

# Lesson 9: Easy as Pi

## TOPIC: Financial Ratios

### OVERVIEW:

For many teens and young adults, the thought of **financial ratios** may seem complex and overwhelming. This lesson uses humor and the concept of pi to shatter such misconceptions by engaging content directly related to students' lives. Teens will see how financial ratios apply to everyday situations and discover that understanding **debt-to-income**, **debt-to-asset**, and **debt-to-limit** will strengthen their abilities to make wise financial decisions.

**Time:** 50 min

### Subject Connections:

- English Language Arts
- Math
- Social Studies

### Supplies:

- Projector (for teacher presentation slides)
- Access to the Internet (optional)

### Preparation:

- Make copies of student handout
- Set up projector with presentation slides

**Glossary with key vocabulary** 16

### OBJECTIVES:

1. Identify common financial ratios
2. Demonstrate and explain how to calculate financial ratios
3. Discuss how financial ratios impact financial decision making and creditworthiness

### INDIVIDUAL HANDOUTS:

- Financial Ratios
- Ratios Race

### GROUP HANDOUTS:

- none

### TEACHER PRESENTATION SLIDES:

- Easy as Pi
- Financial Ratios

### ESSENTIAL QUESTIONS:

- What are financial ratios?
- How do financial ratios affect my money?

### ASSESSMENT ACTIVITIES:

#### Pre-Assessment:

- **Handout:** Easy as Pi

#### Post-Assessment:

- **Handout:** Financial Ratios
- **Activity:** Ratios Race\*

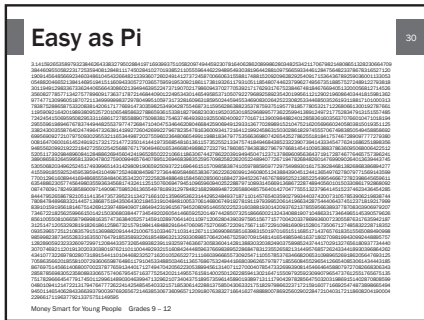
\*Money Smart Portfolio Handouts

# Instruction Steps

## WARM UP

### Understanding Credit Anticipation Guide

5 MINUTES



## Easy as Pi

5 MINUTES

Open the lesson by displaying the **Easy as Pi** slide, which contains the digits of pi, or display one million digits of pi from [www.piday.org/million](http://www.piday.org/million).

Using humor, tell students that today they will memorize the exact ratio of a circle’s circumference to its diameter, or pi. When students realize that this task seems arduous and impossible, make the connection that, even if a math challenge seems overwhelming at first, if we break the challenge into manageable pieces it becomes more workable.

Tell students that they will now explore and practice financial ratios, and that, if at first the ratios seem complex, learning a few basic computing strategies can be much easier than memorizing “pi”!

## GUIDED EXPLORATION

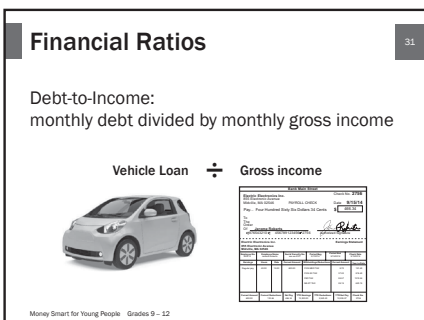
### Financial Ratios

20 MINUTES

Explain that lenders take a risk in lending money because there is always the chance that a borrower will be unable to repay the loan. To minimize risk and ensure a borrower is equipped to repay debt, lenders analyze and consider many different components before deciding to lend money to a borrower, including financial ratios.

**MONEY SMART TIP!**  
Connect back to Lesson 7, *Capacity, Character, Collateral, Capital*, and Lesson 8, *The Almighty Dollar?*, for more information on credit risks and lenders.

Display the **Financial Ratios** slides and explain how each of the ratios work, using examples of your own or those provided below.



**Debt-to-Income** measures your monthly debt payments against your monthly gross income. To calculate, you divide your monthly debt by your monthly gross income. For example: if you pay \$200 each month for a vehicle loan and \$1,000 each month for a home loan, your total debt payment each month is \$1,200 (\$200 + \$1,000). If your monthly gross income is \$4,000, then your debt-to-income ratio is 30 percent (\$1,200 ÷ \$4,000). A high debt-to-income ratio signals to lenders that a borrower may struggle to meet monthly repayments.


### MONEY SMART TIP!

Connect back to Lesson 6, *Bread-and-Butter*, and remind students that gross income is your total income before deductions and that net is your total income after deductions.

