

Math Challenge[®] Student Edition



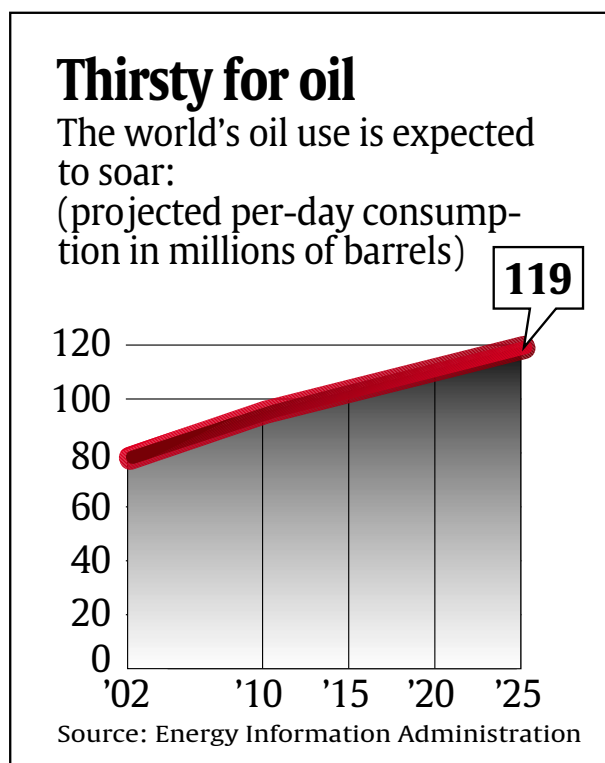
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Thirsty for oil



By Keith Simmons, USA TODAY

Activity Overview:

Using the USA TODAY Infograph "Thirsty for oil" you will find the area of a trapezoid and then apply this to determine the total number of gallons of oil for a given time period. When the total number of gallons has been determined, you will find the projected total expense for a given time period.

Focus Questions:

Q. How many total barrels of oil are expected to be consumed from 2002 through 2010?

Q. For the time period shown in the USA TODAY Infograph "Thirsty for oil," find the expected number of gallons of oil that will be consumed.

Q. If the price of a barrel of oil is \$63, what is the cost for 2002? For 2002 through 2010?

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This activity was created for use with
Texas Instruments handheld technology.

Thirsty for oil

Procedure:

Activity 1: You will explore the area of a trapezoid. Complete Activity 1 before answering the questions.

Step 1. Press \square and select Cabri Jr. and press \square .

Step 2. Press \perp (Y = button), select *Open...*, and press \square . Highlight **TRAP** and press \square . Look at the parallelogram ABEF. What is the length of the base of the parallelogram? What is the measure of the height of the parallelogram? What is the area of the parallelogram?

- Length of the parallelogram _____
- Height of the parallelogram _____
- Area of the parallelogram _____

Step 3. Press β and select Measure and Area. Use the arrow keys to move the pointer so that the ABEF is moving (dotted lines, solid arrow) and press \square to find the area. Move this value to the upper right corner of the screen. How does this value compare with your calculation from Step 2?

Step 4. Use b_1 for FH and DC, b_2 for ED and HA and h for AC and EG in each trapezoid.

- Write an expression for the length of the base of the parallelogram using b_1 and b_2 . _____
- Write an expression for the area of the parallelogram using b_1 , b_2 , and h. _____

Step 5. How does the area of each trapezoid compare to the area of the parallelogram?

Step 6. Use your answers from Steps 4-5 to write a formula for the area of each trapezoid.

Step 7. Making sure to exit the current tool, move the pointer (clear arrow) to H and press \square . Use the hand cursor to grab, move H and press \square . Move the pointer to D, press \square and use the hand cursor to grab and move D so that ED is equal to HA. Explain what happened to the area of the parallelogram as the values for FH, HA, ED, and DB change.

Step 8. Will your formula from Step 6 for the area of each trapezoid still be true?

Data Source:

Energy Information Administration

Materials:

- TI-83 Plus family or TI-84 Plus family
- Cabri™ Jr. Application

Additional Information:

Thirsty for oil

Procedure:

Activity 2: How many total barrels of oil are expected to be consumed from 2002 through 2010?

Step 1. (Use your formula for the area of a trapezoid from Activity 1 and the information from the USA TODAY Infograph “Thirsty for oil” to determine the total number of barrels of oil consumed during the time period from 2002 through 2010. To help with your calculation, assume there are 365 days in each year.) How many days are there 2002 through 2010, assuming that there are 365 days in each year.

Step 2. The region of the USA TODAY Infograph from 2002 through 2010 is in the shape of a trapezoid, use your formula to approximate the area of this region. What are the units for the vertical axis? _____

What are the units for the horizontal axis? _____

Step 3. The region of the USA TODAY Infograph from 2002 through 2010 is in the shape of a trapezoid, use your formula to approximate the area of this region. The approximate number of barrels of oil for 2010 is 93 million per day. What is the total number of barrels of oil estimated to be consumed in 2010?

Activity 3: For the time period shown in the USA TODAY Infograph “Thirsty for oil,” find the expected number of barrels of oil that will be consumed.

Step 1. Repeat the procedure from Steps 1–3 to find the expected number of barrels of oil for 2002 through 2025.

Activity 4: If the price per barrel of oil is \$63, what is the cost for 2002? For 2002 through 2010?

Step 1. Look at the USA TODAY Infograph to determine the number of barrels of oil consumed for 2002.

Barrels for 2002: _____

Step 2. Using the price of \$63/barrel, what is the cost for 2002?

Student Notes: