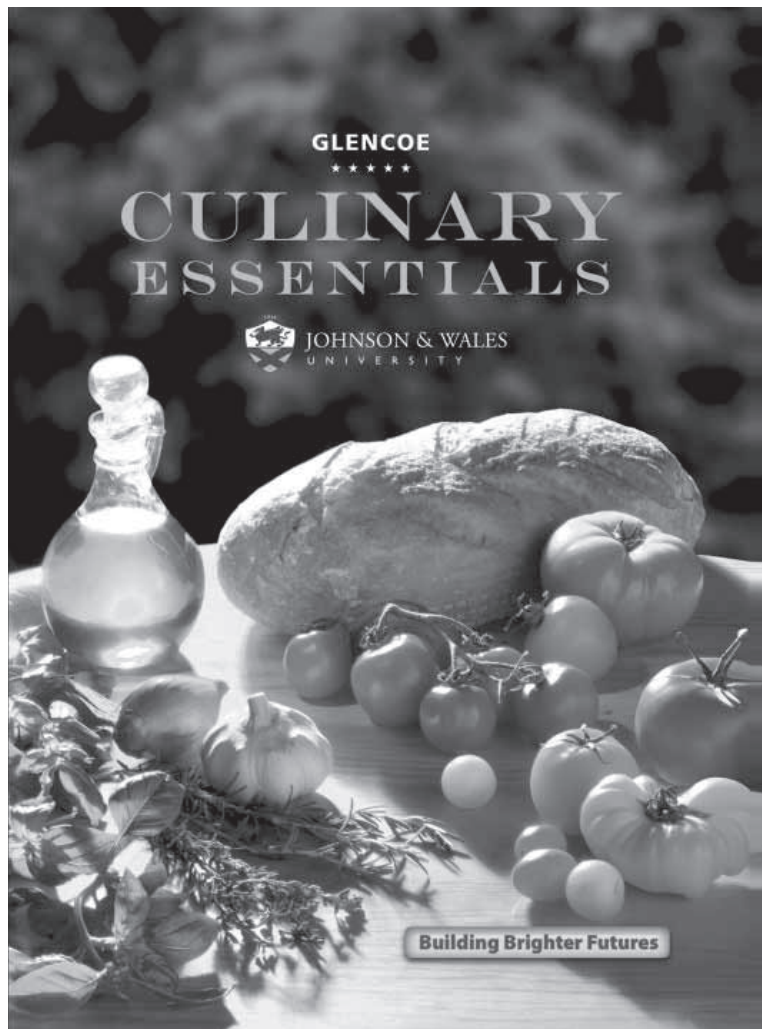


# CULINARY ESSENTIALS

## Culinary Math Skills Answer Key



**Glencoe**



JOHNSON & WALES  
UNIVERSITY



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# CULINARY MATH SKILLS

## ANSWER KEY

### Math Activity 1—MAKING CHANGE

1. Three pennies, one quarter, and a five dollar bill.
2. One penny, two dimes, and two dollar bills.
3. One nickel, one dime, two quarters, and four dollar bills.
4. Two pennies, two dimes, two quarters, and three dollar bills.
5. Three pennies, one nickel, and one dime.
6. One dime and three quarters.
7. Three quarters and one dollar bill.
8. Two quarters and two dollar bills.
9. One nickel, two quarters, and one dollar bill.
10. One nickel, one dime, three quarters, one five dollar bill, and one ten dollar bill.

### Math Activity 2—READING LABELS

*Answers will vary per label provided.*

### Math Activity 3—POUNDS & OUNCES

- |                    |                   |                     |
|--------------------|-------------------|---------------------|
| 1. 96 oz.          | 12. 4 oz.         | 23. 9 lbs., 14 oz.  |
| 2. 208 oz.         | 13. 12 oz.        | 24. 15 lbs., 3 oz.  |
| 3. 88 oz.          | 14. 2 oz.         | 25. 21 lbs., 11 oz. |
| 4. 132 oz.         | 15. 6 oz.         | 26. 10 oz.          |
| 5. 204 oz.         | 16. 242 oz.       | 27. 14 oz.          |
| 6. 1 lb., 3 oz.    | 17. 315 oz.       | 28. 3 lbs., 4 oz.   |
| 7. 2 lbs.          | 18. 518 oz.       | 29. 8 lbs., 12 oz.  |
| 8. 2 lbs., 11 oz.  | 19. 730 oz.       | 30. 5 lbs., 10 oz.  |
| 9. 4 lbs., 1 oz.   | 20. 863 oz.       |                     |
| 10. 4 lbs., 11 oz. | 21. 5 lbs., 7 oz. |                     |
| 11. 8 oz.          | 22. 7 lbs.        |                     |

