REUSE, RECYCLE, RENOVATE

Recouping the Costs: Billing Renters for Electrical Services

Remember...

- voltage is typically 110 volts or 240 volts;
- most circuits are rated for 15 amps and handle 1725 watts; and
- circuit breakers are installed in the electrical box to prevent too much current on the circuit.

1. One wing of the building needs 4 circuits for one renter and 7 circuits for a second renter. The total cost for the circuits is $2200. Write and solve an algebraic equation to find the cost for one circuit.

$4x + 7x = 2200$ $11x = 2200$ $x = 200$

2. Another renter will need 9 circuits. The section already has 5 circuits. The additional circuits cost $480. Write and solve an algebraic equation to find the cost for each additional circuit.

$(9 - 5)x = 480$ $4x = 480$ $x = 120$

3. The third wing needs 11 breaker panel sets. Each set contains a panel and a set number of breakers. There will be a total of 11 panels and 264 breakers. The breakers are distributed evenly across the panels. Write and solve an algebraic equation to find how many breakers are on each panel.

11 (1 panel + x breakers) = 11 panels + 264 breakers
11 panels + 11x breakers = 11 panels + 264 breakers
11x breakers = 264 breakers
x = 24 breakers

4. The fourth wing needs 9 panels and 180 breakers. This is 9 breaker panel sets. Write and solve an algebraic equation to find how many breakers are on each panel.

9 panel + 180 breakers = 9 sets
9 panels + 180 breakers = 9 (1 panel + x breakers)
9 panels + 180 breakers = 9 panels + 9x breakers
180 breakers = 9x breakers
20 breakers = x

5. A wing has 7 circuits for one renter and 4 circuits for another renter. The total cost of the circuits for the wing is $2200. How much does each circuit cost? Solve arithmetically and explain how your approach is different from the approach used to solve question 1.

7 + 4 = 11
2200 ÷ 11
(same steps but without variable)

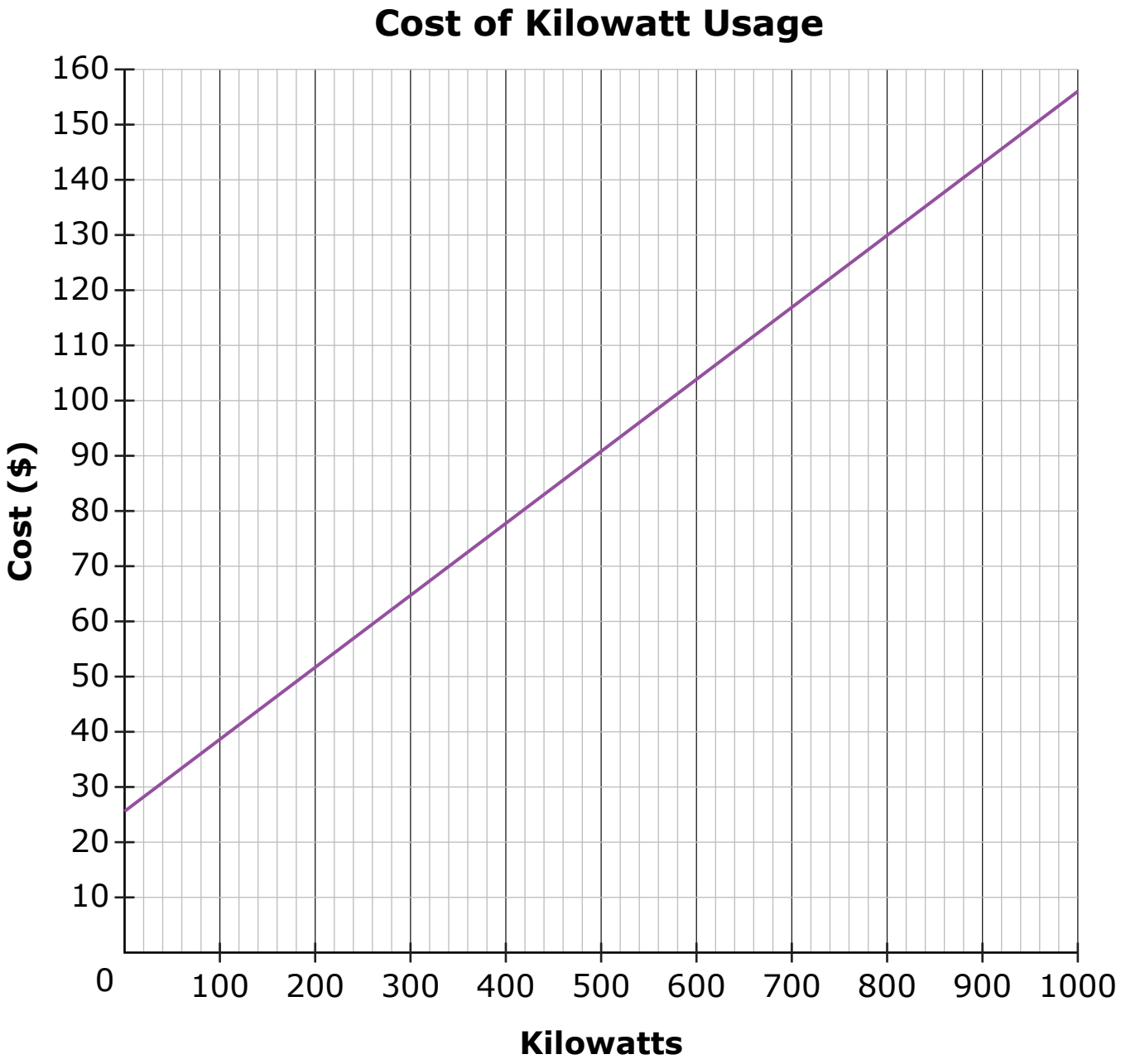
6. For customers who use less than 1000 kilowatts of electricity, the electric company charges $26.06 for each account plus $0.13 per kilowatt. The company also charges $5.85 per meter. Write an algebraic inequality to show the cost for this bill.

