1. The sale price of a TV that is currently 30% off the regular price of $328 can be found using any expression below except:
   A. $0.3 \times 328$
   B. $0.7 \times 328$
   C. $328 - 0.3 \times 328$
   D. $\frac{328 \times 70}{100}$

2. Which number line shows $6 + (-2)$?
   A. 
   B. 
   C. 
   D. 

3. The students in a class collected six lizards born at the same time. They measured the lengths of the lizards at age 3 months and plotted them on a graph in blue. Three months later, the students again measured the lengths and plotted them on the same graph in orange. The results are shown below.

Which statement is true about the ranges of the measured lengths of the lizards?

A. The range of the lengths at 3 months is less than the range of the lengths at 6 months.
B. The range of the lengths at 3 months is greater than the range of the lengths at 6 months.
C. The range of the lengths at 3 months is equal to the range of the lengths at 6 months.
D. The range of the lengths in the two plots cannot be determined.

4. Coach Minter wants each of his students to run 20 laps around the track. He is keeping track of how many laps each student has completed. Edgar finished 25% of the 20 laps. Noel ran \( \frac{2}{10} \) of the laps. Emily completed 15% of the laps. Wyatt finished 6 of the 20 laps. Which student completed the most laps in Coach Minter’s class?

A. Edgar
B. Noel
C. Emily
D. Wyatt
5. Simplify the expression:
\[
\frac{3}{4} - \frac{1}{2}\left(\frac{5}{7} + \frac{5}{7}\right) + \frac{3}{14}
\]

A. \(\frac{-53}{28}\)
B. \(\frac{-13}{22}\)
C. \(\frac{-7}{22}\)
D. \(\frac{46}{28}\)

6. The local home improvement store has posted the Saturday workshops for kids. Mallory would like to attend three of the five sessions. This particular store supplies all of the materials except the rope. Mallory has 16 \(\frac{3}{4}\) feet of rope left from previous projects. She would like to participate in the sessions for Projects B, D, and E. How much rope, if any, will be left after she completes all three projects?

<table>
<thead>
<tr>
<th>Project</th>
<th>Amount of rope needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 ft.</td>
</tr>
<tr>
<td>B</td>
<td>4 3/4 ft.</td>
</tr>
<tr>
<td>C</td>
<td>8 1/2 ft.</td>
</tr>
<tr>
<td>D</td>
<td>5 1/4 ft.</td>
</tr>
<tr>
<td>E</td>
<td>3 3/4 ft.</td>
</tr>
</tbody>
</table>

A. 13 \(\frac{3}{4}\) feet
B. Mallory does not have enough rope for the projects.
C. 4 \(\frac{1}{2}\) feet
D. 3 feet

7. Simplify the following expression 2\((x + 16) + 3(2x + 5)\)
A. \(7x + 21\)
B. \(5 + 3x + 21\)
C. \(8x + 37\)
D. \(8x + 47\)

8. A model rocket was launched from the ground and shot 150 feet straight up. It then fell back down to the ground and landed in the same place from which it was launched. Which expression shows how far the rocket traveled?
A. \(|150| - |150|\)
B. \(|150| - |–150|\)
C. \(|150| + |–150|\)
D. \(|150| + (–|150|)\)

9. It takes Robert \(\frac{3}{4}\) of a day to plant \(\frac{1}{3}\) of his field as shown by the yellow rectangle.

How many days will it take him to plant the entire field?
A. \(1 \frac{1}{2}\)
B. \(2 \frac{1}{4}\)
C. 3
D. \(\frac{4}{9}\)
Which of the following functions graphed on the coordinate plane above represent a proportional relationship?

A. Function A
B. Function B
C. Function C
D. Function D
11. The figure shown below is composed of two rectangles and a quarter circle.

What is the area of this figure, to the nearest square centimeter?

A. 33
B. 37
C. 44
D. 58

12. The base price for a flight from Los Angeles to Chicago is $400. The price goes up in December and June, but it goes down in February. The airline company uses percentages to show these differences.

February: 25% decrease
June: 5% increase
December: 80% increase

Which choice correctly shows how to calculate the price of the flight in February, June and December?

A. February: 0.25 \times $400
   June: 0.05 \times $400
   December: 0.8 \times $400

B. February: 0.75 \times $400
   June: 1.05 \times $400
   December: 1.8 \times $400

C. February: 0.25 \times $400
   June: 1.05 \times $400
   December: 1.8 \times $400

D. February: 0.75 \times $400
   June: 0.95 \times $400
   December: 0.2 \times $400

13. The following math problem is written on the board:

The product of \( \frac{7}{8} \) and \( \frac{4}{3} \) is added to the difference of \( \frac{5}{12} \) and \( -2 \frac{1}{4} \). That result is then divided by \( \frac{1}{2} \). What is the final result?