### Math Activity 4—RECIPE CONVERSION

Ingredients	New Recipe 1 ÷ 2 Conversion Factor	New Recipe 2 × 2 Conversion Factor
Shortening	1¼ cup	5 cup = 1 qt. + 1 cup
Sugar	⅔ cup	2⅔ cup
Vanilla	½ Tbsp. = 1½ Tbsp.	2 Tbsp.
Eggs	1	4
Sifted cake flour	1 cup + 2 Tbsp. + 2 Tbsp.	4⅔ cup = 1 qt. + ⅔ cup
Baking powder	1½ Tbsp. = 1 Tbsp. + 1½ Tbsp.	6 Tbsp. = ¼ cup + 2 Tbsp.
Salt	½ Tbsp.	2 Tbsp.
Milk	4 oz.	16 oz. = 1 pt.
Syrup	3 Tbsp.	12 Tbsp. = ¾ cup
Pecans	⅔ cup = ¼ cup + 2 Tbsp.	1½ cup

### Math Activity 5—WEIGHT & VOLUME CHARTS

Ingredients	Volume	Ingredients	Weight
Bread flour	16 cup = 1 gal.	Brown sugar, packed	1 lb.
Dark rye flour	$7\frac{1}{2}$ cup = 1 qt. + 1 pt. + $1\frac{1}{2}$ cup	Shortening	$\frac{1}{4}$ lb.
Yeast	12 Tbsp. = $\frac{3}{4}$ cup	Salt	$1\frac{1}{2}$ oz.
Salt	3 Tbsp.	Baking soda	$1\frac{1}{2}$ oz.
Dry milk	$1\frac{1}{3}$ cup	Pastry flour	2 lbs.
Shortening	6 cup = 1 qt. + 1 pt.	Whole eggs	$\frac{3}{4}$ lb.
Granulated sugar	4 cup = 1 qt.	Vanilla	$\frac{1}{4}$ oz.
Malt	$\frac{2}{3}$ cup		
Water	8 cup = 2 qt.		

### Math Activity 6—WEIGHT & VOLUME CONVERSION

- $\frac{3}{4}$  lb.
- $\frac{1}{2}$  lb.
- $\frac{1}{2}$  lb.
- $\frac{1}{2}$  lb.
- 2 oz.
- 4 oz.
- $1\frac{1}{2}$  oz.
- $\frac{1}{4}$  lb.
- 36 oz. or 2 lbs. 4 oz.
- $\frac{1}{2}$  gal.
- $\frac{1}{2}$  cup
- 2 qts.
- $6\frac{1}{2}$  cup = 1 qt. + 1 pt. +  $\frac{1}{2}$  cup
- 6 cup = 1 qt. + 1 pt.
- 9 cup = 1 qt. + 2 pts. + 1 cup

### Math Activity 7—WEIGHT VERSUS VOLUME

Answers will vary.

### Math Activity 8—VOLUME MEASURES

Item	Volume Equivalent
Cooked rice	$1\frac{1}{4}$ cup
Apples, peeled and sliced	$\frac{1}{2}$ cup
Diced bananas	1 cup + 2 Tbsp.
Coconut, shredded	$4\frac{1}{2}$ cup = 1 qt. + $\frac{1}{2}$ cup
Evaporated milk	1 cup

1. 4 cup or 1 qt.	6. 5 cup or 1 qt. + 1 cup
2. 6 cup or 1 qt. + 1 pt.	7. $1\frac{1}{4}$ cup
3. 8 cup or 2 qts.	8. $1\frac{1}{2}$ cup
4. 1 cup	9. $2\frac{1}{2}$ cup or 1 pt. + $\frac{1}{2}$ cup
5. 3 cup or 1 pt. + 1 cup	10. $2\frac{3}{4}$ cup or 1 pt. + $\frac{3}{4}$ cup

### Math Activity 9—SCALE OPERATION

Students will demonstrate their skills at scale operation.