$26.06 + $5.85 + $0.13K < $161.91

7. The electric company charges $26.06 per month and $0.13 per kilowatt used. Maximum usage for one office is less than 1000 kilowatts. Write an algebraic inequality expressing the monthly cost of electricity for one office.

cost = $0.13K + $26.06

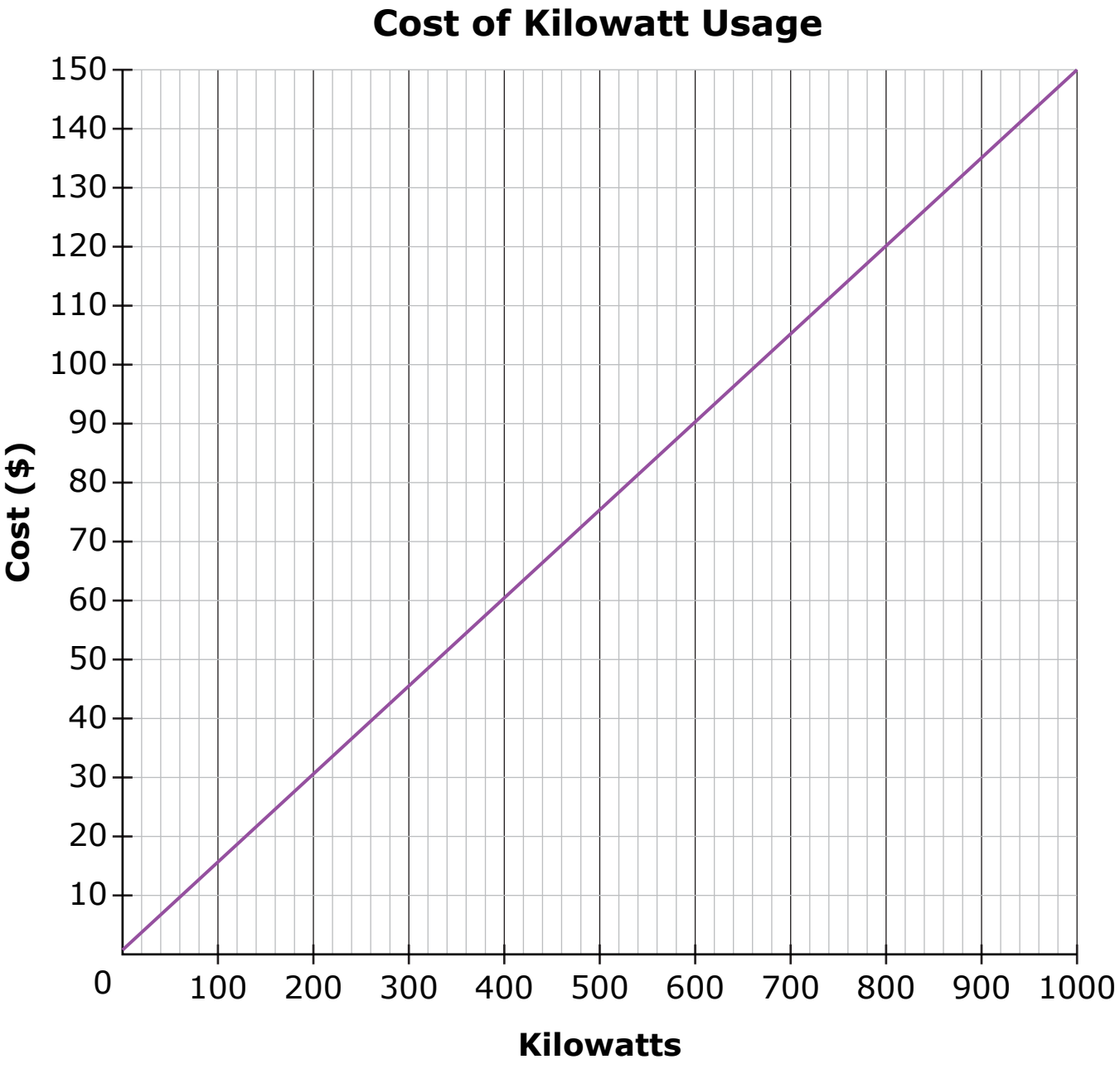
Graph the cost of 0 to 1000 kilowatt-usage.



8. The county pays a flat rate of $0.15 per kilowatt used. Write an algebraic equation to show the monthly cost of electricity for the county.

Cost = $0.15K

Graph the cost of 0 to 1000 kilowatt-usage.



9. Bill and Sue are installing electrical boxes in 8 of the Wing 4 offices. Sue averages 8 boxes per hour and Bill averages 10 boxes per hour. If Wing 4 requires 6 boxes per office, how long will it take Bill and Sue together to finish wiring Wing #4? Round to next hour for billing purposes.

$8H + 10H = 6 \times 8$
$18H = 48$
$H = 2\ 2/3$ hours, so will bill for 3 hours

10. The conference area needs new ceiling fans. The installation company charges $246 for one fan and $98 per hour for installation. The company estimates the cost as $785 per fan. Based on the estimate, how long does it take to install one fan?

$\$246 + \$98H = \$785$
$\$98H = \$539$
$H = 5.5$ hours

11. Some offices will need a computer hub for Wi-Fi. Sue can install 3 hubs per day and Bill can install 2 hubs per day. The project needs a total of 20 hubs. What fraction of the hubs will Sue complete per day? What fraction of the hubs will Bill complete per day? Use the fractions to write and solve an equation to find how long it will take Sue and Bill working together to install the hubs.

Sue = 3/20 per day
Bill = 2/20 or 1/10 per day
$3/20D + 2/20D = 1$
$5/20D = 1$
$D = 20/5$
$D = 4$ days

12. Write and solve an algebraic equation to find how many kilowatts must be used each month for cost to be the same for the renter as for the county.

$\$0.15K = \$0.13K + 26.06$ $0.02K = 26.06$ $K = 1303$

13. If the county pays the electric bill, how much should the county charge renters to cover the cost of 1000 kilowatts? Write and solve an equation to show the cost.

$\$0.15 \times 1000 = \$150.00$