A. \( 1 \frac{1}{6} \)
B. \( 3 \frac{5}{12} \)
C. \( 4 \frac{2}{3} \)
D. \( 13 \frac{2}{3} \)
14. Landry purchased a vehicle for \( \frac{4}{5} \) of the sticker price of $22,550. He had to pay 7.75% sales tax. What was the amount of Landry's bill?
   A. $16,641.90
   B. $18,040.00
   C. $18,214.76
   D. $19,438.10

15. David wants to hang a picture frame that is \( \frac{15}{4} \) inches wide centered on a wall that is 37 inches wide. About how many inches of wall space will be left on either side of the frame?
   A. 2 inches
   B. 10 inches
   C. 11 inches
   D. 22 inches

16. What is the scale factor that was used to draw the larger figure?

17. Josh and Mae work at a concession stand. They each earn $8 per hour. Josh worked three hours more than Mae. If Josh and Mae earned a total of $120, how many hours did Josh work?
   A. 6
   B. 9
   C. 12
   D. 15

18. Lijuan threw a softball 124 feet on her first throw. She threw the softball 30% farther on her second throw. On her third throw, she threw the softball \( \frac{7}{8} \) as far as her second throw. About how much farther did Lijuan's third throw go compared to her first throw?
   A. 18 feet
   B. 21 feet
   C. 32 feet
   D. 38 feet

19. At a restaurant, \( \frac{1}{2} \) of the dishes on the menu are vegetarian. Of the vegetarian dishes, \( \frac{4}{5} \) are pasta dishes. What fraction of the dishes are vegetarian pasta dishes? Answer in simplest form.
   A. \( \frac{2}{5} \)
   B. \( \frac{5}{7} \)
   C. \( \frac{4}{10} \)
   D. \( \frac{5}{10} \)
20. Kareem performs a probability experiment in which he tosses a fair coin. He tallied the outcomes (heads or tails) after 10, 20, 50 and 100 tosses. He recorded the data in the table below.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>After 10 tosses</th>
<th>After 20 tosses</th>
<th>After 50 tosses</th>
<th>After 100 tosses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>6</td>
<td>12</td>
<td>27</td>
<td>50</td>
</tr>
<tr>
<td>Tails</td>
<td>4</td>
<td>8</td>
<td>23</td>
<td>50</td>
</tr>
</tbody>
</table>

Which is a valid conclusion based on Kareem’s data?

A. Kareem probably used an unfair coin.
B. Kareem did not need to toss the coin more than 20 times in order to confirm his results.
C. Probability experiments always confirm the theoretical probabilities.
D. As the number of coin tosses increases, the number of heads becomes closer to what the theoretical probability would predict.

21. Jenny ate $\frac{1}{2}$ of her 10-inch pizza. Debbie ate $\frac{3}{4}$ of her 10-inch pizza. How many times more pizza did Debbie eat?

A. $\frac{3}{4}$
B. $\frac{3}{8}$
C. 3
D. 1.5
22. Carl recently purchased a new washing machine to become more energy efficient. The graphs below represent the water usage for his old and new washing machine.

**Old Washing Machine**

<table>
<thead>
<tr>
<th>Time (in Minutes)</th>
<th>Amount of Water (in Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

**New Washing Machine**

<table>
<thead>
<tr>
<th>Time (in Minutes)</th>
<th>Amount of Water (in Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

What is the difference in the constant of proportionality between the two washing machines?

A. 1.00 gallons/minute  
B. 1.25 gallons/minute  
C. 2.50 gallons/minute  
D. 3.75 gallons/minute

23. Maggy is ‘x’ years old. Which verbal expression correctly represents the number of years that have gone by when Maggy is $4x + 5$ years old?

A. Four less than five times the number of years she originally was.  
B. Five less than quadruple the number of years she originally was.  
C. Her age is now equal to the product of 4 and 5 plus her original age.  
D. She is five more than four times her original age.
24. A store manager notices that 75 of the 100 customers who came into the store on a typical day were female. The next day, 73 of the 96 customers who came in to the store were female. Which is the best conclusion, based on these results?
   A. The manager can estimate that the probability that a customer will be male is 25%.
   B. The manager cannot estimate the probability that a customer will be male because the results over the two days were so different.
   C. The manager can determine exactly how many males will come into the store over any two-day period.
   D. The manager knows how much money will be spent in the store by females and how much will be spent by males.