### Math Activity 10—COOKING WITH FRACTIONS

- a.)  $\frac{1}{4}$  cup  
b.)  $\frac{1}{3}$  cup  
cup)  $\frac{1}{2}$  cup
- a.)  $\frac{1}{4}$  Tbsp.  
b.)  $\frac{1}{2}$  Tbsp.  
c.) 1 Tbsp.  
d.) 1 Tbsp.
- $\frac{1}{8}, \frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{7}{8}$
- 2
- 4
- 3
- 2
- a.)  $\frac{3}{8}$   
b.)  $\frac{7}{8}$
- c.)  $\frac{1}{2}$   
d.)  $\frac{1}{2}$
- a.)  $\frac{1}{4}$  cup  
b.) 2 Tbsp.  
c.)  $\frac{1}{2}$  cup +  $\frac{1}{4}$  cup  
d.)  $\frac{1}{2}$  cup  
e.)  $\frac{1}{2}$  cup + 2 Tbsp.  
f.)  $\frac{1}{3}$  cup  $\times$  2  
g.)  $\frac{1}{4}$  cup + 2 Tbsp.  
h.)  $\frac{3}{4}$  cup + 2 Tbsp.
- a.) 2 qts.  
b.) 3 qts.  
c.) 1 pt.  
d.) 1 qt.

### Math Activity 11—CALCULATING CONVECTION TEMPERATURE

- 250°F
- 400°F
- 300°F
- 350°F
- 375°F
- 300°F
- 275°F
- 325°F
- 350°F
- 300°F

### Math Activity 12—CALCULATING CONVECTION TIME

- | $\frac{1}{2}$ (.5) Time | $\frac{2}{3}$ (.67) Time |
|-------------------------|--------------------------|
| 1. 10 min.              | 14 min.                  |
| 2. 15 min.              | 20 min.                  |
| 3. 20 min.              | 27 min.                  |
| 4. 23 min.              | 30 min.                  |
| 5. 30 min.              | 40 min.                  |
| 6. 8 min.               | 10 min.                  |
| 7. 18 min.              | 24 min.                  |
| 8. 28 min.              | 37 min.                  |
| 9. 38 min.              | 50 min.                  |
| 10. 43 min.             | 57 min.                  |
| 11. 25 min.             | 34 min.                  |
| 12. 53 min.             | 1 hr., 10 min.           |
| 13. 1 hr., 15 min.      | 1 hr., 40 min.           |
| 14. 1 hr., 35 min.      | 2 hrs., 7 min.           |
| 15. 2 hrs., 8 min.      | 2 hrs., 50 min.          |

### Math Activity 13—COSTING FORM

Answers will vary depending on the recipe provided.

### Math Activity 14—USING SCOOPS & LADLES

- Entrées; mashed potatoes
- Muffins; vegetables; salads; desserts
- Muffins; desserts
- Muffins; cupcakes; sandwich fillings
- Cream puffs; muffins
- Cookies; sorbet
- Mini cookies; appetizers
- Garnishes; appetizers
- Garnishes; appetizers
- Sauces; salad dressings
- Gravies; sauces

(Continued on next page)

**Math Activity 15—MATH SCOOPS**

- |               |            |
|---------------|------------|
| 1. A. #8      | 6. A. #16  |
| B. 16         | B. 12      |
| 2. A. #8      | 7. A. #70  |
| B. 24         | B. 128     |
| 3. A. 2 (#12) | 8. A. #70  |
| B. 18         | B. 256     |
| 4. A. 2 (#12) | 9. A. #60  |
| B. 27         | B. 96      |
| 5. A. #16     | 10. A. #30 |
| B. 64         | B. 32      |

**Math Activity 16—COSTING AN INVOICE—WEIGHT/  
UNIT PRICES**

Item	Weight Unit Price
Stewed tomatoes	\$0.03/oz.
Cream of mushroom soup	\$0.05/oz.
Polish sausage links	\$1.70/lb.
Turkey breast (cooked, diced)	\$0.15/oz.
Refried beans	\$0.51/lb.
Elbow macaroni	\$0.39/lb.
Spaghetti	\$2.68/lb.
Milk	\$0.02/oz.
Cake flour	\$0.72/lb.
Sugar	\$0.46/lb.
Cherry pie filling	\$1.75/lb.
Chocolate Chips	\$2.68/lb.
Walnut halves	\$3.40/lb.
American cheese slices	\$2.05/lb.
Grated cheddar cheese	\$2.50/lb.
Cream cheese	\$1.72/lb.
Parmesan cheese	\$3.72/lb.
Mayonnaise	\$0.04/oz.

