

Name:

IN THIS LESSON, YOU WILL:

- Interpret exponential expressions in context
- Construct exponential functions
- Interpret the parameters of an exponential function in context
- Understand the role that Social Security, pension plans, 401(k)s, and IRAs can play in funding retirement
- Differentiate between 401(k)s and IRAs and the traditional and Roth versions of each
- Know the importance of consistently investing every month, starting from a young age, to accumulate enough wealth to fund an adequate retirement



INTRO

**CONSIDER: Your Dream Retirement**

Retirement – it's when, after a successful career, you can stop working and enjoy life (hopefully!).

1. **Draw or write: What does your ideal retirement look like?**



LEARN IT

**ACTIVITY: READ: Retirement Basics**

But, HOW do you retire? You can't just stop working and hope for the best. Follow your teacher's directions to complete this activity.

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### **VIDEO: [Say OK to the 401\(k\)](#)**

So, you can rely on Social Security income, but that PROBABLY won't be enough to fund the dream lifestyle you've got planned in the intro activity. And maybe your future job will offer a pension, but those are becoming less common in today's job market. The 401(k) is another employer-sponsored retirement account you might be offered. Here's how it works.

- 1. A 401(k) plan is a \_\_\_\_\_**
    - a. special type of business plan
    - b. bank account specifically for entrepreneurs
    - c. benefit for workers making \$401,000 or less
    - d. benefit that helps workers invest for retirement
  
  - 2. About how much more does money grow when it's invested rather than deposited in a traditional savings account?**
    - a. About 10 times more
    - b. About 50 times more
    - c. About 100 times more
    - d. About 500 times more
  
  - 3. How can you invest for retirement if your employer does not offer a 401(k) plan?**
    - a. You simply wouldn't be able to invest
    - b. Open a 401(k) from a relative's employer
    - c. Open an Individual Retirement Account (IRA)
    - d. Open a 501(c)(3) instead
  
  - 4. What is one example of a service offered by a brokerage?**
    - a. Offering certificate of deposit accounts
    - b. Offering high yield savings accounts
    - c. Allowing customers to buy/sell stocks
    - d. Allowing customers to sell goods online
  
  - 5. How much of your income do experts recommend investing in a 401(k) account?**
    - a. 5%
    - b. 7%
    - c. 10%
    - d. 12%
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### **PODCAST: [How Does an IRA Work?](#)**

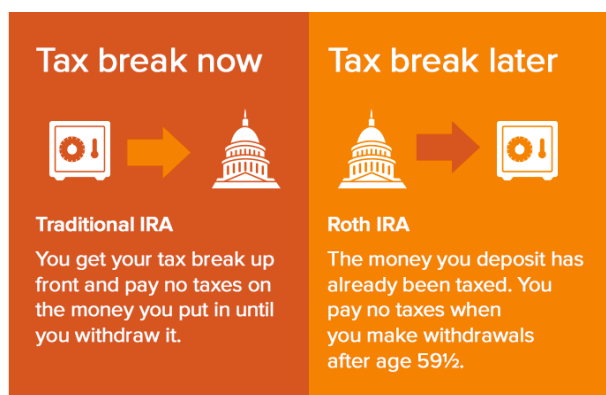
As mentioned in the previous video, there is yet ANOTHER option if you want to save for retirement and your employer is not offering a pension OR a 401(k). You can set up your very own IRA. Listen to this podcast to learn more. If you prefer, you can read the [transcript](#) as well or instead.

- 1. Previously, you learned that a 401(k) is run through your employer. With an IRA you have to do all the work of setting it up yourself, and your employer doesn't make any contributions to it. Why might an IRA still be a good idea?**

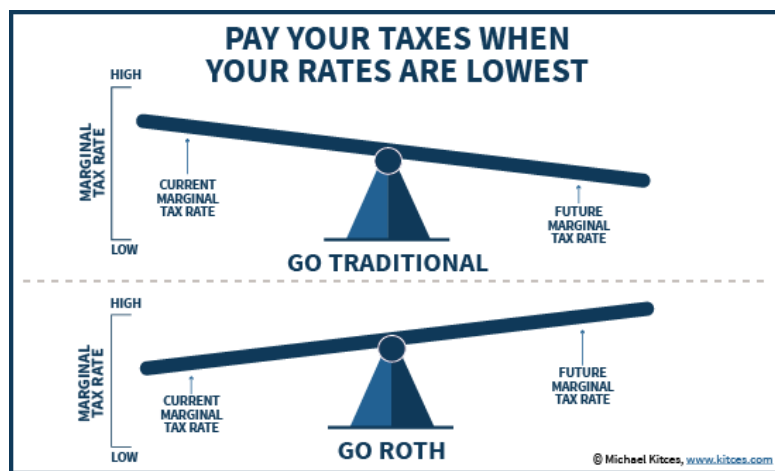
2. The podcast host differentiates between an investment and an IRA. In your own words, explain how the two are related.

### INFOGRAPHICS: Traditional vs. Roth

When discussing tax advantages in the last resource, the podcast host mentioned that traditional and Roth IRAs incur taxes at different times. Not only do IRAs come in these two types, but 401(k)s do as well.



[Source](#)



[Source](#)

1. Using these two images, summarize the advice you'd give to a potential investor on whether they should choose Traditional or Roth for their retirement account.
2. If Vladimir currently works part time at a sandwich shop while he also tries to launch his career as a high-end barber, do you think Traditional or Roth would be a better option for him right now? Explain your thinking.



