AChor/MFM2P **Name: _____**
Date: _____

Worksheet 4-7: Applications of Linear Relations

Steps for Writing Equations of Linear Relations for Real World Situations:

1. Identify the independent and dependent variables.
2. Write let statements to represent the independent and dependent variables with English letters.
3. Use information given to determine slope (rate of change) and *y*-intercept (initial value).
4. Write an equation in slope and intercept form ($y = mx + b$) to represent the situation.

When applicable, use the equation from step 4 to determine unknown values.

1. Sam earns $8 per hour babysitting the children next door. Write an equation to represent the relationship between number of hours babysitting and earnings from babysitting.

Step 1:

Step 2:

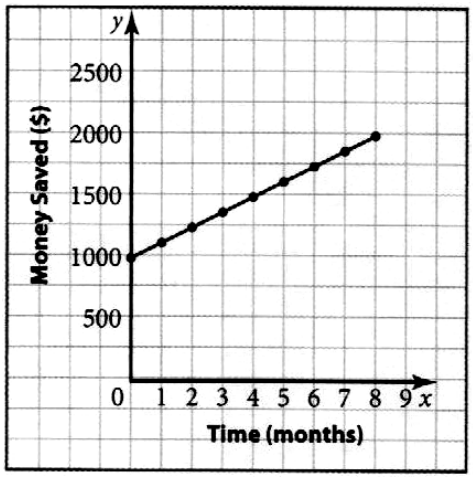
Step 3:

Step 4:

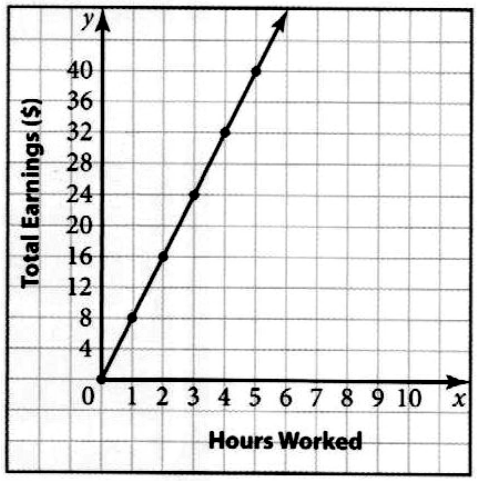
2. A downtown parking garage charges $2.50 per hour after 6 p.m. Write an equation to represent the relationship between parking costs and number of hours parking. (Follow the 4 steps!)

3. Grace has a bank account that she rarely uses. On the last day of each month, the bank charges $4.50 as a service charge for managing the account. On January 1, Grace had $67.00 in her account. She made no deposits or withdrawals in this account for 6 months. Write an equation to represent the relationship between number of months and the amount of money in the account. (Follow the 4 steps!)

4. A graph of Maria's college fund is given. Write an equation that represents the amount of money in Maria's college fund. (Follow the 4 steps!)



5. Wendy works at a fast food restaurant and a graph of her weekly earnings is given. Write an equation to represent Wendy's weekly earnings.



6. Dylan borrowed $1000 from his parents so he could get his GI driver's licence and take a driver training course. Dylan has a part-time job, and he has agreed to pay his parents back at a rate of $50 per week.

(a) Write an equation to represent the amount he still owes over the weeks.

(b) How much does he still owe after 9 weeks?

7. At the gym near her house, Sierra notices a chart that shows that the relationship between people's ages and their heart rates at different levels of exercise is linear. Sierra records the rates for herself and her mother, at the same exercise level as shown below. Write an equation to model this linear relation.

Age (years)	Heart Rate (bpm)
20	138
45	123

8. Some salespeople are paid by a combination of a fixed weekly wage plus commission – variable earnings that are a percent of sales. Justin sells solar pool heating systems. He earns a weekly salary of $500 plus a commission on all sales (total values of heating systems he sells in a week). If Justin's sales were $10000 in one week, his total earnings would be 1100. Determine the equation that represents Justin's weekly earnings. (Hint: Find slope first.)

9. A salesperson earns $200 per week plus 5% of total sales.

(a) Write an equation to represent the relationship between total sales in dollars and weekly earnings.

(b) How much has to be sold to ensure an income of at least $550 per week?

Answers: **1.** $E = 8h$ **; 2.** $C = 2.5h$ **; 3.** $A = 67 - 4.5m$ **or** $A = -4.5m + 67$ **; 4.** $F = 1000 + 125m$ **;**
5. $E = 8h$ **; 6. (a)** $M = 1000 - 50w$ **or** $M = -50w + 1000$ **, (b)** $550**;**
7. $H = -0.6a + 150$ **or** $H = 150 - 0.6a$ **; 8.** $E = 0.6s + 500$ **; 9. (a)** $E = 0.05s + 200$ **, (b)** at least $7000