**Math Activity 17—COSTING A QUICK-SERVICE-MEAL**

Grilled Chicken Sandwich	Extended Cost
Boneless, skinless chicken breast	\$4.01
Provolone cheese	\$0.90
Mushrooms, sliced	\$0.42
Tomato	\$0.27
Leaf lettuce	\$0.19
Low-fat avocado dressing	\$0.25
Bread, 7-grain	\$1.03
Pickles, sliced, drained	\$0.17
<b>Total Extended Cost</b>	<b>\$7.24</b>
<b>30% Mark-Up</b>	<b>\$2.17</b>
<b>Selling Price</b>	<b>\$9.41</b>
<b>Cost per Serving (\$9.41 ÷ 4)</b>	<b>\$2.35</b>

Fresh Fruit Medley	Extended Cost
Strawberries, whole, fresh	\$1.30
Bananas, diced	\$0.22
Melon, cubed	\$1.00
Grapes, whole, stemmed	\$0.50
Orange, sections	\$0.30
Pineapple, fresh, cubed	\$2.50
<b>Total Extended Cost</b>	<b>\$5.82</b>
<b>30% Mark-Up</b>	<b>\$1.75</b>
<b>Selling Price</b>	<b>\$7.57</b>
<b>Cost per Serving (\$7.57 ÷ 8)</b>	<b>\$0.95</b>

Menu Selection	Selling Price
Grilled Chicken Sandwich	\$2.35
Fresh Fruit Medley	\$0.95
<b>Total Menu Price</b>	<b>\$3.30</b>

<b>Math Activity 18—COSTING A CASUAL DINING MEAL</b>	
<b>Mixed Baby Greens Salad</b>	<b>Extended Cost</b>
Baby greens	\$1.75
Roma tomatoes	\$0.45
Parmesan cheese	\$0.15
Carrots	\$0.02
Cucumber	\$0.25
Croutons	\$0.13
Low-fat dressing	\$0.21
<b>Total Extended Cost</b>	<b>\$2.96</b>
<b>30% Mark-Up</b>	<b>\$0.89</b>
<b>Total Selling Price</b>	<b>\$3.85</b>

<b>Citrus Red Snapper</b>	<b>Extended Cost</b>
Red snapper	\$5.06
Lemon zest & juice	\$0.11
Lime zest & juice	\$0.09
Orange zest & juice	\$0.07
Fresh garlic	\$0.23
Seasonings	\$0.06
Green onion	\$0.07
Green chili	\$0.03
Olive oil	\$0.18
<b>Total Extended Cost</b>	<b>\$5.90</b>
<b>30% Mark-Up</b>	<b>\$1.77</b>
<b>Total Selling Price</b>	<b>\$7.67</b>

<b>Wild Rice Blend</b>	<b>Extended Cost</b>
Wild rice	\$0.42
Basmati rice	\$0.25
Pine nuts	\$0.28
Onion	\$0.04
Rosemary	\$0.06
Butter	\$0.07
Seasonings	\$0.06
<b>Total Extended Cost</b>	<b>\$1.18</b>
<b>30% Mark-Up</b>	<b>\$0.35</b>
<b>Total Selling Price</b>	<b>\$1.53</b>

<b>Grilled Vegetable Kabob</b>	<b>Extended Cost</b>
Eggplant	\$0.63
Yellow squash	\$0.35
Red onion	\$0.04
Green pepper	\$0.12
Portobello mushrooms	\$0.77
Garlic	\$0.45
Fresh basil	\$0.09
Seasoning	\$0.06
Balsamic vinegar	\$0.06
Olive oil	\$0.18
<b>Total Extended Cost</b>	<b>\$2.75</b>
<b>30% Mark-Up</b>	<b>\$0.83</b>
<b>Total Selling Price</b>	<b>\$3.58</b>

