Name: _____ Date: _____

The Extra Nine-Tenths of a Cent at the Pump

Circle group

Drive by a gas station. The sign may say $3.499 per gallon. That last digit is a tenth of a cent. No coin can pay it. So how does anyone pay a bill with it? The answer is rounding. The numbers show how small the extra piece is.

Say a driver pumps 8 gallons. The pump multiplies 8 by $3.499. That is $27.992. Money is paid in whole cents. So the amount is rounded to the nearest cent. The next digit is a 2. That is less than 5. So the total rounds down to $27.99. With 12 gallons, the answer is $41.988. This time the next digit is an 8. So the cents round up. The bill is $41.99.

Now think about a sign that said $3.50. Twelve gallons at $3.50 cost $42.00. That is just one cent more. A tenth of a cent per gallon is small. It adds up to about a penny for every ten gallons.

So why do it? Researchers who study shopping say people look at the first digits of a price most. A sign with $3.499 looks like the three-forty range. But it is almost $3.50. Knowing about rounding helps a driver see through this. Then the driver can compare stations by what a full tank really costs.

Questions

1. What is the last digit in $3.499 worth?

_____

_____

2. How is a total turned into an amount you can pay with coins?

_____

_____

3. What is the bill for 8 gallons at $3.499 per gallon?

_____

_____

4. Why does the bill for 12 gallons round up to $41.99?

_____

_____

5. About how much extra is a tenth of a cent per gallon?

_____

_____

6. Why might a station use $3.499 and not $3.50?

_____

_____

Words to know

rounding: changing a number to a nearby, simpler one
gallon: a unit used to measure liquids such as gasoline
multiplies: uses multiplication to find a product
researchers: people who study a subject to learn new facts

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Extra Nine-Tenths of a Cent at the Pump

Triangle group

Drive past a gas station and the sign may read $3.499 per gallon. That strange last digit is a tenth of a cent, a piece of money that no coin can pay, so how does anyone settle a bill that includes it? The answer is rounding, and the numbers show how little the extra piece actually matters.

Suppose a driver pumps 8 gallons. The pump multiplies 8 by $3.499 and gets $27.992, but money is paid in whole cents, so the amount is rounded to the nearest cent. The digit after the cents place is a 2, which is less than 5, so the total rounds down to $27.99. With 12 gallons, the product is $41.988. This time the next digit is an 8, so the cents round up, and the bill becomes $41.99.

Compare that with a sign that simply said $3.50. Twelve gallons at $3.50 would cost exactly $42.00, which is only one cent more than the real bill. A tenth of a cent per gallon is a tiny amount, and it accumulates to about a penny for every ten gallons that a customer buys.

If the difference is so small, why bother with it? Researchers who study shopping behavior have found that people tend to pay the most attention to the leftmost digits of a price. A sign showing $3.499 looks like a price in the three-forty range, even though it is nearly $3.50. Understanding rounding lets a driver see through that effect and compare stations by the real cost of filling a tank.

Questions

1. What is the last digit in a price like $3.499 worth?

_____

_____

2. How are totals changed into an amount that can be paid with coins?

_____

_____

3. What is the bill for 8 gallons at $3.499 per gallon?

_____

_____

4. Why does the bill for 12 gallons round up to $41.99?

_____

_____

5. About how much extra does a tenth of a cent per gallon add up to?

_____

_____

6. Why might stations use a price like $3.499 instead of $3.50?

_____

_____

Words to know

rounding: changing a number to a nearby, simpler one
gallon: a unit used to measure liquids such as gasoline
multiplies: uses multiplication to find a product
researchers: people who study a subject to learn new facts
leftmost: farthest to the left

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Extra Nine-Tenths of a Cent at the Pump

Square group

Drive past almost any gas station and the sign may advertise a price of $3.499 per gallon. That peculiar final digit represents a tenth of a cent, a fragment of money that no coin can actually pay. How, then, does anyone settle a bill that includes it? The answer is rounding, and the arithmetic demonstrates how little the extra fragment matters.

Suppose that a driver pumps 8 gallons. The pump multiplies 8 by $3.499 and arrives at $27.992. Because money is paid in whole cents, the amount is rounded to the nearest cent. The digit that follows the cents place is a 2, which is smaller than 5, so the total rounds downward to $27.99. With 12 gallons, the product is $41.988. On this occasion the next digit is an 8, so the cents round upward, and the bill comes to $41.99.

Compare that result with a sign that simply read $3.50. Twelve gallons at $3.50 would cost exactly $42.00, merely one cent more than the genuine bill. A tenth of a cent per gallon is a tiny amount, and it accumulates to roughly a penny for every ten gallons that are purchased.

If the difference is so negligible, why does anyone bother with it? Researchers who study shopping behavior have discovered that people tend to devote the most attention to the leftmost digits of a price. A sign showing $3.499 appears to be a price somewhere in the three-forty range, even though it is nearly $3.50. Understanding rounding allows a driver to see through that effect and to compare stations according to the real cost of filling a tank.

Questions

1. What does the final digit of a price such as $3.499 represent?

_____

_____

2. How is a total converted into an amount that can be paid with coins?

_____

_____

3. What is the bill for 8 gallons at $3.499 per gallon?

_____

_____

4. Why does the bill for 12 gallons round upward to $41.99?

_____

_____

5. Roughly how much extra does a tenth of a cent per gallon accumulate to?

_____

_____

6. Why might a station advertise $3.499 instead of $3.50?

_____

_____

Words to know

rounding: changing a number to a nearby, simpler one
gallon: a unit used to measure liquids such as gasoline
multiplies: uses multiplication to find a product
researchers: people who study a subject to learn new facts
leftmost: farthest to the left

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: The Extra Nine-Tenths of a Cent at the Pump

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: The Extra Nine-Tenths of a Cent at the Pump

Easier · 199 words · Flesch-Kincaid grade 1.6

1. A tenth of a cent.
2. It is rounded to the nearest cent.
3. $27.99.
4. The next digit is an 8, which is 5 or more, so the cents go up.
5. About a penny for every ten gallons.
6. People look at the first digits, so it seems like a lower price.

Triangle: The Extra Nine-Tenths of a Cent at the Pump

This passage · 241 words · Flesch-Kincaid grade 6.4

1. A tenth of a cent.
2. They are rounded to the nearest cent.
3. $27.99.
4. The digit after the cents place is an 8, which is 5 or more, so the cents round up.
5. About a penny for every ten gallons.
6. People notice the leftmost digits, so it looks like a lower price.

Square: The Extra Nine-Tenths of a Cent at the Pump

Harder · 254 words · Flesch-Kincaid grade 7.5

1. A tenth of a cent.
2. It is rounded to the nearest cent.
3. $27.99.
4. The digit after the cents place is an 8, which is 5 or greater, so the cents round upward.
5. Roughly a penny for every ten gallons purchased.
6. People pay the most attention to the leftmost digits, so the price appears lower.