}$$

Roth IRA

- Vanguard (501 c3 "non-profit")

- Earned Income only

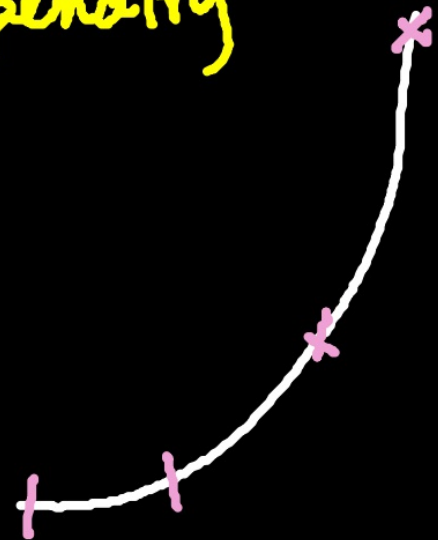
- $\leq \$5,500 / \text{yr}$ ^{Jan 1}

- S&P 500 (V00)
(77.)

- pre-65 access
incurs a 10%
penalty

0.01%

$$\frac{\$5,500}{v_1} \xrightarrow{r} 1.07$$



20, 10, 5, ...

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

5, 10, 20, 40 ...

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

Solve the following quadratic function:

$$x^2 = x + 6$$

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

The sum of the first 13 terms of a geometric ~~sequence~~^{series} is -797162 , and the 1st term is -2 . What is the common ratio, and what is the 7th term?

$$-797162 = \frac{-2(r^{13} - 1)}{(r - 1)} + 797162$$

$$0 =$$

$$41 = \frac{-2(r^{13} - 1)}{(r - 1)} + 797162$$

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

Challenge: The sum of the first 21 terms in a geometric sequence is $36,611,236,207$. The first term is 7 . What is "r" and the 9th term?

The sum of the first 12 terms in a geometric sequence is 1,860,040. If the first term is 7, find r and the 5th term.

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

$$S_n = \frac{n}{2}(2u_1 + (n - 1)d) = \frac{n}{2}(u_1 + u_n)$$

Challenge: The sum of the first 18 terms in a geometric sequence is 1,355,971,708. If the first term is 7, what is " r " and the 5th term?

Find the sum of the infinite series $-640, -160, -40, -10\dots$

$$r = \frac{\text{2nd term}}{\text{1st term}}$$

$$\frac{-640}{(1 - \frac{1}{4})} = -853\frac{1}{3}$$

$$S_n = \frac{u_1(r^n - 1)}{r - 1} = \frac{u_1(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$S_\infty = \frac{u_1}{1 - r}, \quad |r| < 1$$

$$S_n = \frac{n}{2}(2u_1 + (n - 1)d) = \frac{n}{2}(u_1 + u_n)$$

Challenge: Find the sum of the infinite series $81, 27, 9, 3\dots$

There's a sequence: $m, 3m, m - 8$

For what value of m is the sequence arithmetic?

Challenge: For what value of m is the sequence geometric?