<b>Poached Pears</b>	<b>Extended Cost</b>
Pears	\$1.45
Raisins	\$0.38
Apple juice, concentrate	\$0.19
Cinnamon stick	\$0.25
Flavorings	\$0.09
Pecans, whole	\$0.39
Fresh berries	\$1.50
<b>Total Extended Cost</b>	<b>\$4.25</b>
<b>30% Mark-Up</b>	<b>\$1.28</b>
<b>Total Selling Price</b>	<b>\$5.53</b>

(Total Menu Selling Price ÷ 4 Servings)

Menu Selection	Selling Price per Serving
Mixed Baby Greens Salad	\$0.96
Citrus Red Snapper	\$1.92
Wild Rice Blend	\$0.38
Grilled Vegetable Kabob	\$0.90
Poached Pear with Fresh Berries	\$1.38
<b>Total Menu Selling Price per Serving</b>	<b>\$5.54</b>

**Math Activity 19—COSTING A COLD PLATTER BUFFET**

**Crudité**

**Extended Cost**

Carrot, julienne	\$1.02
Red pepper, julienne	\$2.60
Green beans	\$1.65
Radishes	\$0.79
Broccoli	\$0.90
Celery	\$2.62
Cherry tomatoes	\$2.50
Vegetable dip	\$2.70
<b>Total Extended Cost</b>	<b>\$14.78</b>

**Chicken Salad Mini Pitas**

**Extended Cost**

Mini pita breads	\$2.75
Diced chicken	\$11.75
Celery	\$0.59
Red grapes	\$1.57
Slivered almonds	\$0.75
Parsley	\$0.16
Seasonings	\$0.27
Mayonnaise	\$0.46
Lemon juice	\$0.03
Sour cream	\$0.53
Leaf lettuce	\$1.55
<b>Total Extended Cost</b>	<b>\$20.41</b>

**Glazed Ham Roll-Up**

**Extended Cost**

Crepes	\$6.00
Cream cheese	\$3.43
Sun-dried tomato pesto	\$3.89
Shredded co-jack cheese	\$2.06
Green olives	\$0.43
Honey glazed ham	\$10.12
<b>Total Extended Cost</b>	<b>\$25.93</b>

**Roasted Turkey Sandwich**

**Extended Cost**

Wheat bread	\$1.40
Roasted turkey	\$7.02
Swiss cheese	\$2.65
Alfalfa sprouts	\$1.49
Tomatoes	\$1.06
Flavored butter	\$0.54
<b>Total Extended Cost</b>	<b>\$14.16</b>

**Pasta Salad**

**Extended Cost**

Tri-colored bow-tie pasta	\$3.60
Grape tomatoes	\$1.73
Carrot	\$0.17
Cauliflower	\$1.10
Green olives	\$0.49
Black olives	\$0.28
Green onions	\$0.18
Parsley	\$0.16
Italian dressing	\$1.80
<b>Total Extended Cost</b>	<b>\$9.51</b>

**Fresh Fruit Platter**

**Extended Cost**

Watermelon	\$5.99
Cantaloupe	\$3.90
Strawberries	\$4.18
Pineapple	\$5.38
Orange slices	\$1.74
Grapes	\$2.08
Cherries	\$1.50
Kiwi slices	\$0.74
<b>Total Extended Cost</b>	<b>\$25.51</b>

**Dessert Tray**

**Extended Cost**

Chocolate frosted brownies	\$18.27
Peanut butter cookies	\$3.20
Lemon bars	\$14.78
Custard-filled cream puffs	\$8.30
Mini assorted cheesecakes	\$25.53
Petit fours	\$8.58
<b>Total Extended Cost</b>	<b>\$78.66</b>

<b>Cold Platter</b>	<b>Total Cost of Platter</b>
Crudité	\$14.78
Chicken Salad Mini Pitas	\$20.41
Glazed Ham Roll-Ups	\$25.93
Roasted Turkey Sandwiches	\$14.16
Pasta Salad	\$9.51
Fresh Fruit Platter	\$25.51
Dessert Tray	\$78.66
<b>Total Extended Cost of Cold Platters</b>	<b>\$188.96</b>
<b>25% Mark-Up</b>	<b>\$47.24</b>
<b>Selling Price of Cold Platter Buffet</b>	<b>\$236.20</b>
<b>Selling Price per Individual</b>	<b>\$4.72</b>



