Travel Stretch

$\text{speed} = \dfrac{\text{distance}}{\text{time}}$	$\text{distance} = \text{speed} \times \text{time}$	$\text{time} = \dfrac{\text{distance}}{\text{speed}}$

21. _____ mi/h Jack and Jill travel up a hill at a speed of 2 mi/h. They travel back down the hill at a speed of 4 mi/h. What is their average speed for the entire trip? Express your answer as a mixed number.

22. ____ : ____ p.m. At 2:20 p.m., Jack is at the top of the hill and starts walking down at the exact same time that Jill, who is at the bottom of the hill, starts walking up. If they maintain the same uphill and downhill speeds from the previous problem, and the distance from the bottom to the top of the hill is 1.5 miles, at what time will Jack and Jill meet?

23. _____ yards When Jack and Jill meet, as described in the previous problem, how many yards will they be from the bottom of the hill?

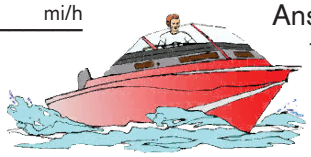
24. _____ minutes Alysha's average speed when walking from home to the market is 5 mi/h, and it takes her 21 minutes longer than when she drives to the market. If Alysha drives to the market, along the same route, at an average speed that is eight times her average walking speed, how many minutes does it take her to drive from home to the market?

25. _____ miles Based on problem 24, how many miles does Alysha travel to get from home to the market?

26. _____ minutes Jana begins jogging along a path and, 5 minutes later, Zhao begins riding his bicycle along the same path, which has a length of 2 miles. Zhao rides his bicycle at a speed of 10 mi/h, and Jana's jogging speed is 6 mi/h. If they both begin at one end of the path and end at the other, how many minutes after Zhao reaches the end of the path will Jana reach the end of the path?

27. _____ minutes Based on problem 26, how many minutes after Zhao begins riding will he catch up with Jana? Express your answer as a mixed number.

28. _____ miles Again, based on problem 26, how many miles will Jana have traveled when Zhao catches up with her? Express your answer as a mixed number.



29. _____ mi/h Ansel left the dock in his motorboat, traveled 10 miles, and then returned to the dock along the same route. On the return trip, Ansel was traveling against the current of the river, and his average speed relative to the water was 20 mi/h. If the round-trip took Ansel 64 minutes, what is the speed of the river's current?

30. _____ Based on problem 29, what fraction of Ansel's total travel time was spent traveling upstream? Express your answer as a common fraction.

Work Stretch

281. _____ minutes Working alone, Alice can paint a room in 1 hour. Bob can paint the room in 2 hours alone. How many minutes will it take them to paint the room together?

282. _____ minutes James is trying to learn a new yoga posture. Reading about it from a book, he would take 30 minutes to learn the posture. Working with an instructor doubles his rate of learning. How many total minutes will it take James to learn the posture if his instructor arrives after he has studied from the book for 10 minutes?

283. _____ minutes A hose could fill a small pool in 50 minutes if the pool did not leak. Alas, the pool leaks at a steady rate that can drain it completely in 300 minutes. How many minutes will it take the hose to fill the leaky pool?

284. _____ : _____ pm A vineyard's grapes can be harvested by 10 workers in 5 hours. If one worker starts the harvest at noon, and another worker joins the harvest each hour on the hour, at what time will the harvest be completed?

285. _____ : _____ pm Alfonso can write 100 practice problems for the math team in 20 hours, Beauregard can write the same number of problems in 30 hours, and Clyde can write that number of problems in 40 hours. Working together, at what time will the three of them finish writing 100 practice problems if Alfonso starts at noon, Beauregard joins him at 1 pm and Clyde joins them at 2 pm?

286. _____ minutes Vincent can process 50 orders in 2 hours working alone. When Leela is in the room, Vincent works at twice his normal speed. When Fry is in the room, Vincent works at half his normal speed. If Vincent works alone for 10 minutes, then with Leela for 10 minutes, then alone for 10 minutes, then with Fry for 10 minutes, then alone for 10 minutes, and this pattern continues (alone, with Leela, alone, with Fry), how many minutes will it take to process 50 orders?

287. _____ minutes Larry and Curly are trying to fill a sandbox with sand. Working alone, Larry can fill an empty sandbox in 4 hours, and Curly can do the same job in 5 hours. Moe is trying to empty the sandbox. Working alone, Moe can empty a full sandbox in 6 hours. If the sandbox is half full at the time Larry and Curly begin filling the sandbox and Moe begins emptying it, how many minutes will it take for the sandbox to be filled? Express your answer to the nearest whole number.

288. _____ hours Danielle and Jennifer can do a job in 2 hours working together. Danielle could do it in 3 hours alone. How many hours would it take Jennifer to do the job alone?

