

# WRITING PIECEWISE FUNCTIONS

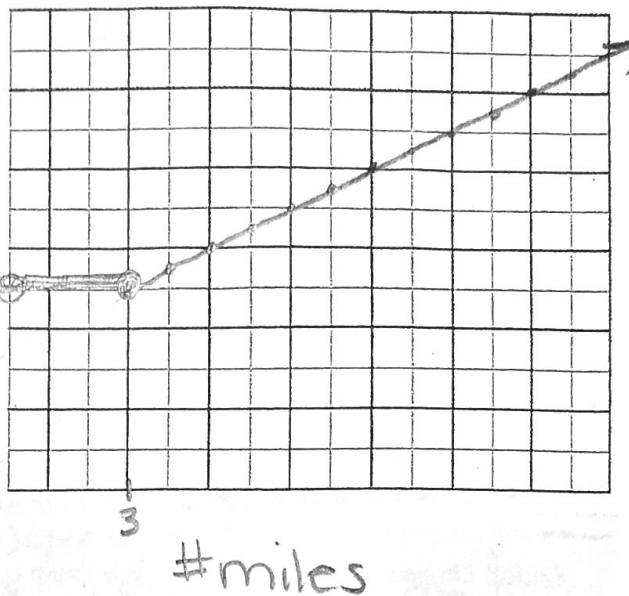
Key

For each, write a piecewise function to represent the situation. Be sure to define the variable first. Provide a graph when the graph paper is present.

1. A taxi charges \$5 minimum to ride up to 3 miles and then charges \$0.50 for each mile beyond 3. Represent the total cost.

$x = \# \text{ miles}$

$$f(x) = \begin{cases} 5, & 0 < x \leq 3 \\ 5 + .5(x-3), & x > 3 \\ \text{or} \\ .5x + 3.5 \end{cases}$$



- 2.) A store charges \$15 per t-shirt for orders of 50 or fewer t-shirts, \$13.50 per t-shirt for orders of more than 50 t-shirts but less than or equal to 75 t-shirts, and \$12.50 per t-shirt for orders of more than 75 t-shirts. Represent the total cost.

$x = \# \text{ shirts}$

$$f(x) = \begin{cases} 15x, & 0 < x \leq 50 \\ 13.50x, & 50 < x \leq 75 \\ 12.50x, & x > 75 \end{cases}$$

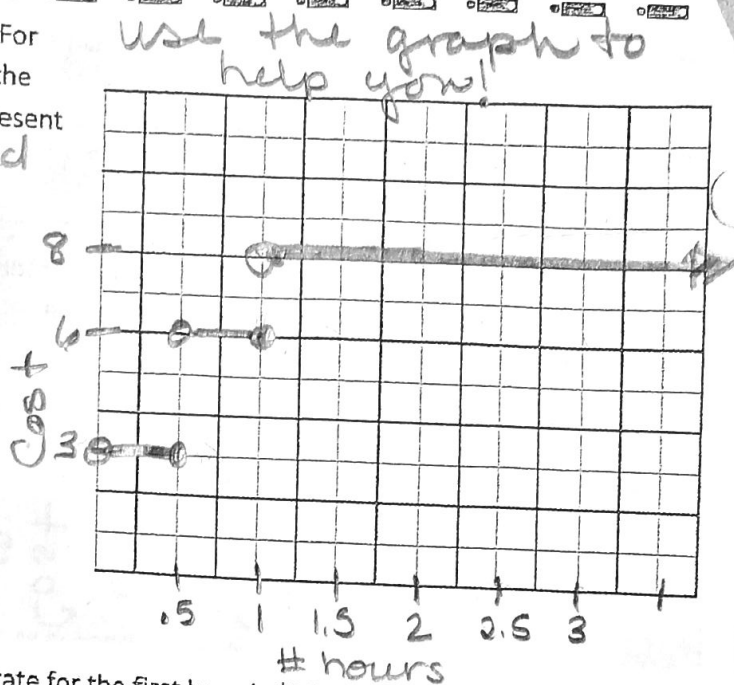
- 3.) The postal service charges \$1.95 for a package up to 4 ounces and \$0.17 for each additional ounce up to 13 ounces. Represent the total cost.