**Math Activity 20—COSTING TUNA NOODLE  
CASSEROLE**

<b>Ingredients</b>	<b>Extended Cost</b>
Noodles	\$0.96
Tuna fish	\$0.56
Mayonnaise	\$0.16
Sliced celery	\$0.33
Chopped onion	\$0.04
Chopped green pepper	\$0.07
Chopped pimentos	\$0.55
Salt	\$0.03
Cream of celery soup	\$0.56
Milk	\$0.09
American cheese	\$0.63

**Total Cost:** \$3.98

**Calculate Mark-Up:**  $3.98 \times 20\% = \$0.80$

**Calculate Selling Price:**  $3.98 + .80 = 4.78$

**Selling Price =** \$4.78

**Calculate Cost per Serving:**  $3.98 \div 6 = .66$

**Cost per Serving =** \$0.66

**Math Activity 21—COSTING SLAW**

<b>Ingredients</b>	<b>Extended Cost</b>
Sugar	\$0.08
Garlic salt	\$0.03
Celery seed	\$0.03
Vinegar	\$0.27
Lemon juice	\$0.06
Cabbage	\$0.36
Green pepper	\$0.13
Celery	\$0.10
Green onions	\$0.28

**Total Cost:** \$1.34

**Calculate Mark-Up:**  $1.34 \times 25\% = \$0.34$

**Calculate Selling Price:**  $1.34 + .34 = 1.68$

**Selling Price =** \$1.68

**Calculate Cost per Serving:**  $1.34 \div 6 = .22$

**Cost per Serving =** \$0.22

**Math Activity 22—COSTING PEANUT BUTTER  
COOKIES**

<b>Ingredients</b>	<b>Extended Cost</b>
Shortening	\$0.40
Peanut butter	\$1.53
Sugar	\$0.23
Brown sugar	\$0.34
Eggs	\$0.12
Vanilla	\$0.03
Flour	\$0.10
Salt	\$0.02
Baking soda	\$0.02
Baking powder	\$0.02
Peanuts	\$0.08

**Total Cost:** \$2.89

**Calculate Mark-Up:**  $2.89 \times 25\% = \$0.73$

**Calculate Selling Price:**  $2.89 + 0.73 = 3.62$

**Selling Price =** \$3.62

**Calculate Cost per Serving:**  $2.89 \div 24 = .12$

**Cost per Serving =** \$0.12

**Math Activity 23—COSTING BROWNIES**

<b>Ingredients</b>	<b>Extended Cost</b>
Flour	\$0.02
Baking powder	\$0.03
Cocoa	\$0.18
Margarine	\$0.12
Granulated sugar	\$0.23
Eggs	\$0.12
Walnuts	\$0.84
Vanilla	\$0.03

**Total Cost:** \$1.57

**Calculate Mark-Up:**  $1.57 \times 25\% = \$0.39$

**Calculate Selling Price:**  $1.57 + .39 = 1.96$

**Selling Price =** \$1.96

**Calculate Cost per Serving:**  $1.57 \div 18 = .09$

**Cost per Serving =** \$0.09

**Math Activity 24 —COSTING SOUR CREAM  
COFFEE CAKE**

<b>Ingredients</b>	<b>Extended Cost</b>
Margarine	\$0.27
Sugar	\$0.43
Eggs	\$0.18
Almond extract	\$0.02
Vanilla	\$0.05
Flour	\$0.15
Baking soda	\$0.05
Sour cream	\$0.75
Cherry pie filling	\$0.63
Cinnamon	\$0.02
Powdered sugar	\$0.28

**Total Cost:** \$2.83

**Calculate Mark-Up:**  $2.83 \times 20\% = \$0.57$

**Calculate Selling Price:**  $2.83 + .57 = 3.40$

**Selling Price =** \$3.40

**Calculate Cost per Serving:**  $2.83 \div 2 = 1.42$

**Cost per Serving =** \$1.42