

# Hoover High School Math League

April 1-2, 2009

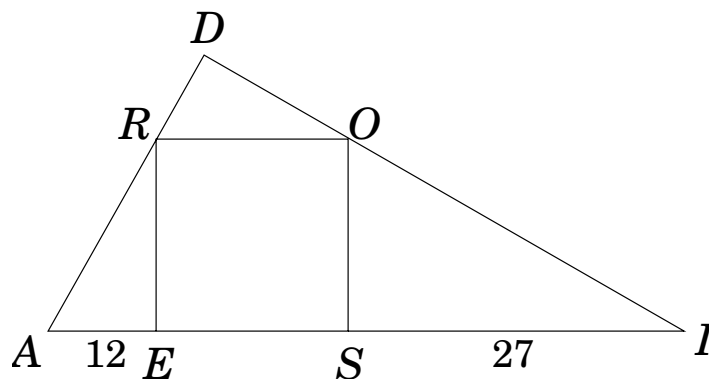
## Proportional Reasoning, Ratios, and Rates

## Problems

- The ratio of  $x$  to  $y$  is  $5 : 3$ . The ratio of  $y$  to  $z$  is  $9 : 10$ . What is the ratio of  $x$  to  $z$ ?
  - $3 : 2$
  - $2 : 1$
  - $3 : 1$
  - none of the above
- If  $y$  is inversely proportional to the square of  $x$  and  $y = 5$  when  $x = 5$ , what is  $y$  when  $x = \frac{1}{10}$ ?
  - 2150
  - 250
  - 1250
  - none of the above
- Suppose  $x$  varies directly as the square of  $y$  and inversely as the product of  $z$  and  $w$ , and suppose  $x = 10$  when  $y = 5$ ,  $z = 2$ , and  $w = 10$ . Find  $x$  if  $y = 10$ ,  $z = 5$ , and  $w = 2$ .
  - 100
  - 80
  - 50
  - 20
- Find the ratio of  $A$  to  $B$  if  $\frac{2B+6A}{3A-B} = 10$ .
  - 1:3
  - 3:1
  - 1:2
  - none of the above
- The distance a body falls from rest varies directly to the square of the time it falls. If an object falls 144 feet in 3 seconds, how far will it fall in 6 seconds?
  - 567 ft
  - 576 ft
  - 32 ft
  - none of the above

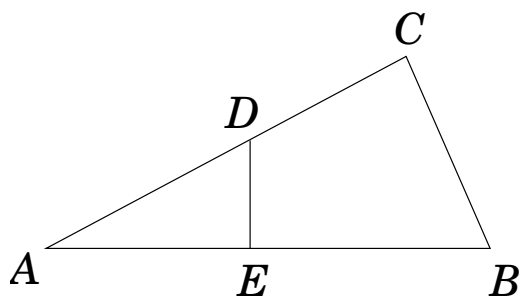
6. If 26 blops weigh as much as 4 glorps and 2 gloops, while 8 blops and 2 glorps have the same weight as 2 gloops, how many blops have the same weigh as 3 gloops?
- (a) 10
  - (b) 12
  - (c) 21
  - (d) None of the above
7. The number 216 is divided into 3 parts proportional to 2, 3, and 4. Find the smallest part.
- (a) 24
  - (b) 48
  - (c) 12
  - (d) 60
8. A painter needs to make a certain shade of green paint. She has 7.5 ounces of yellow paint, and she can make this shade of green by mixing 8 parts blue with 3 parts yellow paint. How much blue paint does she need?
- (a) 60 ounces
  - (b) 30 ounces
  - (c) 22.5 ounces
  - (d) 20 ounces
  - (e) None of the above
9. Mr. Jones traveled for 2 hours at 40 mph and then for another 3 hours at 80 mph. What is his average rate over the entire trip?
- (a) 57
  - (b) 60
  - (c) 64
  - (d) none of the above
10. A boat travels 145 km downstream and it takes it the same time to travel 95 km upstream. The speed of the current is 5 km/h. Determine the speed of the boat in still water.
- (a) 22 km/h
  - (b) 23 km/h
  - (c) 24 km/h
  - (d) 25 km/h
  - (e) None of the above
11. If 7 dogs can eat 7 bowls of dog food in 7 minutes, how long will it take 14 dogs to eat 14 bowls of dog food?
- (a) 28 minutes
  - (b) 21 minutes
  - (c) 14 minutes

- (d) 7 minutes
12. Nine woodchucks can chuck eight pieces of wood in three hours. How much wood can a woodchuck chuck in one hour?
- (a)  $\frac{8}{3}$  pieces  
 (b)  $\frac{8}{9}$  pieces  
 (c)  $\frac{8}{27}$  pieces  
 (d) none of these
13. Kate and Helen have to make 60 pyramids for their geometry project. Kate can make them in 6 hours, and Helen can make them in 12 hours. Assuming that they will work at these rates, how long will it take them to make 60 pyramids together?
- (a) 3 hours  
 (b) 4 hours  
 (c) 4 hours 30 minutes  
 (d) 5 hours  
 (e) None of the above
14. It takes 5 hr 20 min for Bill to type some text. It takes 4 hr 40 min for John to type the same text. One day they typed 90 pages together. How many pages did Bill type and how many pages did John type on that day?
- (a) 42 and 48 pages  
 (b) 40 and 50 pages  
 (c) 30 and 60 pages  
 (d) 38 and 52 pages  
 (e) 44 and 46 pages
15. Find the area of the square  $ROSE$  which is inscribed in right triangle  $ADI$ , if  $AE = 12$  and  $SI = 27$ .

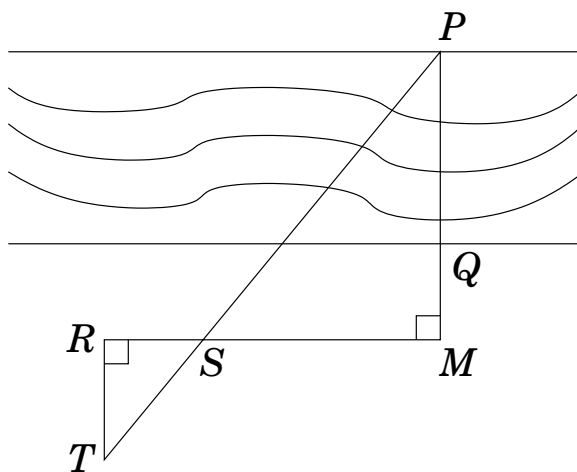


- (a) 729  
 (b) 144  
 (c) 324  
 (d) none of the above

16. In the figure below,  $AB$  is perpendicular to  $DE$  and  $AC$  is perpendicular to  $CB$ .  $AE = 6$ ,  $EB = 7$ , and  $BC = 5$ . What is the area of the quadrilateral  $EBCD$ ?



- (a) 12  
 (b) 45  
 (c) 22.5  
 (d) none of the above
17. On a dark lonely night, a man is standing 5 yards away from a street light. The man is 2 yards tall and the light is 6 yards high. How long is the man's shadow?
- (a) 2 yards  
 (b) 4 yards  
 (c)  $\frac{5}{2}$  yards  
 (d)  $\frac{7}{3}$  yards  
 (e) None of the above
18. Suppose you wish to measure the distance across the river shown below. You find that the distance  $SM$  is 35 feet,  $RS$  is 8 feet,  $RT$  is 16 feet, and  $QM$  is 10 feet. How far is it across the river?



- (a) 40 feet  
 (b) 50 feet  
 (c) 70 feet  
 (d) 60 feet