25. The graph below shows the prices at which Candelicious sells its candy according to its weight in pounds.

What is the constant of proportionality for the given situation?
   A. $2.75
   B. $2.50
   C. $2.25
   D. $2.00
A special deck of playing cards consists only of the following nine cards:

<table>
<thead>
<tr>
<th>Jack of Hearts</th>
<th>Queen of Hearts</th>
<th>King of Hearts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack of Clubs</td>
<td>Queen of Clubs</td>
<td>King of Clubs</td>
</tr>
<tr>
<td>Jack of Diamonds</td>
<td>Queen of Diamonds</td>
<td>King of Diamonds</td>
</tr>
</tbody>
</table>

26. [Refer to figure 1]
If the deck is shuffled and a player is dealt two cards, what is the probability that both cards are hearts?
A. $\frac{1}{2}$
B. $\frac{2}{3}$
C. $\frac{1}{9}$
D. $\frac{1}{12}$

27. Linda made a scale drawing of her classroom for her math project. She used a scale of 1 cm = 2.5 ft. If the length of her classroom on the drawing measured 20 cm, what is the actual length of her classroom?
A. 50 ft.
B. 1,250 ft.
C. 500 ft.
D. 43 ft.

28. A cashier who makes $7.50 per hour gets a raise of $1 \frac{1}{10}$ of his current hourly pay. How much will he make per hour after the raise?
A. $0.75$
B. $7.60$
C. $8.25$
D. $10.00$

29. As an event becomes less likely to occur, what happens to its probability?
A. It is zero.
B. It becomes closer to zero.
C. It becomes closer to one.
D. It is one.

30. Simplify the expression:
$$4 \div \frac{4}{7} \times (-2) \times \frac{5}{7} \div \left( \frac{-1}{5} \right)$$
A. -50
B. $\frac{-49}{2}$
C. $\frac{49}{2}$
D. 50

31. Jim spends $3 \frac{1}{2}$ days a month away from home. He does this for $6 \frac{1}{2}$ months. How many days is Jim away from home? Answer in simplest form.
A. $18 \frac{1}{2}$
B. $18 \frac{3}{4}$
C. $22 \frac{3}{4}$
D. $22 \frac{1}{2}$
32. Skye had been putting money into her savings account. She spent one-fifth of her money on a down payment for a house. She spent twice as much money on her wedding as she did on the down payment for her house. She then spent half as much money on her honeymoon to Hawaii as she did for the down payment and wedding combined. What percent of the original amount of her savings account remains?
   A. 10%
   B. 20%
   C. 30%
   D. 90%

33. Which is an illustration of the associative property?
   A. \( ab = ba \)
   B. \( a(b + c) = ab + ac \)
   C. \( ab + c = (ab)c \)
   D. \( a + 0 = a \)

34. Nora has \( 2x \) dollars. Maura has six more than twice the amount of dollars Nora has. Mia has half the number of dollars Maura has. How many dollars does Mia have?
   A. \( 2x + 3 \)
   B. \( 3x + 2 \)
   C. \( 4x + 6 \)
   D. \( 8x + 12 \)

35. Carly purchased 4 new computers and 7 new desks from a computer store.
   - Each computer is regularly priced at \$479.96.
   - Each desk is regularly priced at \$189.60.
   - Carly has a 25% off coupon.

   What is Carly’s final bill after she uses a credit of \$250?
   A. \$811.76
   B. \$2,185.28
   C. \$2,435.28
   D. \$2,997.04

36. 4 friends went out to dinner. The total bill was \$80.00 and they wanted to leave the waiter a 15% tip. Each friend used a different algebraic expression to calculate the total amount of money they should pay.
   Tony: \( 80.00 \times 0.15 \)
   Aaron: \( 80.00 + (80.00 \times 0.15) \)
   Joe: \( 80.00 \times 1.15 \)
   Jason: \( 80.00 \times 0.85 \)

   Who was correct?
   A. Jason and Aaron
   B. Tony and Joe
   C. Joe and Aaron
   D. Tony and Jason

37. The diagram shows the length and area of a rectangle.

   \[
   \text{Area} = \frac{7}{12} \text{ft}^2
   \]
   \[
   \frac{7}{8} \text{ft}
   \]

   Find the width, \( w \).
   A. \( \frac{0}{4} \text{ft} \)
   B. \( \frac{1}{4} \text{ft} \)
   C. \( \frac{49}{96} \text{ft} \)
   D. \( \frac{2}{3} \text{ft} \)
38. Use the diagram below to answer the question.

Jocelyn wants to buy candy for a party for her son. She observed the prices for candy at several stores. Which store sells candy in a proportional relationship?

A. Store A  
B. Store B  
C. Store C  
D. Store D

39. A dolphin dove 55 feet below the surface of the ocean. Then he rose 22 feet to feed. Which expression describes this situation?

A. -55 + 22  
B. 55 + -22  
C. -55 - 22  
D. 55 - (-22)
40. The width of a rectangle is 4 less than half the length. If $l$ represents the length, which equation could be used to find the width, $w$?

