



## CBE Assessment

### Performance Assessment MA.8.11 Equations for Entertainment Grade 8

## STUDENT BOOKLET

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## ACKNOWLEDGEMENTS

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The scoring rubrics shown in this booklet are adapted from those developed by the Center for Assessment, under Creative Commons license Attribution 4.0 International (CC BY 4.0)



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## CALCULATING VOLUME AND DETERMINING DIMENSIONS

Today, you will be participating in an assessment asking you to apply your knowledge and skills related to operations and algebraic thinking to solve problems using linear equations.

There are 5 problems for this assessment.

Problems 1-2, on page 3, asks you to create an equation to determine the admission price at an amusement park for students at different ages.

Problems 3-4, on page 4, ask you to use the admission price equation to determine the ages that match with different admission prices. Another problem asks you to calculate the cost of a Fast Pass that lets you move to the front of the lines for each ride.

Problem 5, on page 5, asks you to use an expression representing the number of rides per hour to find the number of rides ridden during a race.

The Teacher Scoring Rubric that will be used to evaluate your work on the problems is shown below.

Teacher Scoring Rubric—Student Version			
Dimensions	Not Yet Meeting Expectations	Meeting Expectations	Exceeding Expectations
<b>Concepts and Procedures</b>	I can solve some of the problems, but I am confused in some places and have calculation mistakes.	I can solve the problems using strategies that make sense with few calculation mistakes.	I can solve the problems efficiently and accurately without any calculation mistakes.
<b>Reasoning and Explaining</b>	I can show some of the strategies and steps I used and explain how I solved the problem.	I can show all of the strategies and steps I used. I can and explain the thinking I used to solve the problems using some math vocabulary.	I can show all of the strategies and steps I used. I can explain the thinking I used to solve the problems using precise math vocabulary in a way that another person can easily understand my math reasoning.

Do you have any questions about what you are expected to do?

You may now begin. Remember, you have 60 minutes to respond to the five questions.

When time is up, please close your Student Booklet and pass it in.

# STUDENT MATERIALS

## QUESTIONS 1-2

Solve the following problems. Please show any work.

### Equations for Entertainment

You and two friends are visiting the Wally World Amusement Park. They have a special pricing system where the admission cost depends on the visitor's age.

The pricing equation for the park's admission includes a \$5 fee for anyone entering the park. It also includes an additional dollar amount that is 2.5 times the visitor's age.

The total of these is equal to the admission price.

1. Create an equation that represents their pricing using the variable  $p$  for admission price and the variable  $a$  for the visitor's age.

Equation:  $5 + 2.5a = p$

Explain why you set up your equation this way and how it can be used to calculate the admission price. Choose your age to show the calculation.

Because there is a \$5 fee to enter the park, the 2.5 times the age of the person is added to the \$5 fee to get the admission price.

2. You and your friends are 10, 12, and 13 years old. You also have an older sibling chaperoning who is 22 years old. Use your equation from the prior question to calculate the admission price for each person in your group.

Age	10	12	13	22
Admission Price	30	35	27.5	60

Show your calculations below:

$5 + 2.5 \cdot 10 = p$   
 $5 + 25 = p$   
 $30 = p$

$5 + 2.5 \cdot 12 = p$   
 $5 + 30 = p$   
 $35 = p$

$5 + 2.5 \cdot 13 = p$   
 $5 + 32.5 = p$   
 $37.5 = p$

$5 + 2.5 \cdot 22 = p$   
 $5 + 55 = p$   
 $60 = p$

### QUESTION 3

3. While you are in line waiting for a ride, you overhear people in front of you explaining how expensive their admission price was. One mentions a price of \$70 and the other says the price was \$80.

Use your equation from the first question to calculate the age for an admission price of \$70 and an admission price of \$80.

Show your work below:

$$\begin{array}{rcl}
 5 + 2.5A = 70 & 26 \cdot 2.5 = 65 & 5 + 2.5A = 80 \\
 -5 & 65 + 5 = 70 & -5 \\
 \hline
 2.5A = 65 & A = 26 & 2.5A = 75 \\
 \frac{2.5}{2.5} \quad \frac{65}{2.5} & & \frac{2.5}{2.5} \quad \frac{75}{2.5} \\
 & & A = 30
 \end{array}$$

Admission Price	\$70	\$80
Age	26	30

Do you feel like this is a fair pricing model? Explain why or why not.

No because different people are paying more money than others for the same experience

If you were in charge of admission costs, what type of pricing equation would you use?

Use the variable  $p$  for admission price and explain other variables you would use.

Explain how it would calculate the total cost for a given age.

I would do  $15 + 1.5A = p$  but everything else inside would be free. There would be \$15 for admission fee and your age times 1.5 to get the total.

## QUESTIONS 4-5

4. Your friend sees a sign for a special wristband called a Fast Pass. This is a special pass that lets you move to the front of the line for any ride you visit. One friend has a coupon for \$18 off the price. The other has a coupon for a 15% discount off the price.

At the Fast Pass counter, the worker tells you the discount for each coupon will be the same amount. Use this information to set up and solve an equation to find the price for the Fast Pass. Using the variable  $p$  for price, the \$18 off coupon can be expressed as  $p - 18$ . The 15% off coupon takes  $1.00 - 0.15$  or  $0.85$  of the original price. This can be expressed as  $0.85p$ .

Coupon: \$18 off Expression:  $p - 18$

Coupon: 15% off Expression:  $0.85p$

Fast Pass Price  $p$ : 120

$$\begin{array}{r} p - 18 = 0.85p \\ -0.85p \quad -0.85p \\ \hline 0.15p - 18 = 0 \\ 18 \quad 18 \\ \hline 0.15p = 18 \\ p = 120 \end{array}$$

5. You and your friends decide to purchase the Fast Pass and have a race against your older brother who is chaperoning. With the Fast Pass, you and your friends can ride 7.4 rides per hour. Your brother has the Fast Pass and can ride 8.2 rides per hour, but starts half an hour later.

The number of rides per hour times hours equals total rides. Using the variable  $t$  for time (in hours) the expression for each would be:

You and your friends: 7.4 rides per hour

Total rides expression:  $7.4t$

Brother: 8.2 rides per hour starting  $\frac{1}{2}$  hour later

Total rides expression:  $8.2(t - 0.5)$

Set up an equation and solve to see how long it will take your brother to catch up and ride an equal number of rides.

Show your work below:

Time when rides will be equal: 3.125

If you will only be at the amusement park for 4 hours after buying the pass, who will be the winner of the race? Support your explanation by determining the number of rides for each.

$$\begin{array}{r} 7.4t = 8.2(t - 0.5) \\ 7.4t = 8.2t - 4.1 \\ -7.4t \quad -7.4t \\ \hline 0 = 0.8t - 4.1 \\ +4.1 \quad +4.1 \\ \hline 4.1 = 0.8t \\ 4.1 = 0.8t \\ 0.8 \quad 0.8 \\ \hline 5.125 \end{array}$$

You will win!  
Your brother will take 5 hours to catch up