Name(s):	Period:	Date:

Ella's Etsy Store

Expressions in Industry Assignment 1

An SB1070 Project

Objectives

By the end of this activity students will be able to

- Evaluate expressions
- Write expressions
- Manipulate expressions

Case Study & Practice

Every month, Ella and her friends get together for a game night. From board games to video games and card games, they love to leave work behind and immerse themselves in something total different and have a good time. This inspired Ella to come up with her own game which she calls *35 To Win*. This game uses a special deck of cards, and Ella printed them on card stock and tried it out with her friends on game night. It was a ton of fun and they played long into the night. Soon her friends were asking her to make copies of the game for them, and they shared it with others.

After quite a few people asked Ella if they could buy a copy of *35 to Win* from her she decided that on top of her day job she would open an online store to sell her game. This would bring in extra money as well as give her a chance to be more creative.

Ella had to consider a number of things before opening her store. The first thing she needed to find out was the cost of manufacturing the game from home. The game consists of 104 cards about the size of a regular playing card. Each sheet of cardstock can make 9 cards. Ella needs to take into consideration the cost of cardstock (c), the cost of printing each page cardstock (p), the cost of her time to cut the cards and the cost of the label & box (b) for each set of 104 cards.

1. Which expression to represents how much she should calculate for the cost of labor based on time in minutes (t) if she plans to pay herself or her employees $10 per hour.

$10t $6t $0.16t $0.16/t

Why did you choose this answer?

If you did any math to find the answer, show your work here:

2. Which expression to represents the cost of a single card.

$\frac{c-p}{9}$ $\frac{c+p}{9}$ $\frac{c+p+t}{9}$ $\frac{c+b}{9}$

What is the purpose of the number 9 in this expression?

3. Look at the following expressions. You might notice that they contain components of the expressions you have studied up above. Which represents the manufacturing cost of the product?

a) $\frac{c-p}{9}$ (104) + 0.16t + b

b) $\frac{c+p}{9}$ (104) + 0.16t + b

c) $c+p$ (104) + 0.16/t + b

d) [$\frac{c-p}{9}$ + 0.16t + b] x 104

Write out the expression you have chosen and label each variable with what it represents.

4. A pack of 100 pieces of linen cover stock costs $14.99, it's $0.42 per page for high quality colored printing, and you found boxes for $1 each and apply a label that cost you $35 cents. What is the cost of manufacturing (m) each game if it takes 25 minutes to cut and assemble it?

Since Ella was making the game by hand at home she decided to sell the game on Etsy, an internet marketplace for homemade goods. Etsy keeps 3.5% of the sales price as a fee for the online store.

If Ella plans to make a 50% profit on each item she sells she needs to create an expression that can represent the minimum sale price (s) she should set on any product that she sells as a function of the total cost of manufacturing the product (m)

5. This expression can be written in a number of ways. Which of the following expressions DOES NOT represent the minimum price Ella should set on any product she decides to sell on Etsy?

1.50(m+0.035m)
1.50m+0.035m
1.50m+.0525m
1.5525m

6. There are many variable costs when building a game, and Ella needs to be able to change her price based on changes in the cost of materials. Combine the expression in question 4 with the expression in question 2 to create one expression that Ella can use to calculate how much to charge for her card game.

What does each variable represent?

7. The following data table lists the cost of each variable item over a 6 month period. Use the expression you created to determine the sales price she should set for her card game each month. Also, find the average price over the 6 month period so Ella can consider her prices going forward.

	January	February	March	April	May	June	Average
Cost per piece of cardstock (c)	.1499	0.1499	0.1299	0.1299	0.1299	0.1399	
Cost of printing per page (p)	$0.42	$0.42	$0.42	$0.21 *half price sale!	$0.21	$0.42	
Time it takes to manufacture each set in minutes (t)	25	20	20	20	18	18	
Cost of the box & label (b)	$1.35	$1.35	$1.35	$1.35	$1.20 *Bulk discount	$1.20 *Bulk discount	
Lowest price Ella should set							

8. If Ella sets her price at $15, which months would she reach her goal of making a 50% profit? Can you identify any reason that her costs were reduced during these months?

If you were Ella, what price would you set on the card game going forward taking into consideration the above numbers and your own thoughts on how much you would pay for a game? Explain your reasoning.

9. *35 to Win* has been doing very well, so Ella decides to make a kids version of the game. This game is called *17 to Win* and it only uses 52 cards. Consider the expression that Ella uses to find the amount she charges for *35 to Win* and circle the component that needs to change in order to find the cost of *17 to Win.*

$$1.5525\left(\frac{c+p}{9}(104) + 0.16t + b\right)$$

Rewrite the expression so it can calculate the amount Ella should charge for her new game *35 to Win*

10. Ella begins selling this game in March. The cost of the supplies are the same as the costs of supplies for *32 to Win*. What are the prices Ella should set to make a 50% profit? What is the average price Ella should consider as she goes forward?

	March	April	May	June	Average
Cost per piece of cardstock (c)	0.1299	0.1299	0.1299	0.1399	
Cost of printing per page (p)	$0.42	$0.21 *half price sale!	$0.21	$0.42	
Time it takes to manufacture each set in minutes (t)	20	20	18	18	
Cost of the box & label (b)	$1.35	$1.35	$1.20 *Bulk discount	$1.20 *Bulk discount	
Lowest price Ella should set					

11. For the holidays Ella decides to make a travel version of her game to advertise as a stocking stuffer. The travel version is the same as the original version, however it is smaller so that 20 cards can fit on a page. Look over the original expression and circle any component that needs to be changed

$$1.5525\left(\frac{c+p}{9}(104) + 0.16t + b\right)$$

Rewrite the expression so it can be used to find the sales price for the travel version of *35 to Win*.

