



Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

### APPLY RATIONAL FUNCTIONS WORKSHEET

1) Three times the reciprocal of a number equals 9 times the reciprocal of 6. Find the number.

2) In 2 minutes, a conveyor belt moves 300 pounds of tin from the delivery truck to a storage area. A smaller belt moves the same amount the same distance in 6 minutes. If both belts are used, find how long it takes to move the cans to the storage area.

	Minutes	Part of Job in 1 Minute
Large		
Small		
Together		

Or

	Rate (1 over total time)	Time (unknown)	Part of Task Completed
Large			
Small			
Together	<del>        </del>	<del>        </del>	<i>Always 1</i>

3) A cyclist rode the first 20-mile portion of his workout at a constant speed. For the 16-mile cool down portion of his workout, he reduced his speed by 2 miles per hour. Each portion of the workout took the same time. Find the cyclist's speed during the first portion and find his speed during the cool down portion.

Distance =	Rate •	Time (T = D/R)

4) Ray starts out on a boating trip early one morning. Ray's boat can go 20 mph in still water. How far downstream can Ray go if the current is 5 mph and he wishes to go down and come back in 4 hours?

- 5) Let  $f(x) = \frac{1}{x}$  and  $g(x) = 2x + 4$ .
- a) Find  $f \circ g$  and state its domain.
- b) Find  $g \circ f$  and state its domain.
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- 6) Let  $f(x) = \frac{1}{x+5}$  and  $g(x) = \frac{3}{x} - 5$ .
- a) Find  $f(g(x))$  and state its domain.
- b) Find  $g(f(x))$  and state its domain.
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- 7) The sum of a number and its reciprocal is  $\frac{29}{10}$ . Find the number(s).
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- 8) Bill can finish a report in 2 hours. Maria can finish the same report in 4 hours. How long will it take them to finish the report if they work together?
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- 9) It takes Liya 7 more hours to paint a kitchen than it takes Hank to complete the same job. Together, they can complete the same job in 12 hours. How long does it take Hank to complete the job if he works alone?

- 10)** The game commission introduces 100 deer into newly acquired state game lands. The population  $N$  of the herd is given by  $N = \frac{20(5+3t)}{1+0.04t}$ ,  $t \geq 0$ , where  $t$  is the time in years.
- Use a grapher to graph the model.
  - Find the populations when  $t = 5$ ,  $t = 10$ , and  $t = 25$ .
  - What is the limiting size of the herd as time increases? Explain.
- 11)** The average cost per unit  $C(x)$  to produce  $x$  units of plywood is given by  $C(x) = \frac{300}{x+10}$ .
- What is the cost per unit when 590 units are produced?
  - If the cost per unit is \$1.50, how many units have been produced?
- 12)** The concentration  $C$  (in mg/dl), of a certain antibiotic in a patient's bloodstream is given by  $\frac{50t}{t^2 + 25}$  where  $t$  is the time (in hours) after taking the antibiotic.
- What is the concentration 4 hours after taking the antibiotic?
  - In order for the antibiotic to be effective, 4 or more mg/dl must be present in the bloodstream. When do you have to take the antibiotic again? Solve using algebra or solve graphically.
- 13)** In the following formula,  $S(x)$  is the minimum number of hours of studying required to attain a test score of  $x$ :  $S(x) = \frac{0.32x}{100.5 - x}$
- How many hours of study are needed to score 85?
  - What score can you get if you study 8 hours?
  - How many hours of study are needed to score 100?
- 14)** **6)** Let  $f(x) = \frac{3}{x-2}$  and  $g(x) = 2x^2 - x + 1$ .
- Find  $(f \circ g)(x)$  and state its domain.
  - Find  $(g \circ f)(x)$  and state its domain.