### EXPLORE IT

#### INTERACTIVE: [Nerdwallet Retirement Calculator](#)

Now that you know what account types you can use to invest for retirement, when should you start saving for retirement? And how much? Use this retirement calculator to investigate the following scenario.



Patrice is 27 years old and earns the mean salary for a court clerk, which is \$43,490. They currently have \$2800 in savings, and every month they save 6% of their monthly gross income. They plan to retire at age 67, but they

hope they'll live until age 95.



**TEACHER TIP:** Students will need to click the arrow on the “Optional” section of the calculator screen to access fields such as retirement age, life expectancy, and investment rate of return, among others.

1. If Patrice invests none of the money and instead puts it in a savings account earning 0.5% guaranteed interest, how “short” will Patrice be for their retirement? Note: Click Optional and adjust the “Investment Rate of Return” to reflect her interest rate.
2. YIKES! Saving alone isn't going to cut it. They decide to invest, rather than save, and they assume they can get a 7% rate of return over the course of their working life. Now what is the difference between how much Patrice will need and how much they will have?
3. While there's nothing Patrice can do about their current age, and they don't want to get overconfident and assume a higher rate of return, what happens to Patrice's retirement goal if they instead start saving 9% of their gross pay?
4. Looking at the inputs you can change in the calculator, write a plan you THINK might get Patrice to a successful retirement.
5. Now, test your plan for Patrice by changing the inputs accordingly. Does Patrice now meet their retirement savings goal?



## MATH CONNECTION - Retirement Drawdown

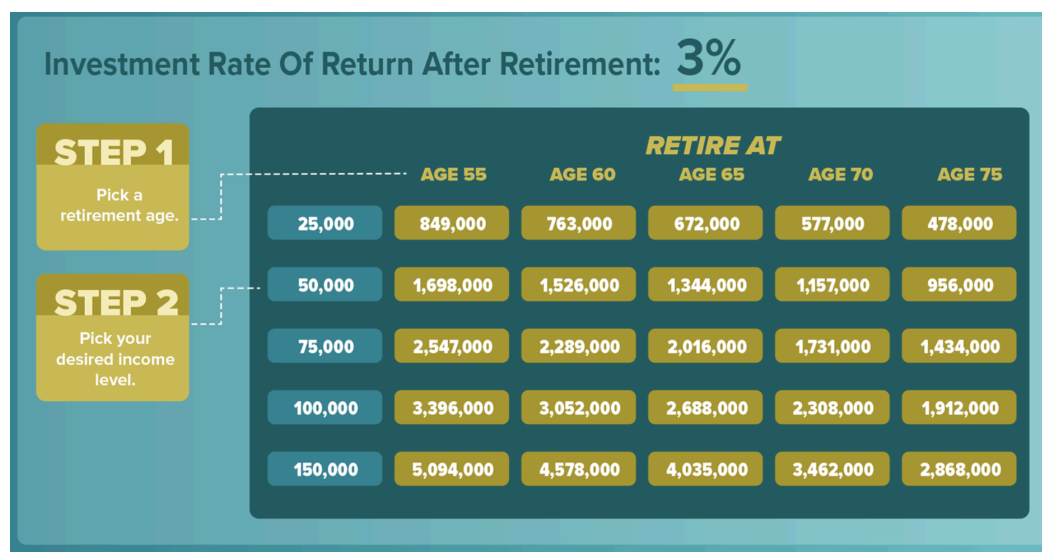
### Retirement Drawdown

Calculating the exact amount you need for retirement involves making some predictions about your lifestyle after retirement.

1. First, watch [this video](#) to understand the basics of how your drawdown happens in retirement. List the factors that impact how much you need to retire.

Now, let's return to Patrice and their retirement goals with these new drawdown factors in mind. We will need to make some assumptions about Patrice's post-retirement life. For all the questions below, you'll no longer be using the Nerdwallet calculator – you're using your own math power!

2. If Patrice expects to maintain the exact same standard of living while aging, they will need at least an annual raise of 2% to match inflation. If Patrice is earning \$43,490 at age 27 and gets a 2% raise each year, what will their salary be at age 65?
  
3. Patrice is planning to retire at age 65 and provide income until age 95. The chart below gives the required savings for a combination of retirement age and desired starting income assuming a 2% inflation rate and a 3% rate of return on investments during retirement.



Patrice wants to retire with at least 100% of their inflation-adjusted salary. Use the closest values on the chart to approximate how much they would need to have saved at retirement.

4. Imagine Patrice reaches her retirement age of 65 and has \$1.4 million saved.
  - a. Based on the chart, approximately how much could she afford as a retirement income?
  
  - b. How much more money would Patrice need each year to maintain her inflation-adjusted salary from Question 2?
  
  - c. If Patrice receives \$1657 per month in Social Security benefits after retirement (the average benefits in 2022), how much more money does Patrice now need to maintain her inflation-adjusted salary?

**5. What are some possible ways that Patrice could close that gap to reach their desired income level in retirement?**

**6. Retirement planning involves a lot of assumptions and approximations.**

- a. Name at least two approximations you had to make in planning for Patrice's retirement.
  
  
  
  
  
  
  
  
  
  
- b. Explain why it is important to always be conservative in your estimates and assumptions when planning for retirement.



## EXIT TICKET

Follow your teacher's instructions to complete the Exit Ticket.

**Teachers,** you can find exit ticket questions on the Lesson Guide.