$x = \text{weight (ounces)}$

$$f(x) = \begin{cases} 1.95, & 0 < x \leq 4 \\ 1.95 + .17(x-4), & 4 < x \leq 13 \\ \text{or} \\ .17x + 1.27 \end{cases}$$

4. A parking garage charges \$3 per half hour to park. For each additional half hour (or portion of half hour), the charge is an additional \$3 until you reach \$8. Represent the total cost.  $x = \# \text{ hours parked}$

$$f(x) = \begin{cases} 3, & 0 < x \leq .5 \\ 6, & .5 < x \leq 1 \\ 8, & x > 1 \end{cases}$$



5. A horseback riding stable charges by the hour. The rate for the first hour is \$25, each hour or portion of an hour thereafter costs an additional \$15.00. There is a four hour maximum. If you keep the horse out more than 5 hours, the price increases by \$50 an hour. Represent cost per hour then rewrite representing total cost.  $x = \# \text{ hours}$

$$f(x) = \begin{cases} 25, & 0 < x \leq 1 \\ 25 + 15 \lceil x - 1 \rceil, & 1 < x \leq 5 \\ 85 + 50 \lceil x - 5 \rceil, & x > 5 \end{cases}$$

round up (ceiling function)

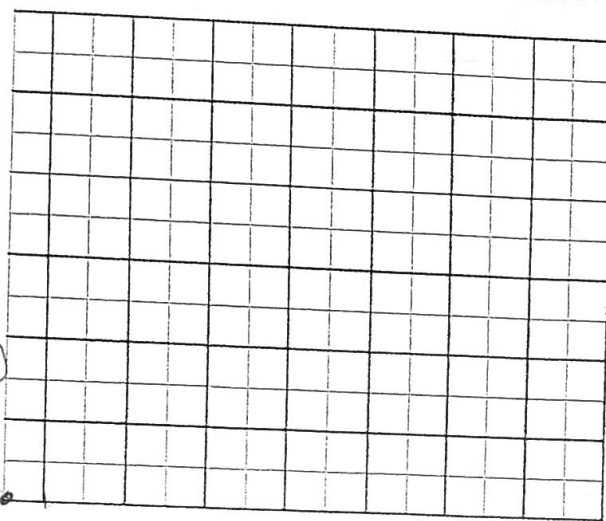
$$f(x) = \begin{cases} 25, & 0 < x \leq 1 \\ 15 \lceil x \rceil + 10, & 1 < x \leq 5 \\ 50 \lceil x \rceil - 165, & x > 5 \end{cases}$$

simplified

6. A school club is looking to buy t-shirts to sell. After much investigating, the club found a company that offered a discount based on quantity orders. T-shirts cost \$11 each for orders less than 10. Orders of 10 or more but less than 25 are \$9 per t-shirt, orders of 25 or more but less than 50 are \$6.50, and orders of 50 or more are \$5.50 each. Represent total cost.

$$f(x) = \begin{cases} 11x, & 0 < x < 10 \\ 9x, & 10 \leq x < 25 \\ 6.50x, & 25 \leq x < 50 \\ 5.50x, & x \geq 50 \end{cases}$$

(10, 90) (25, 225)



How many shirts should I order if I need 9 t-shirts?

Home Depot charges \$20 a day plus \$0.15 per mile to rent a pick-up truck. Home Depot offers a discount of \$0.05 a mile if you drive over 10 miles a day. Or they offer a discount of \$0.10 a mile if you drive over 20 miles a day. Represent total cost. # miles per day

$$f(x) = \begin{cases} 20 + .15x, & 0 < x \leq 10 \\ 20 + .10x, & 10 < x \leq 20 \\ 20 + .05x, & x > 20 \end{cases}$$

8. You have a summer job that pays time and a half for overtime. That is, if you work more than 40 hours per week, your hourly wage for the extra hours is 1.5 times your normal hourly wage of \$7. Represent total wage.  $x = \# \text{hours}$

$$f(x) = \begin{cases} 7x & 0 \leq x \leq 40 \\ 280 + 10.50(x-40) & x > 40 \end{cases}$$

How much will you get paid if you work 45 hours?

\$332.50

9. The pay structure at a parking garage is \$3 per hour for the first 4 hours. For any number of hours parked after 4 hours, it costs \$2 per hour to park. Represent total cost.  $x = \# \text{hours}$

$$f(x) = \begin{cases} 3x, & 0 < x \leq 4 \\ 12 + 2(x-4), & x > 4 \end{cases}$$

10. The function below shows the week day parking charges of a parking lot. Describe the scenario if  $x$  represents the number of hours parked.

$$f(x) = \begin{cases} 5x, & x \leq 3 \\ 10, & x > 3 \end{cases}$$

cost 5\$ per hour for the first 3 hours, then a flat \$10 if you park for over 3 hours... Hmm this sucks if you park for 2.5 hours.