**Financial Ratios** 32

**Debt-to-Assets:** liabilities divided by assets  
Liabilities are money owed, or debt obligations  
Assets are items of value that can be converted into cash

Liability ÷ Asset




Money Smart for Young People Grades 9 – 12

▪ **Debt-to-Assets** measures the amount of money owed (**liabilities** like a vehicle loan or student loan) to items that are of value (**assets** like property owned, savings accounts, retirement savings). To calculate, you divide your total liabilities by your total assets. For example: if you own a home that is worth \$200,000 (asset), but you have a mortgage of \$50,000 left on the home (liability), your debt-to-asset ratio is 25 percent ( $\$50,000 \div \$200,000 = 0.25$  or 25%). The higher the percentage, the greater the level of risk.

**Financial Ratios** 33

**Debt-to-Limits:**  
credit debt divided by credit limit



Money Smart for Young People Grades 9 – 12

▪ **Debt-to-Limit** measures the amount of credit debt to your credit limit. To calculate, divide your total credit card balance by the credit limit available to you. For example: if you currently have a balance of \$500 on a credit card with a credit limit of \$3,000, your debt-to-limit ratio is 16 percent ( $\$500 \div \$3,000 = 0.16$  or 16%). Your debt-to-limit ratio, also called **credit utilization**, is used to calculate your credit score. The debt-to-limit should be at least 30 percent of the credit card limit, and not exceed 50 percent of the limit.

### Grade-Level Modifications:

**Beginner:** Have students first focus only on debt-to-income ratios. When students have mastered calculating that, then introduce debt-to-assets and debt-to-limit.

**Advanced:** Scale student learning by introducing additional financial ratios and expanding the discussion to include ratios applicable to businesses, such as return-on-assets, debt-to-equity, and inventory turnover ratios.

### MONEY SMART TIP!

Connect back to Lesson 7, *Capacity, Character, Collateral, Capital*, and Lesson 8, *The Almighty Dollar?*, for more information on credit reports and credit scores.

Next, distribute the *Financial Ratios* handout and work through the sample problems together as a class. Ask students to share their ideas on why financial ratios are important to understand. Help students understand that financial ratios are a representation of financial behavior and can determine items like credit score and the ability to borrow money.

## INDEPENDENT EXPLORATION

### Ratios in Action

20 MINUTES

**Note:** These activities are more independent than the Guided Exploration activities and may be used as homework assignments, collaborative group work, or independent study.

Distribute the **Ratios Race** handout and divide the class into small groups.

Explain that the activity is a race to see which group can come up with the correct financial ratios first to solve each of the problems. Give students time to get settled into their groups and then signal the start of the competition.

When the first group to answer all of the financial ratios is done, have that group explain to the class its answers, and discuss each of the scenarios. If there are dissenters, encourage groups to debate the scenarios and share with the class the correct answers from the answer key.

## WRAP UP

### Why Ratios?

5 MINUTES

Close the lesson by having students reflect on how financial ratios are connected to our financial behaviors. Ask students: *Why are financial ratios important for us to understand? How do they influence your ability to borrow?*

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## Extended Exploration

**Note:** Use the following ideas to extend financial literacy concepts throughout the school year within core content areas through English Language Arts, Math, Social Studies and Economics, and Technology activities, projects, and discussions. Duration of activities will vary.

### ENGLISH LANGUAGE ARTS

#### Writing Prompts:

*What is an ideal balance of debt to income?* Explain your position and disprove opposing viewpoints.

*How does one use credit wisely?* Describe three ways to responsibly manage credit, such as not using all available credit, not carrying a balance on a credit card, and paying all bills in full and on time.

#### Suggested Readings:

*What Is Debt-to-Income Ratio?* Explore reasons why understanding your debt-to-income ratio is important to overall financial health.  
[www.consumerfinance.gov/askcfpb/1791/what-debt-income-ratio-why-43-debt-income-ratio-important.html](http://www.consumerfinance.gov/askcfpb/1791/what-debt-income-ratio-why-43-debt-income-ratio-important.html)

*Analyze Your Debt-to-Limit Ratio:* Read about how to analyze your debt-to-limit ratio and why it is important to understand.  
<http://finance.yahoo.com/news/analyze-debt-credit-limit-ratio-171100241.html>

## MATHEMATICS

### Activity/Project Ideas:

Have students practice applying financial ratios based on both consumer and business examples. For instance, have students calculate several businesses' debt-to-assets ratios and compare and contrast results. For example: if a company has \$10 million in assets and \$2 million in debt, what is the debt-to-asset ratio? What if the reverse were true, and a company had \$2 million in assets and \$10 million in debt?

## SOCIAL STUDIES AND ECONOMICS

### Discussion Topics:

Ask students to reflect and discuss how financial ratios apply to businesses, large and small. Have students compare the value of financial ratios from consumer use to business applications. For example: ratios provide a snapshot of financial behaviors for both consumers and businesses and this snapshot can be vital in showing investors how a business manages finances, credit, and potential growth.