289. _____ hours One hose can fill a pool twice as quickly as another, smaller hose. If the two hoses together can fill the pool in 6 hours, how many hours would it take the smaller hose alone to fill the pool?

290. _____ housekeepers The Hilbert Lodge has a housekeeping staff of ten. Working alone, one housekeeper can clean all of the rooms in the lodge in 4 hours. A different housekeeper can clean all of the rooms in 5 hours, and still another takes 6 hours to clean all the rooms, working alone. Working alone, each of the remaining seven housekeepers can clean all the rooms in 7, 8, 9, 10, 11, 12 and 13 hours, respectively. What is the minimum number of housekeepers needed to clean all of the rooms in Hilbert Lodge in exactly 2 hours?

Proportional Reasoning Stretch

1. _____ A dozen cookies cost $3.99. At the same cost per cookie, how many dollars should eight cookies cost? Express your answer to the nearest hundredth.

2. _____ Marian traveled at an average rate of 65 miles per hour for 15 hours. Kristen travels at an average rate of 50 miles per hour. How many hours does it take Kristen to travel the same distance Marian traveled? Express your answer as a decimal to the nearest tenth.

3. _____ A recipe requires three cups of flour and two eggs to make eight servings of a cake. How many cups of flour are needed to make 20 servings of the same cake? Express your answer as a decimal to the nearest tenth.

4. _____ To receive an attendance bonus of 20 points in her history class, Phyllis must attend at least 95% of the 180 history classes during the school year. By the end of January, she has missed six classes. What is the maximum number of history classes she can miss the rest of the school year and still get the attendance bonus?

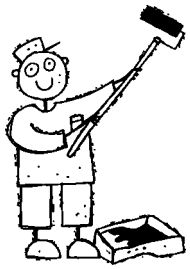
5. _____ Thirty percent of a number is 8.4. What is 37.5% of the number, as a decimal to the nearest tenth?

6. _____ A price is reduced by 10% and then increased by 10%. What percent of the original price is the new price?

7. _____ How many meters per second faster is 30 meters per second than 100 kilometers per hour? Express your answer as a decimal to the nearest tenth.

8. _____ The ratio length:width:height of a box is 3:1:2. If the height of the box is 10 cm, how many square centimeters is the surface area of the box?

9. _____ It takes four painters working at the same rate 1.25 work-days to finish a job. If only three painters are available, how many work-days will it take them to finish the job, working at the same rate? Express your answer as a mixed number.

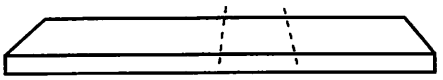


10. _____ A surveillance camera photographs a shoplifter in front of a 3.5-foot counter. In the photograph, the shoplifter appears 6 inches tall and the counter appears 4 inches high. How many inches tall is the shoplifter?

Proportional Reasoning Stretch

1. _____ On Monday, Euler's Bakery discounted the price of pies 20%. On Tuesday, it discounted the pies an additional 70%. What is the combined percent discount?

2. _____ A 12-foot board is cut into three pieces whose lengths are in the ratio of 3:1:2. How many inches are in the length of the shortest piece?

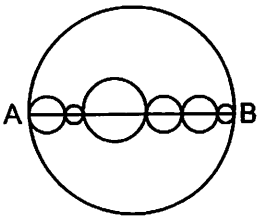


3. _____ If 3 tics balance 9 tacs, and 3 tacs balance 6 toes, how many tics are needed to balance 36 tacs and 36 toes?

4. _____ Jessica completed 7/8 of a training run in 2 hours and 55 minutes. If Jessica runs at a constant pace, what is the number of minutes left in her run?

5. _____ Mecklenburg, in Culver county, has population 2570. The population of Culver County is 64,250. What percent of the county population lives in Mecklenburg?

6. _____ Diameter $\overline{AB}$ is equal to the sum of the six smaller diameters. What is the number of units in the difference between the circumference of the large circle and the combined circumferences of the six smaller circles?

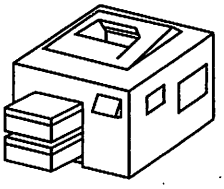


7. _____ The courthouse in Pleasantville measures 1980 ft x 440 ft. One square mile equals 640 acres. How many acres does the courthouse cover?

8. _____ Xa worked 2 hours and 15 minutes, Yo worked 1 hour and 40 minutes, and Zu worked 2 hours and 30 minutes. Combined, they were paid $77. If each of them is paid the same hourly wage, how many dollars should Xa get?

9. _____ Homer paid $3 for 6 donuts. How many dollars would Homer pay for 3 dozen donuts?

10. _____ A page of 12-point type contains 500 words; a page of 10-point type contains 660 words. A student printed a paper using 10-point type, and the result was 25 full pages. If she prints it in 12-point type, how many pages will the paper contain?



Problem #8 submitted by coach John Bradford, Chattanooga, TN.