

MATHCOUNTS® Problem of the Week Archive

Vacation Planning Math – July 10, 2017

Problems & Solutions

Dawn is planning a vacation. The dates of her vacation are September 18 through September 24, which will require her to take five 8-hour vacation days off from work. She accrues three-and-a-third vacation hours each payday, and her paydays are always the 15th and last days of each calendar month. At the end of the day on July 15, Dawn's total accrued vacation hours reached exactly 32 hours. If Dawn takes five vacation days in September, but uses no other vacation time, how many total vacation hours will she have at the end of the day on October 15?

At the end of the day on July 15 Dawn had 32 hours. She will have future paydays on July 31, Aug. 15, Aug. 31, Sept. 15, Sept. 30 and Oct. 15. This is six more pay periods and six more opportunities to add three-and-a-third hours to her total vacation hours, which will earn her $6 \times 3 \frac{1}{3} = 6 \times \frac{10}{3} = 20$ hours. This brings her total hours to $32 + 20 = 52$ hours, but she will also have used $5 \times 8 = 40$ hours for her vacation in September. At the end of the day on October 15, she will have $52 - 40 = 12$ vacation hours.

Dawn is planning this vacation to the beach for a group of three families. She has found a house that has enough room for 14 people, which is just the size of her group. The families have 3, 5 and 6 family members. The rent for the house for the week is \$2800. If the group agrees to split the rent up so that an equal portion of the rent is assigned to each person in the group, how much will the family with the biggest portion of the rent owe?

If the rent is split evenly between the 14 people, each person's portion of the rent will be $\$2800 \div 14 = \200 . The largest family has six members and will therefore owe $6 \times \$200 = \1200 for the week.

Since Dawn and her family do not live close to the beach, they will have to fly to the airport closest to the beach. Dawn has a coupon that entitles her to either a 15% discount off the standard ticket price for each ticket she purchases or a free fifth ticket for every four tickets she purchases. If Dawn's family has five members and they each need a ticket with a standard price of \$329, how much will the total cost of the family's airline tickets be, using the best of the two possible scenarios?

Without any special deals, Dawn would be paying $5 \times \$329 = \1645 for the five tickets. Since one of her options entitles her to 15% off this price, that would be a savings of $0.15 \times \$1645 = \246.75 . This is less of a savings than if she paid full price for four tickets and got the fifth \$329-ticket for free. The price of the family's tickets is then $4 \times \$329 = \1316 .

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