Discuss the role government plays in regulating credit cards and how this affects consumers' debt-to-limit ratios.

### Activity/Project Ideas:

Have students research several different public companies and assess their financials such as debt and equity. Challenge students to apply the financial ratios and discuss how businesses use financial ratios to determine borrowing and spending capabilities.

## TECHNOLOGY

### Online Resources:

Debt-to-Assets Ratio Calculator: An online calculator that calculates debt-to-assets ratios.

**[www.calculatorpro.com/calculator/debt-to-assets-ratio-calculator](http://www.calculatorpro.com/calculator/debt-to-assets-ratio-calculator)**

Debt-to-Income Calculator: An online calculator that calculates debt-to-income ratio.

**[www.zillow.com/mortgage-calculator/debt-to-income-calculator](http://www.zillow.com/mortgage-calculator/debt-to-income-calculator)**

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# Answer Key

## Student Handout 1:

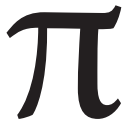
### *Financial Ratios*

1. What is Ishaan's total debt? \$1,330  
What is his gross income? **\$2,500**  
What is his debt-to-income ratio? **53%**
2. How much are Stephanie's total liabilities? \$5,500  
How much are her assets? **\$9,500**  
What is her debt-to-assets ratio? **57%**
3. What is Avni's credit limit? \$5,000  
What is her debt? **\$2,000**  
What is her debt-to-limits ratio? **40%**

## Student Handout 2:

### *Ratios Race*

1. James, 18 years old  
What ratio should James use? **Debt-to-assets ratio**  
What is James's ratio percentage: **33%**
2. Elizabeth, 28 years old  
What ratio should Elizabeth use? **Debt-to-income ratio**  
What is Elizabeth's ratio percentage: **42%**
3. Michael, 23 years old  
What ratio should Michael use? **Debt-to-limits ratio**  
What is Michael's ratio percentage: **10%**



## Lesson 9: Easy as Pi FINANCIAL RATIOS

Name: \_\_\_\_\_

Read each scenario and apply the appropriate financial ratio.

**1. Debt-to-Income:** monthly debt divided by monthly gross income

Ishaan has a monthly mortgage payment of \$800, one credit card at \$200 a month, a second credit card at \$80 a month, and a vehicle loan for \$250 a month. His income is \$2,500 each month before taxes.

What is Ishaan's total debt?

What is his income?

What is his Debt-to-Income ratio?

**2. Debt-to-Assets:** liabilities divided by assets

Stephanie recently took out a loan for \$5,500 to help pay for a new-used vehicle. The vehicle is worth \$9,500.

How much are Stephanie's total liabilities?

How much are her assets?

What is her Debt-to-Assets ratio?

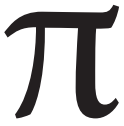
**3. Debt-to-Limits:** credit debt divided by credit limit

Avni has a credit card with a \$5,000 credit limit. She currently has a balance of \$2,000 on the card.

What is Avni's credit limit?

What is her debt?

What is her Debt-to-Limits ratio?



## Lesson 9: Easy as Pi RATIOS RACE

Name: \_\_\_\_\_

Working with your small group, be the first team to correctly solve the financial ratio problems below. Remember — the financial ratios to choose from are debt-to-income, debt-to-assets, and debt-to-limits. Ready, set, race!

### 1. James, 18 years old:

"I bought my first truck last year and it's great. It's so much easier to get to school and work now. I did have to borrow money, though, because I only had \$3,000 saved up and the truck cost \$5,000. I just checked online to see how much my truck is worth today, and it's dropped a little in value. If I sold it right now, it's worth \$4,500. I still have \$1,500 left on my loan, though. I'm wondering how I can measure my loan to the value of my truck. What do you think...which ratio should I calculate?"

*What ratio should James use?*

*What is James's ratio percentage?*

### 2. Elizabeth, 28 years old

"I haven't been very good about managing my debt, and I'm trying to figure out how my debt relates to my income. I have four different credit cards right now but I really want to pay them all off soon. For now, though, I'm making monthly payments of \$50 on one, \$200 on another, \$25 on a third, and \$175 on the fourth. I also own a home, and my mortgage is another \$900 a month. I earn \$3,200 each month before taxes. Can you help me figure out what financial ratio to use?"

*What ratio should Elizabeth use?*

*What is Elizabeth's ratio percentage?*

### 3. Michael, 23 years old

"I want to purchase a home someday, so I'm making sure my credit score is in good shape. I have a credit card that I can spend up to \$1,000 on but I only have a balance of \$100. What financial ratio would help me? Do the math...what's my percentage?"

*What ratio should Michael use?*

*What is Michael's ratio percentage?*