Culinary Arts (12.0501) T-chart

Cost and Evaluate Inventory	=	Apply Inverse Operations to Solve Equations or Formulas for a Given Variable

Program Task: 406 Explain the procedures for rotation of stock and for costing and evaluating including FIFO.

POS Duty: 400 Purchasing Receiving And Storage Procedures

Program Associated Vocabulary
BREAKEVEN POINT, FIXED EXPENSES, VARIABLE EXPENSE PERCENTAGE

Program Formulas and Procedures
An estimate is a calculation that is made using numbers that are approximate and based on experience and the judgment of the person doing the calculation. Creating a standard profit & loss statement is straight forward for food service operation. However, it is also common to estimate the profit and loss to determine if a new restaurant will be profitable.

Breakeven Point (BEP) = Fixed Expenses (FE), divided by, 100% - Variable Expense Percentage (VE %)

$$BEP = \frac{FE}{(100\% - VE\%)}$$

Example 1: A chef considering opening a 20 seat luncheonette has done a lot of research and estimates that fixed expenses (FE) for rent, utilities, and management and staff payroll will total $12,000/month. Based on years of experience, the chef estimates that Variable Expenses (VE) will be about 45% of sales. She estimates the Breakeven Point (BEP) for the new restaurant would be calculated:

$$BEP = \frac{\$12,000}{(100\% - 45\%)}$$

$$BEP = \frac{\$12,000}{(1.00 - 0.45)} \quad BEP = \frac{\$12,000}{(.55)}$$

$$BEP = \$21,818 / month$$

$$Where\ a\ month = 30\ days$$

To be profitable, the chef estimates if she serves on average 75 customers a day, how much must each customer, on average, have to spend?

$$BEP = \$21,818 / month$$

$$\frac{\$21,818}{2250\,(75 \text{ customers per day } x \text{ } 30 \text{ day}) customers\ a\ month}$$

$$= \$9.70 / customer$$

PA Core Standard: CC.2.2.HS.D.8

Description: Apply inverse operations to solve equations or formulas for a given variable

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

Formulas and Procedures
It is often more practical to use estimation to solve problems so that a calculator is not necessary to solve the problem. 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 10s. Henry will spend about $40/mo. and Elizabeth will spend $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 x 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. Take the number between 4 and 6. (5)
2. Multiply this by 8 hours: 5 x 8 = 40

Approximately 40 cars should pass by his house.

Teacher's Script - Comparing and Contrasting
The math involved in this lesson contributes to a set of math-related tools that gives students the ability to predict the outcome of changes before actually implementing the change (along with estimation, direct and inverse proportions, and manipulating formulas).

Common Mistakes Made By Students
Not taking the time to understand the limitations of estimating and how the situation determines the estimate. For instance, it is not okay to round up 85 psi to 100 psi. However, if a faulty component costs $85, it would be okay to round the customer's estimate to $100 when estimating the cost.

Lab Teacher's Extended Discussion
Technical tasks are usually not presented using this model. Therefore, it is important for technical instructors to demonstrate to students how these math concepts link to and are relevant in their technical training and that technical teachers present the math in a way which shows a relationship to the math CTE students use in their academic school settings.

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Problems	Occupational (Contextual) Math Concepts	Solutions
1. If the estimated Breakeven Point (BEP) is $37,500/mo., how many customers will need to be served daily if the average sale is $10.80?		
2. Find the BEP if the FE=$45,500/mo. with a VE% of 42%; what must the average bill be if you serve approximately 75 customers a day?		
3. Find the BEP if the FE=$110,775/mo. with a VE% of 36%; what must the average bill be if you serve approximately 600 customers a day?		
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 $1495. Round each price to the nearest hundred dollars to estimate the savings for a two year commitment.		
5. You have 8 vacation days to use in 17 weeks. Your boss asks you to consider taking long weekends only so you can keep up with the weekly workload. You decide to take as many evenly spaced Fridays and Mondays off as possible. How many long weekends would you take and how often would you take a long weekend?		
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. $150 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?		

Problems	Occupational (Contextual) Math Concepts	Solutions
1. If the estimated Breakeven Point (BEP) is $37,500/mo., how many customers will need to be served daily if the average sale is $10.80?		$BEP = \frac{\$37,500}{\$10.80}$ $BEP = 3472\ customers\ /\ mo$ $BEP = \frac{3472}{30}$ $BEP = approx\ 116\ customers\ /\ day$
2. Find the BEP if the FE=$45,500/mo. with a VE% of 42%; what must the average bill be if you serve approximately 75 customers a day?		$BEP = \frac{\$45,000}{(100\% - 42\%)}$ $BEP = \frac{\$45,000}{(1.00 - 0.42)}$ $BEP = \frac{\$45,000}{(.58)}$ $BEP = \$77,586\ /\ month\ or\ \$2,586\ a\ day$ *if you serve* 75 *customers a day the average bill must be approx* $34.50
3. Find the BEP if the FE=$110,775/mo. with a VE% of 36%; what must the average bill be if you serve approximately 600 customers a day?		$BEP = \frac{\$110,775}{(100\% - 36\%)}$ $BEP = \frac{\$110,775}{(1.00 - 0.36)}$ $BEP = \frac{\$110,775}{(.64)}$ $BEP = \$173,086\ /\ month\ or\ \$5770\ a\ day$ *if you serve* 600 *customers a day the average bill must be approx* $9.62
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 $1495. Round each price to the nearest hundred dollars to estimate the savings for a two year commitment.		Rounding off, one year = $800, while two years = $1,500. $1,500 / 2 = $750 per year, or a $50 per year savings for the two year commitment.
5. You have 8 vacation days to use in 17 weeks. Your boss asks you to consider taking long weekends only so you can keep up with the weekly workload. You decide to take as many evenly spaced Fridays and Mondays off as possible. How many long weekends would you take and how often would you take a long weekend?		8 / 2 = 4 weekends. 4 spread over 17 weeks (take one right away and then take one 5th weekend).
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. $150 c. $200 d. $250		c. $200 40 x 4 = 160 .40 x 100 = 40 160 + 40 = 200
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?		$\$50,000$ *salary estimate.* 10% *is* $\$5,000$, *so* 20% = $\$10,000$ $5 \times 10,000 = 50,000$ *taxes in* 5 *years.* $50,000 \times 5 = 250,000$ $\$250,000 - \$50,000 = \$200,000$
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?		45 x 5 = 225 per hour. $2250 per 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?		Estimate a $40 bill. 10% is $4. 20% is $8, so a fair tip would be any number between 6 and 8.