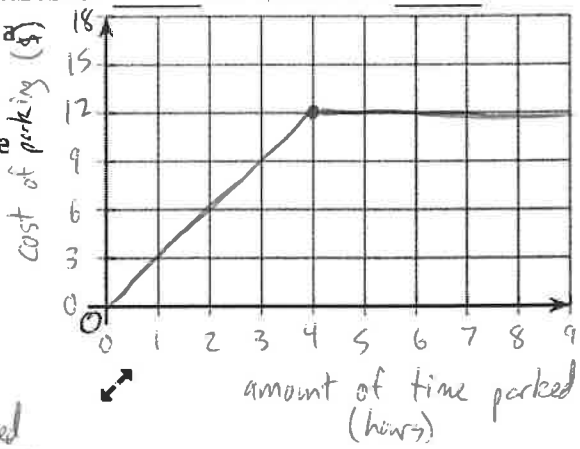
Unit 4 Test Review Packet

Name: KEY
Hour: ____

1. The relationship between the amount of time a car is parked, in hours, and the cost of parking, in dollars, can be described with a function.

   1. Identify the independent variable and the dependent variable in this function.
   2. Describe the function with a sentence of the form "_____ is a function of _____."
   3. Suppose it costs $3 per hour to park, with a maximum cost of $12.

      Sketch a possible graph of the function. Be sure to label the axes.



1. Ind. → amount of time parked (x)
   dep. → cost of parking (y)
2. Cost of parking is a function of amount of time parked

   4. Identify one point on the graph and explain its meaning in this situation.

(4, 12) → it costs $12 to park a car for 4 hours

2. Function C takes time for its input and gives a student's Monday class for its output.

   1. Use function notation to represent: A student has English at 10:00.
   2. Write a statement to describe the meaning of $C(11:15) = \text{chemistry}$.

1. C(10:00) = English
2. A student has chemistry at 11:15

3. Functions f and A are defined by these equations.

$$f(x) = 80 - 15x \qquad A(x) = 25 + 10x$$

Which function has a greater value when x is 2.5?

$f(2.5) = 80 - 15(2.5)$

$f(2.5) = 42.5$

$A(2.5) = 25 + 10(2.5)$

$A(2.5) = 50$

Function A has a greater value when $x = 2.5$

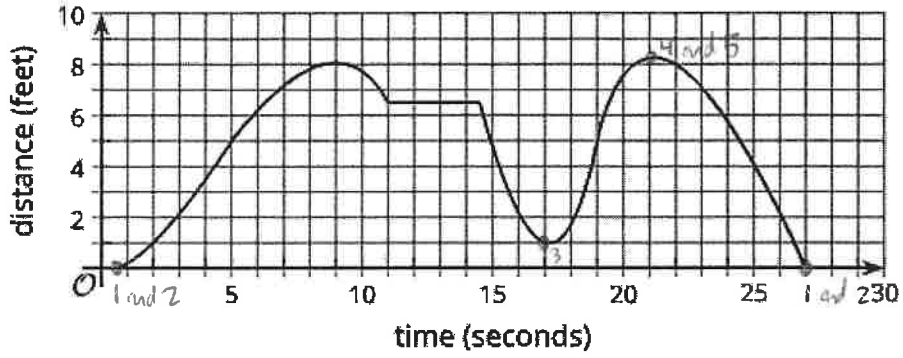
4. Function P gives the perimeter of an equilateral triangle of side length s. It is represented by the equation $P(s) = 3s$.

1. What does $P(s) = 60$ mean in this situation?
2. Find a value of s to make the equation $P(s) = 60$ true.

1. The perimeter of an equilateral triangle of side length s is 60

2. $P(s) = 60$ $\quad 60 = 3s$ $\quad s = \frac{60}{3} = 20$

5. This graph represents Andre's distance from his bicycle as he walks in a park.



Decide whether the following statements are true or false.

T 1. The graph has multiple horizontal intercepts.
T 2. A horizontal intercept of the graph represents the time when Andre was with his bike.
F 3. A minimum of the graph is $(17, 1)$. → this is a relative minimum, but not the minimum
F 4. The graph has two maximums. → it has two relative maxima, but only one maximum
T 5. About 21 seconds after he left his bike, he was the farthest away from it, at about 8.3 feet.

6. The percent of voters between the ages of 18 and 29 that participated in each United States presidential election between the years 1988 to 2016 are shown in the table.

year	1988	1992	1996	2000	2004	2008	2012	2016
percentage of voters ages 18-29	35.7	42.7	33.1	34.5	45.0	48.4	40.9	43.4

The function P gives the percent of voters between 18 and 29 years old that participated in the election in year t.

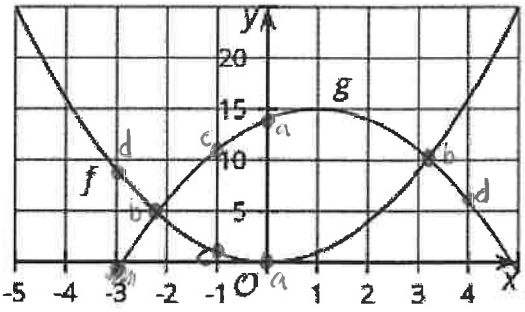
1. Determine the average rate of change for P between 1992 and 2000.
2. Pick two different values of t so that the function has a negative average rate of change between the two values. Determine the average rate of change.
3. Pick two values of t so that the function has a positive average rate of change between the two values. Determine the average rate of change.

