

# MATHCOUNTS<sup>®</sup> Problem of the Week Archive

## Summer Funds – July 18, 2022

### Problems & Solutions

Darcy has two part-time jobs during her summer vacation. She works part-time as a counselor at a local day camp, and she has another part-time job as a lifeguard at the community swimming pool. Darcy works a combined total of 40 hours every week between the two jobs.

The first week working both jobs, it rained all but one day, so three-fourths of the hours she worked that week were at the day camp. How many hours did Darcy work at the pool the first week?

*If three-fourths of the hours Darcy worked were at the day camp, it follows that she spent the other  $1 - 3/4 = 1/4$  of the hours working at the pool. That means the number of hours Darcy worked at the pool the first week was  $40 \times 1/4 = 10$  hours.*

The second week, the number of hours Darcy worked at the day camp was  $3/5$  the number of hours she worked at the swimming pool. What is the positive difference in the number of hours Darcy worked at the day camp and the number of hours she worked at the pool during the second week?

*If we let  $d$  represent the number of hours Darcy worked at the day camp, and let  $p$  represent the number of hours she worked at the pool, we have  $d = (3/5)p$ . We also know that Darcy works 40 hours every week, so  $d + p = 40$ . If we substitute  $(3/5)p$  for  $d$  in this equation, we get  $(3/5)p + p = 40$ . Solving for  $p$ , we see that the number of hours that Darcy worked at the pool the second week was  $(8/5)p = 40 \rightarrow p = 5/8 \times 40 = 25$  hours. It follows that Darcy worked  $40 - 25 = 15$  hours at the day camp that week. The positive difference in the number of hours Darcy worked at the day camp and the number of hours she worked at the pool the second week is  $25 - 15 = 10$  hours.*

Darcy earns \$8 per hour as a camp counselor and \$12 per hour as a lifeguard. What is the positive difference in the amount Darcy earned the first week and the amount she earned the second week?

*From the first problem, we know that Darcy worked at the pool 10 hours during the first week, which means she worked at the day camp  $40 - 10 = 30$  hours. The total amount Darcy earns each week can be determined using the expression  $8d + 12p$ , where  $d$  is the number of hours she works at the day camp, and  $p$  is the number of hours she works at the pool. So, the first week, Darcy earned  $8 \times 30 + 12 \times 10 = 240 + 120 = 360$  dollars. From the second problem, we know that Darcy worked 15 hours at the day camp and 25 hours at the pool during the second week. So, the second week she earned  $8 \times 15 + 12 \times 25 = 120 + 300 = 420$  dollars. The positive difference in the amount Darcy earned the first two weeks then is  $420 - 360 = 60$  dollars.*

What is the total amount Darcy will earn during the third week if she earns the same amount working at the day camp as she earns working at the pool?

*Using the information from the previous problems, we know  $d + p = 40$ , and Darcy earns  $8d$  dollars per week at the day camp and  $12p$  dollars each week at the pool. We are told  $8d = 12p \rightarrow d = (12/8)p \rightarrow d = (3/2)p$ . If we substitute for  $d$  in the equation  $d + p = 40$ , we get  $(3/2)p + p = 40$ . Solving for  $p$  yields  $(5/2)p = 40 \rightarrow p = 2/5 \times 40 = 16$  hours. The third week, we see that Darcy will earn  $12p = 12 \times 16 = 192$  dollars working at the pool. Since we are told she will earn the same amount that week working at the day camp, we can conclude that she will earn a total of  $192 + 192 = \mathbf{384}$  dollars the third week.*

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### ***Problems***

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The first week working both jobs, it rained all but one day, so three-fourths of the hours she worked that week were at the day camp. How many hours did Darcy work at the pool the first week?

The second week, the number of hours Darcy worked at the day camp was  $\frac{3}{5}$  the number of hours she worked at the swimming pool. What is the positive difference in the number of hours Darcy worked at the day camp and the number of hours she worked at the pool during the second week?

Darcy earns \$8 per hour as a camp counselor and \$12 per hour as a lifeguard. What is the positive difference in the amount Darcy earned the first week and the amount she earned the second week?

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