3.3 Day 2 Notes Name_____

Choosing a reasonable domain and range

Starter: Dalton has already earned $270 by mowing lawns this summer and earns $30 for each additional lawn he mows.

A. Write a function, f(x), for the total amount of money he earns by mowing lawns.

$f(x) = 270 + 30x$

B. Find f(3) and interpret the meaning of this.

$f(3) = 270 + 30(3)$
$= 270 + 90$
$= 360$

After mowing 3 more lawns, he has $360

C. Dalton's parents will let him mow no more than 6 lawns this fall. What is the domain of f(x) then?

$\{0, 1, 2, 3, 4, 5, 6\}$

D. Given the domain you found in C, what is the range?

$f(0) = 270$
$f(1) = 300$
$f(2) = 330$
$f(3) = 360$
$f(4) = 390$
$f(5) = 420$
$f(6) = 450$

$\{270, 300, 330, 360, 390, 420, 450\}$

When a function describes a real-world situation, every real number is <u>not</u> always a reasonable choice for the domain and range. For example, a number representing the length of an object cannot be negative, and only whole numbers can represent a number of people. What you found in the problem above is the <u>reasonable domain and range</u> for the context of the problem.

Write a function in function notation for each situation. Find a reasonable domain and range for each function.

1. Manuel has already sold $20 worth of tickets to the school play. He has 4 tickets left to sell at $2.50 per ticket. Write a function for the <u>total amount collected from ticket sales</u>.

x = # of tickets sold
$f(x) = 20 + 2.5x$

Domain $\{0, 1, 2, 3, 4\}$
Range $\{20, 22.5, 25, 27.5, 30\}$

$f(0) = 20 + 2.5(0) = 20$
$f(1) = 20 + 2.5(1) = 22.50$
$f(2) = 20 + 2.5(2) = 25$
$f(3) = 20 + 2.5(3) = 27.50$
$f(4) = 20 + 2.5(4) = 30$

2. The temperature early in the morning is 17 °C. The temperature increases by 2 °C for every hour for the next 5 hours. Write a function for the temperature in degrees Celsius.

x = # of hours
$f(x) = 17 + 2x$

Domain $\{0, 1, 2, 3, 4, 5\}$
Range $\{17, 19, 21, 23, 25, 27\}$

$f(0) = 17 + 2(0) = 17$
$f(1) = 17 + 2(1) = 19$
$f(2) = 17 + 2(2) = 21$
$f(3) = 17 + 2(3) = 23$
$f(4) = 17 + 2(4) = 25$
$f(5) = 17 + 2(5) = 27$

3. The equipment needed to produce DVD's costs Katy $2500, while the cost to make each individual DVD is just $1.25. On her first run, Katy only wants to make 7 DVDs. Write a function for the cost to produce DVD's and determine a reasonable domain and range.

x = # of DVD's
$f(x) = 2500 + 1.25x$

Domain $\{0, 1, 2, 3, 4, 5, 6, 7\}$
Range $\{2500, 2501.25, 2502.50, 2503.75, 2505, 2506.25, 2507.50, 2508.75\}$

4. Sophie works in a jewelry store. She earns a base pay of $100 per day plus a 2% commission on every $1,000-worth of jewelry she sells, up to $4,000. Write a function for amount of Sophie can earn in a day and determine a reasonable domain and range.

$f(x) = 100 + .02x$

$D: \{0, 1000, 2000, 3000, 4000\}$

$R: \{100, 120, 140, 160, 180\}$

5. You put a yam in the oven. After 45 minutes, you take it out. Let f(t) be the temperature of the yam t minutes after you placed it in the oven.
In (a)-(d), explain the meaning of the statement in everyday language.

a. $f(0)=65$ At 0 minutes, the temp is 65°

b. $f(5)<f(10)$ The temp at 5 minutes is less than the temp at 10 minutes.

c. $f(40)=f(45)$ The temp at 40 minutes equals the temp at 45 minutes.

d. $f(45)>f(60)$ The temp at 45 minutes is greater than the temp at 60 minutes

If we only want the temperatures for the time the yam is in the oven, what domain would we use?

$0 \leq x \leq 45$

4. A parking lot charges $2 for each hour, up to a daily maximum of $20. Let C(t) be the cost in dollars of parking for t hours.

a. Complete the table below.

t (hours)	C(t) (dollars)
0	0
.5	1
1	2
1.5	3
2	4
2.5	5

b. Write a function to represent the situation.

$C(t) = 2t$

c. What is the range of the function?

$0 \leq C(t) \leq 20$

d. What is the domain of the function?

$0 \leq t \leq 10$

5. Let f(t) be the number of people, in millions, who own cell phones t years after 1990. Explain the meaning of the following statements.

a. $f(10)=100.3$ In 2000, 100.3 million people had cell phone

b. $f(a)=20$ In year "a" 20 million people had cell phones.