

11-1 Utility Expenses

ADVANCED FINANCIAL ALGEBRA



Utilities include gas, water, electricity, phone, trash, cable, internet, etc.

- ▶ Meters on your house measure your gas (cubic feet), water (cubic feet or ccf), and electricity (kilowatt hours-kwh) usage and you are charged accordingly.

Example #1 - water meter

- ▶ Tom's October water bill had two meter readings. Beginning reading was 3,128 ccf and ending was 3,141 ccf. How much water did his household use?
- ▶ SOLUTION:
- ▶ $3,141 - 3,128 = \underline{13 \text{ cubic feet of water}}$



Example #2 – electric meter

Janet works for a utility company and is reading the Saevitzs' household electric meter. What is the reading?



0 9 5 5 1

- ▶ Read the lesser (smaller) number, unless the indicator is between 9 and 0. Then read it as 9.
- ▶ **9,551 kwh of electricity**

Example #3 – electricity costs

- ▶ A certain electric mixer requires 125 watts. How much would it cost to run the mixer for a total of 90 minutes at a cost of \$0.10 per kilowatt-hour?

Handwritten calculation showing the steps to find the cost of running an electric mixer:

$$\begin{aligned} 90 \text{ minutes} &= 1.5 \text{ hours} \\ 125 \text{ watts} \times 1.5 \text{ hours} &= 187.5 \text{ Watt hours} \\ \frac{187.5 \text{ watt-hours}}{1000 \text{ watt-hours}} &= \frac{187.5}{1000} \\ &= 0.1875 \text{ kWh} \\ &\times \$0.10 \\ \hline &= \$0.1875 \end{aligned}$$

Final result: $\$0.1875 \approx 2\text{¢}$

Example #5 – energy saving appliance

- ▶ Energy-saving appliances often pay for themselves. This means that the savings in energy usage can equal, or offset, the cost of the item after a certain number of years. The Thomsons' old water heater cost them \$455 per year to run. The new one they purchased for \$1,240 will save them 31% annually in energy costs to run it. In how many years will it pay for itself?

Handwritten calculations on a piece of paper:

$$455 \times 0.31 = \overset{\text{save}}{\$141.05} \text{ per year}$$
$$1240 \div 141.05 \approx 8.791 \text{ years to pay for itself}$$

they should buy it if they plan to stay in house ≥ 9 years

Assignment: pg 665 #2 – 6 all, 10, 17, start budget project spreadsheet

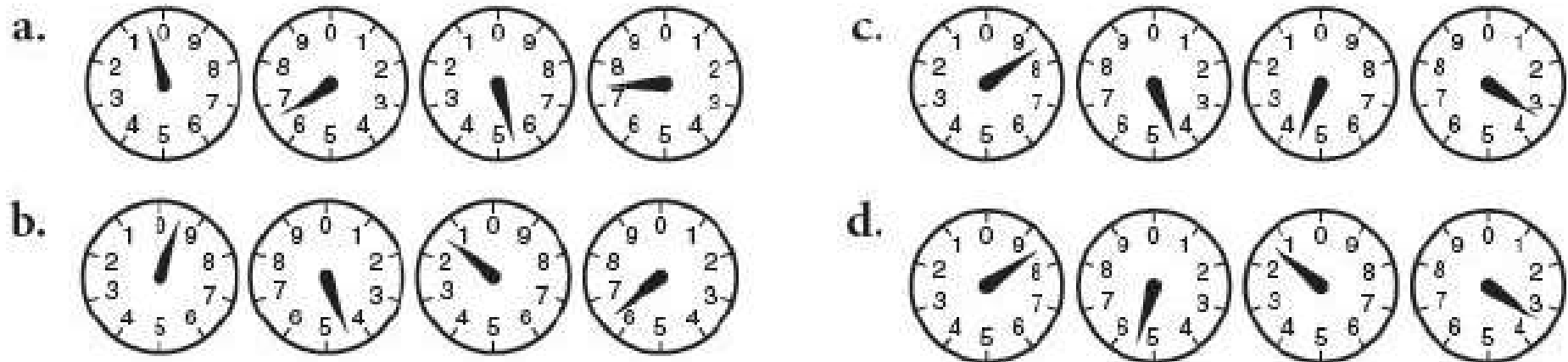
▶ 2)

Emily's last water bill listed a previous reading of 7,123 ccf and a present reading of 7,171 ccf. Her water company charges \$0.73 per ccf of water. What should Emily have been charged on her water bill?

▶ 3)

▶

What is the meter reading, in ccf, indicated by each of the gas meters shown?



Assignment: pg 665 #2 – 6 all, 10, 17, start budget project spreadsheet (cont.)

Bill Heckle's last electric bill is shown below.

▶ 4)

WATTCO LIGHTING CORPORATION						
FOR SERVICES TO:	Bill Heckle 12 Cavern St. Linwood, KS 66052		ACCOUNT NUMBER		8761-21	
			BILL DATE		AUG 11	
SERVICE	SERVICE PERIOD		METER READING		USAGE	AMOUNT
	FROM	TO	PREVIOUS	PRESENT		
ELECTRIC	JUL 3	AUG 4	21,780	24,100	2,320	\$255.20

a. What was the previous reading?

b. What is the present reading?

c. How many kilowatt-hours of electricity did Bill use during the service period shown?

d. What did Wattco charge per kilowatt-hour of electricity?

e. The bill covers 31 days of electric use. What was Bill's average daily expense for electricity for this service period? Round to the nearest cent.

Assignment: pg 665 #2 – 6 all, 10, 17, start budget project spreadsheet (cont.)

▶ 5)

Home heating oil is sold by the gallon. Last winter, the Romano family used 370 gallons of oil at a price of \$2.56 per gallon. If the price increases 9% next year, what will their approximate heating expense be? Round to the nearest ten dollars.

▶ 6)

The PA system at North High School requires 400 watts when it is switched on. How much would it cost to run for 3 hours, at a cost of \$0.10 per kilowatt-hour? Round to the nearest cent.

Assignment: pg 665 #2 – 6 all, 10, 17, start budget project spreadsheet (cont.)

▶ 10)

Jessica's parents are always telling her to turn off the lights when she leaves her room. The fixture in Jessica's room requires four bulbs that each use 75 watts of electricity when they're on.

a. Jessica's parents estimate that she leaves the lights on unnecessarily for 2.5 hours per day. How many watt-hours of electricity are used by these bulbs during 2.5 hours?

b. Approximately how many kilowatt-hours of electricity are used in a year to keep these bulbs lit for 2.5 hours per day?

c. At a cost of \$0.12 per kilowatt-hour, how much money is wasted per year by keeping these lights on unnecessarily? Round to the nearest dollar.

d. If five million people keep lights on as Jessica does, how much is wasted in unnecessary electric expenses?

Assignment: pg 665 #2 – 6 all, 10, 17, start budget project spreadsheet (cont.)

▶ 17)

A large appliance such as a water heater is only running when it has clicked on and is actually heating water. The time your water heater is on varies according to how much you use hot water—do laundry, take showers, run the dishwasher. The national average is 3 hours per day.

a. If a water heater uses 4,200 watts, find the daily cost of running it at a cost of \$0.11 per kilowatt-hour. Round to the nearest ten cents.

b. Find the annual cost of running the water heater to the nearest ten dollars.

c. A certain energy-saving water heater sells for \$1,100. It will save 36% in energy costs per year compared to the water heater from parts a and b. What will be the approximate annual cost of running this water heater? Round to the nearest ten dollars.

d. In how many years will the new water heater “pay for itself”?