(1) $\frac{34.5 - 42.7}{2000 - 1992} = -1.025$ percent per year (from 1992 to 2000)

(2) $\frac{33.1 - 42.7}{1996 - 1992} = -2.4$ percent per year (from 1992 to 1996)

(3) $\frac{45 - 34.5}{2004 - 2000} = 2.65$ percent per year (from 2000 to 2004)

7. Here are two graphs representing functions f and g.



Select all statements that are true about functions f and g.

a) $f(0) > g(0)$ $f(0) = 0 < g(0) = 14$

(b) There are two values of x where $f(x) = g(x)$ (two intersection points)

(c) $f(-1) < g(-1)$ $f(-1) = 1 < g(-1) = 11$

(d) $f(-3) > g(4)$ $f(-3) = 9 > g(4) = 6$

8. The cost for an upcoming field trip is \$30 per student. The cost of the field trip C, in dollars, is a function of the number of students x.

x must be positive integers, so C(x) must be multiples of 30

Select **all** the possible outputs for the function defined by $C(x) = 30x$.

a) 20 (b) 30 c) 50 (d) 90 e) 100

x	1	2	3	4	...
C(x)	30	60	90	120	...

9. To raise funds for a trip, members of a high school math club are holding a game night in the gym. They sell tickets at \$5 per person. The gym holds a maximum of 250 people. The amount of money raised is a function of the number of tickets sold.

max of 250 tickets
tickets must be positive integers

Which statement accurately describes the domain of the function?

A:
all numbers less than 250 what about -3? No! what about 2.7? No!

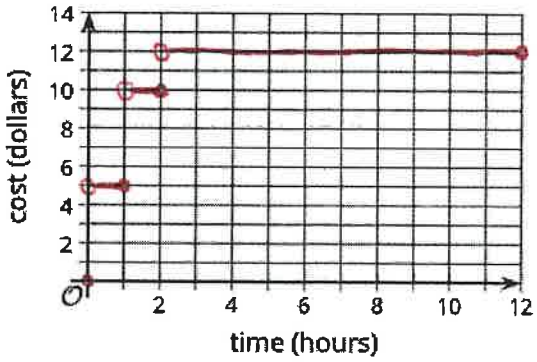
B:
all integers what about -3? No!

C:
all positive integers what about 1,000,000? No!

(D:)
all positive integers less than or equal to 250

10. A parking garage charges \$5 for the first hour, \$10 for up to two hours, and \$12 for the entire day. Let G be the dollar cost of parking for t hours.

1. Complete the table.
2. Sketch a graph of G for $0 \leq t \leq 12$.



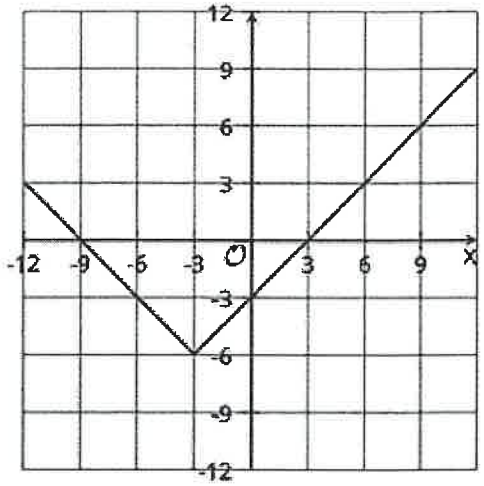
t (hours)	G (dollars)
0	0
$\frac{1}{2}$	5
1	5
$1\frac{3}{4}$	10
2	10
5	12

3. Is G a function of t? Explain your reasoning.
4. Is t a function of G? Explain your reasoning.

11. Write the equation for the graph shown:

$y = |x+3| - 6$

(note: scaling jumps by 3's, not 1's)



12. Functions h and j are inverses. When x is -10, the value of $h(x)$ is 7, or $h(-10) = 7$.

1. What is the value of $j(7)$? $j(7) = -10$ (because $h(-10) = 7$)
2. Determine if each point is on the graph of h, on the graph of j, or neither. Explain your reasoning.

   a. $(-10, 7)$ on graph of h
   b. $(7, -10)$ on graph of j

13. A school group has \$600 to spend on T-shirts. The group is buying from a store that gives them a \$5 discount off the regular price per shirt.

$n = \frac{600}{p-5}$ gives the number of shirts, n, that can be purchased at a regular price, p.

$p = \frac{600}{n} + 5$ gives the regular price, p, of a shirt when n shirts are bought.

1. What is n when p is 20? $n = \frac{600}{(20)-5} = \frac{600}{15} = 40$
2. What is p when n is 40? $p = \frac{600}{(40)} + 5 = 15 + 5 = 20$
3. Is one function an inverse of the other? Explain how you know.

yes, because solving the first equation for p gives the second equation (and solving the second for n gives the first)

$n = \frac{600}{p-5}$

$*(p-5) \quad *(p-5)$

$n(p-5) = 600$

$\div n \quad \div n$

$p - 5 = \frac{600}{n}$

$+5 \quad +5$

$p = \frac{600}{n} + 5$