

Math TODAY™ Challenge Student Edition



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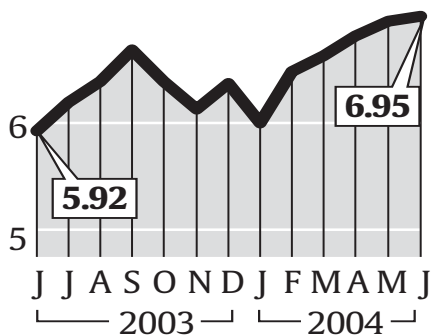
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Home sales records

Home sales records

Home sales and prices reached new levels in June. Existing home sales, seasonally adjusted at an annual rate.

(in millions):



Source: National Association of Realtors

By Karl Gelles, USA TODAY

Activity Overview:

Many young people choose to purchase a house rather than rent a house. This usually requires them to take out a loan. In this activity, you will explore the monthly expense for a home mortgage for different loan amounts and the total amount paid over a 30-year and 15-year repayment plan. Finally, you will examine the monthly payment and total amount paid for a 30-year and 15-year loan for a fixed amount at the same interest rate. You will use a spreadsheet format to draw conclusions about both a 30-year and a 15-year plan.

Focus Questions:

- How much does it cost per month to pay back a home mortgage?
- How much do you actually pay for a house when you take out a loan?
- What is the ratio of a 30-year total amount paid to the loan amount? What is the ratio of the 15-year total amount paid to the loan amount?
- Suppose the monthly payments for a 30-year and a 15-year loan are determined using the same interest rate. How will the monthly payments for the 30-year loan compare to the 15-year loan? How will the total amount paid for a 30-year loan compare to the total amount paid for the 15-year loan?

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Home sales records



Home sales boom 2.1% to record in June

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From staff and wire reports

WASHINGTON -- Sales and prices of previously owned homes jumped to records in June as home buyers rushed to take advantage of low mortgage rates, a trade association said Monday.

Sales of existing homes rose 2.1% to a seasonally adjusted annual rate of 6.95 million units in June from a 6.81 million unit pace in May, the National Association of Realtors said.

The national median home price rose to \$191,800 in June, up from \$182,400 in May. The June price was up 9.6% from the same month a year ago and was the highest on record.

The median is where half of the prices fall above and half fall below.

"Mortgage rates are starting to go up, and people who had been waffling about buying a house are deciding they had better jump on board before the ship leaves the dock," Standard & Poor's chief economist David Wyss said.

U.S. mortgage interest rates are not far above historic lows. But they are expected to track higher this year as the

economy gains strength and the Federal Reserve raises its target for short-term interest rates, which influences borrowing costs economywide.

The average rate for a 30-year, fixed-rate mortgage was 5.98% for the week ended July 22, up from the record low of 5.23% hit in June 2003, according to Freddie Mac.

Fed officials raised interest rates at the end of June for the first time in four years. The target is now 1.25%, a quarter-percentage point above the decades-low rate hit in 2003. The Fed is widely expected to raise rates by another quarter-percentage point at its next meeting, on Aug. 12, and to continue inching rates up throughout 2004 and into 2005.

Despite the jump in home values, many economists see little reason to fear that a national housing price bubble is forming.

They say that's because the economy is growing and adding jobs, developments that should sustain housing demand.

Federal Reserve Chairman Alan Greenspan has noted that increased immigration and high transaction costs for selling homes will also buoy the market.

"Right now the fundamentals don't suggest any housing bubble, not in general for the U.S. economy," Wachovia chief economist John Silvia says.

House price appreciation has varied regionally, he says. States with weak jobs markets, such as Pennsylvania, Ohio and Illinois, have experienced flat or declining home values. But places like the Washington, D.C., area have seen climbing home prices as expanded employment has drawn people to the area.

Existing home sales are recorded on the closing of the deal and reflect a purchase decision several weeks old. New home sales, which are noted before a builder breaks ground on a lot, are expected to show a dip when June data come out today.

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Procedure:

Activity 1

How much does it cost per month to pay back a home mortgage for the median priced home?

Step 1

Create a spreadsheet titled Payment using the CellSheet APP with the following nine column headings.

LA = Loan Amount

30IR = 30-yr interest rate

30MP = 30-yr monthly payment

30TAP = 30-yr total amount paid

15IR = 15-yr interest rate

15MP = 15-yr monthly payment

15TAP = 15-yr total amount paid

R30L = Ratio of 30-yr total to Loan Amount

R15L = Ratio of 15-yr total to Loan Amount

Use the formula below to determine the payment per month for a loan when you know the amount of the loan.

$$P = \frac{Ar}{1 - (1+r)^{-t}}$$

- P is the amount you will pay each month
- A is the total amount of the loan
- r is the interest rate per month, expressed as a decimal. If the rate is per year you will have to divide by 12.
- t is the number of time periods for payments, for a 30-year mortgage the number of time periods for payments is 30*12 or 360.

Step 2

Read the article "Home sales boom 2.1% to record in June" and find the national median price of a house in June and May 2004. Enter these values in the column titled LA.

Step 3

In the Money section of USA TODAY (Tuesday through Friday editions), find the table titled "Consumer rates" and look for the section titled "Mortgage rates." You will find interest rates for 30-year fixed and 15-year fixed for the previous day, 6 months ago, and a year ago.

Step 4

Enter the two rates, 30-year and 15-year, for the previous day in the appropriate columns in the spreadsheet.

Step 5

Calculate the remaining columns for the median priced houses found in Step 2 by completing the spreadsheet.

Data Source:

National Association of Realtors

Materials:

- TI-83 Plus family or TI-84 Plus family

Student Notes:

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Activity 2

How much do you actually pay for a house when you take out a loan using the median priced home?

Step 1

Use the spreadsheet you developed in Activity 1 to answer the question in Activity 2.

Step 2

The total amount paid on the \$182,400 house was _____ for 30 years and _____ for 15 years.

The total amount paid on the \$191,800 house was _____ for 30 years and _____ for 15 years.

Activity 3

What is the value for the ratio of a 30-year total amount paid to the loan amount? What is the value of the ratio of the 15-year total amount paid to the loan amount?

Step 1

Use the spreadsheet to complete Step 2 of Activity 3.

Step 2

Ratio for 30-year total amount paid to Loan Amount _____

Ratio for 15-year total amount paid to Loan Amount _____

Activity 4

Suppose the monthly payments for a 30-year and a 15-year loan are determined using the same interest rate. How will the monthly payments for the 30-year loan compare to the 15-year loan? How will the total amount paid for a 30-year loan compare to the total amount paid for the 15-year loan?

Student Notes:

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Reading the article:

1. According to the article the sales of existing homes rose at a seasonal adjusted rate of _____ in June 2004.
2. The national median price of a home rose to \$191,800 in June 2004, which is _____% above the same month a year ago.
3. What is the expectation for U.S. mortgage interest rates for this next year? What are the reasons given in the article for the expected change in the mortgage rates?

4. Why would a region's house prices might stay flat or decline?

5. Federal Reserve officials raised interest rates at the end of June 2004 and expect to do what at their August 2004 meeting and throughout 2004 and into 2005?