If Ella plans to sell her travel version for $9 will she make a 50% profit if the paper costs $0.1399 a piece, the printing costs $0.42 it takes her 20 minutes to cut and package each set and the tiny boxes with a label cost $1.50? What would be the minimum price she should set?

Career Spotlight – Entrepreneur

An entrepreneur creates a business they are passionate about and invest time and money to make it a success. Entrepreneurs might have a food truck, an Etsy store or a million dollar movie, but what ties them together is originality and a drive to run their own business and make something of it. Many entrepreneurs begin their business with a product or an idea which they work on while still employed at their full time job and eventually begin to work for themselves as the CEO of their own brand. Entrepreneurs often partner with investors who will be willing to invest money into the business in exchange for ownership or a share of profits. This is an industry that can be very risky, and the cost to start the company might be high, but the benefits of working for yourself and having a passion for your job are worth it to many people, making them take the leap into entrepreneurship.

Average Annual Salary: $1,000 - $100,000+ per year
Education Requirements: Entrepreneurs benefit from an education in business or marketing no matter what industry. Associates or bachelor degrees in these fields, or in fields like digital media, technology or accounting, help to make an entrepreneur a success.
More information:
http://study.com/articles/Entrepreneurs_Information_About_a_Career_as_an_Entrepreneur.html
http://www.forbes.com/sites/meghancasserly/2012/09/25/the-10-best-careers-for-wannabe-entrepreneurs/

KEY

1. Which expression to represents how much she should calculate for the cost of labor based on time in minutes (t) if she plans to pay herself or her employees $10 per hour.
$0.16t

2. Which expression to represents the cost of a single card.
$\frac{c+p}{9}$

3. Look at the following expressions. You might notice that they contain components of the expressions you have studied up above. Which represents the manufacturing cost of the product?
b) $\frac{c+p}{9}$ (104) + 0.16t + b

4. A pack of 100 pieces of linen cover stock costs $14.99, it's $0.42 per page for high quality colored printing, and you found boxes for $1 each and apply a label that cost you $35 cents. What is the cost of manufacturing (m) each game if it takes 25 minutes to cut and assemble it?
$\frac{(.1499+.42)}{9}$ x104 +.16(25) + 1.35 = $11.94

5. This expression can be written in a number of ways. Which of the following expressions DOES NOT represent the minimum price Ella should set on any product she decides to sell on Etsy?
1.50(m+0.035m)
1.50m+0.035m
1.50m+.0525m
1.5525m

6. There are many variable costs when building a game, and Ella needs to be able to change her price based on changes in the cost of materials. Combine the expression in question 4 with the expression in question 2 to create one expression that Ella can use to calculate how much to charge for her card game.
1.5525($\frac{c+p}{9}$ (104) + 0.16t + b)
What does each variable represent?
c=cost of paper p=cost of printing t=time in minutes spent manufacturing
b=the cost of the box

7. The following data table lists the cost of each variable item over a 6 month period. Use the expression you created to determine the sales price she should set for her card game each month. Also, find the average price over the 6 month period so Ella can consider her prices going forward.

Lowest price Ella should set	$18.53	$17.29	$16.92	$13.16	$12.43	$16.38	$15.785

8. If Ella sets her price at $15, which months would she reach her goal of making a 50% profit? Can you identify any reason that her costs were reduced during these months?
Only in April and May because there was a sale on color printing
If you were Ella, what price would you set on the card game going forward taking into consideration the above numbers and your own thoughts on how much you would pay for a game? Explain your reasoning.
Answers vary – as long as there is logical reasoning the student should get credit

9. *35 to Win* has been doing very well, so Ella decides to make a kids version of the game. This game is called *17 to Win* and it only uses 52 cards. Consider the expression that Ella uses to find the amount she charges for *35 to Win* and circle the component that needs to change in order to find the cost of *17 to Win.*

$$1.5525\left(\frac{c+p}{9}(104) + 0.16t + b\right)$$

Rewrite the expression so it can calculate the amount Ella should charge for her new game *35 to Win*

$$1.5525\left(\frac{c+p}{9}(52) + 0.16t + b\right)$$

10. Ella begins selling this game in March. The cost of the supplies are the same as the costs of supplies for *32 to Win*. What are the prices Ella should set to make a 50% profit? What is the average price Ella should consider as she goes forward?

	March	April	May	June	Average
Lowest price Ella should set	$11.99	$10.11	$9.38	$11.36	$10.71

11. For the holidays Ella decides to make a travel version of her game to advertise as a stocking stuffer. The travel version is the same as the original version, however it is smaller so that 20 cards can fit on a page. Look over the original expression and circle any component that needs to be changed

$$1.5525\left(\frac{c+p}{9}(104) + 0.16t + b\right)$$

Rewrite the expression so it can be used to find the sales price for the travel version of *35 to Win*.

$$1.5525\left(\frac{c+p}{20}(104) + 0.16t + b\right)$$

If Ella plans to sell her travel version for $9 will she make a 50% profit if the paper costs $0.1399 a piece, the printing costs $0.42 it takes her 20 minutes to cut and package each set and the tiny boxes with a label cost $1.50? What would be the minimum price she should set?
No, she will not meet her 50% profit goal. The minimum price should be $9.56 in order to make a 50% profit.