

Estimate fees = Choose a level of accuracy appropriate to limitations on measurement when reporting quantities

Program Task: Answer patient questions on fees and insurance coverage using estimation.

Program Associated Vocabulary:
CAPITATION, COPAYMENT, REIMBURSEMENT, DUAL COVERAGE, BIRTHDAY RULE, INSURED PARTY, PROVIDER, UCR, YEARLY MAXIMUM, DEDUCTABLE

Program Formulas and Procedures:
Dental office managers handle accounts receivable on a daily basis. They will be expected to give estimates on insurance payments and patient payments on a regular basis. This math concept will help students learn how to estimate payments quickly and easily with a high degree of accuracy.

Example:
Mrs. Brown has 3 children and they all need sealants placed on their teeth. The total number of teeth getting sealed is 12 teeth per child. A sealant costs \$16.75 per tooth, and Mrs. Brown’s insurance will cover 50% of the cost. Give the patient an estimate on what she will have to pay.

Solution:
Round up the amount to the nearest 10 dollars.
\$16.75 to \$20
 $\$20 \times 12 \times 3 = \720
 50% or half of $\$720 = \360
The estimated out of pocket expense for Mrs. Brown is \$360.

PA Core Standard: CC.2.1.HS.F.5
Description: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Math Associated Vocabulary:
ROUNDING, PLACE VALUE, MENTAL MATH, AVERAGE

Formulas and Procedures:
It is often practical to use estimation by using mental math, to solve problems so that a calculator is not necessary. Usually the situations presented require you to either round to the nearest whole number, tens, hundreds, or thousands, or require you to take an average of the range of numbers given. The two examples below demonstrate specific situations where rounding and averaging are useful.

Rounding:
Henry just purchased a cell phone plan that will cost him \$38.99 per month. His friend, Elizabeth, just purchased a cell phone plan that will cost her \$59.99 per month. Estimate how much more money Elizabeth will spend on her cell phone plan in one year.

1. To estimate, round to the nearest \$10. Henry will spend about \$40/mo. and Elizabeth will spend about \$60/mo.
2. Take the difference between the two: $\$60 - \$40 = \$20$ to determine how much more Elizabeth will spend in one month.
3. Multiply by 12. $\$20 \times 12 = \240 more per year.

Averaging:
Billy notices that 4-6 cars pass by his house each hour. Estimate the number of cars that will pass by his house in 8 hours.

1. Find the average of 4 and 6. $\text{Average} = (4+6)/2 = 5$
2. Multiply the answer by 8 hours: $5 \times 8 = 40$
Approximately 40 cars should pass by his house.

Instructor's Script - Comparing and Contrasting

When teaching estimation, there are many ways that students can round and still obtain a reasonable answer. In the example provided in the dental side of the T-Chart, the cost per tooth was rounded to \$20. The purpose of rounding is to make mental math easier and to get a reasonable estimate quickly. A student who is more adept at mental math could round the cost per tooth to \$8 or \$9, by estimating half of \$16.75 (the first estimate is a little low, the second a little high) and multiply that number by 12. Using \$8 would yield an answer of \$96 and using \$9 would yield an answer of \$108 per child ($96 \times 3 = \288 or $108 \times 3 = \$324$ for 3 children). While both methods yield a reasonable answer, the dental office manager would not wish to underestimate the patient's cost – this is one of the drawbacks of rounding down.

Estimation is a strategy that good problem solvers employ. Even if the question requires an exact answer, a mental estimate should be completed before the calculations so that the estimate can be used to check the validity of the answer.

Common Mistakes Made By Students

Not taking the time to understand the limitations of estimating and how the situation determines the estimate. For instance, if the cost per color copy is \$0.74/copy and 8,500 copies are made, rounding the price to an even dollar will yield an unreasonable answer. In this case, the estimate would produce a price of \$8,500 even though the actual price is only \$6.

CTE Instructor's Extended Discussion

When it is determined students can estimate insurance on a patient with single coverage, have students estimate insurance on someone with dual coverage, using the birthday rule.

Dental Technology (51.0601) T-Chart

Problems	Career and Technical Math Concepts	Solutions
1. A patient has regular insurance that pays 60% of the dental costs. The patient needs a post/core and crown, the fees are as follows: Post \$158.75, Core \$247.50, and Crown \$908.25. Estimate the patient's out of pocket expenses.		
2. Your patient has to pay 10% of the bill when leaving the dental office per the patient's insurance plan. The total bill comes to \$165.80. Estimate what you will collect from the patient at the end of the visit?		
3. Your office is paid \$23.50 per adult cleaning from insurance company A. They are paid \$19.50 per adult cleaning from insurance company B. The doctor had 12 patients from company A and 18 patients from company B. Estimate which company will pay the doctor the larger amount during this billing period.		
Problems	Related, Generic Math Concepts	Solutions
4. A software support contract is quoted for one or two years. One year would cost \$795, but two years would cost \$1,495. Round each price to the nearest hundred dollars and estimate the savings for a two year commitment.		
5. Students want to raise \$500 for a field trip. With fundraising, they collected \$127 on Monday, \$130 on Tuesday, \$84 on Wednesday, and \$90 on Thursday. Approximately how much money will they need to collect on Friday to reach their goal?		
6. A car can be rented for \$37.99/day plus \$0.39/mile. Which of the following is the best estimate for the cost of renting the car for 4 days if you are driving 100 miles? a) \$150 b) \$160 c) \$200 d) \$250		
Problems	PA Core Math Look	Solutions
7. A company is offering a salary of \$48,500 per year. If about 20% is taken from taxes, how much will a person have made in 5 years after taxes?		
8. Every hour, the store sells between 40-50 items that range from \$1.99 - \$7.99. What would be a good estimate for the amount of money the store generates in a 10 hour day?		
9. Two friends went to dinner. Their bill came to \$37.79. If a fair tip is between 15 and 20 percent, what would be a fair tip to leave their waiter?		