A. $w = \frac{1}{2}(4 - l)$
B. $w = \frac{1}{2}(l - 4)$
C. $w = \frac{1}{2}l - 4$
D. $w = 4 - \frac{1}{2}l$

41. A survey is being conducted to determine if a cable company should add another sports channel to their schedule. Which random survey would be the least biased?

A. surveying 30 men at a gym
B. surveying 45 people at a mall
C. surveying 50 fans at a football game
D. surveying 20 members of a high school soccer team

42. Offir’s Outdoor Adventures is having a 2-day sale on their water slides. The original price of the Ultimate Spiral Slide was $549.00. If it is on sale for 65% off, what will be the sale price of the slide?

A. $484.00
B. $356.85
C. $192.15
D. $614.00

43. Rashawn bought a CD that cost $18.99 and paid $20.51, including sales tax. What was the rate of the sales tax?

A. 5%
B. 2%
C. 3%
D. 8%

44. Hiro exercises by swimming laps at his community pool.

- Old Exercise Plan: Hiro swims $3 \frac{3}{4}$ miles each day, four days per week.
- New Exercise Plan: Hiro increases the distance he swims each day by 30% but swims one day less each week.

How does the total distance he swims during the new exercise plan compare to the old exercise plan?

A. He now swims $4 \frac{7}{8}$ miles more each week.
B. He now swims $1 \frac{1}{8}$ miles more each week.
C. He now swims $\frac{5}{8}$ miles less each week.
D. He now swims $\frac{3}{8}$ miles less each week.
The data table shows the total value of world exports over a 20-year period.

<table>
<thead>
<tr>
<th>Year</th>
<th>1965</th>
<th>1970</th>
<th>1980</th>
<th>1985</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>186</td>
<td>312</td>
<td>1393</td>
<td>2456</td>
</tr>
</tbody>
</table>

45. [Refer to figure 2]
The total value of exports rose significantly between 1970 and 1980. Which expression could be used to calculate the percent increase in exports during this time period?

A. \( \frac{1393 - 312}{312} \times 100 \)

B. \( \frac{1393 + 312}{312} \times 100 \)

C. \( \frac{2456 - 312}{312} \times 100 \)

D. \( \frac{2456 + 312}{312} \times 100 \)

46. A 40% discount is the same as paying:

A. 60% of the original price

B. \( \frac{2}{5} \) of the original price

C. 140% of the original price

D. 40% of the original price

47. How else can the decimal 0.42424242… be expressed?

A. 0.42

B. 0.42

C. 0.4

D. 0.4

48. Bill is in the process of installing an above ground swimming pool in his yard. If the diameter of the pool is 35 feet, what is the approximate circumference of the pool?

A. 110 feet

B. 962 feet

C. 55 feet

D. 35 feet

49. Carol plans to sell twice as many magazine subscriptions as Jennifer. If Carol and Jennifer need to sell at least 90 subscriptions in all, which inequality could be used to determine how many subscriptions, \( x \), Jennifer needs to sell?

A. \( x \geq 45 \)

B. \( 2x \geq 90 \)

C. \( 2x - x \geq 90 \)

D. \( 2x + x \geq 90 \)

50. A boat motor runs on a gasoline and oil mixture. If \( \frac{1}{2} \) gallon of mixture requires \( \frac{1}{3} \) of a gallon of gasoline, how many gallons of oil must be in a 5-gallon mixture?

A. \( 1 \frac{2}{3} \) gallons

B. 2 gallons

C. 3 gallons

D. \( 3 \frac{1}{3} \) gallons
51.

Three storage bins contain colored blocks. Bin 1 contains 15 red and 14 blue blocks. Bin 2 contains 16 white and 15 blue blocks. Bin 3 contains 15 red and 15 white blocks. All of the blocks from the three bins are placed into one box.

If one block is randomly selected from the box, which color block would most likely be picked? Justify your answer.

52.

Thom was asked to design a garden, where the length was 5 yards longer than its width. Around the garden, there is a 6-foot wide stone pathway. Write a completely simplified expression for the perimeter of the garden and the stone pathway.

53.

Jonny and Alex are standing 20 meters apart throwing a baseball. To get 20 meters apart, they started with the backs to each other and took 16 steps each. Alex walked 0.58 meters with each step. What is the length of an average step for Jonny?

54.

A survey-taker randomly selected 50 people as they were leaving a museum on a Wednesday. She asked how much time they had spent in the museum. The mean response was 70 minutes. She randomly selected 300 people leaving the museum the next Wednesday and asked the same question. The mean response for this group was 100 minutes.

What might explain this difference in responses?
Jacob wanted to buy a certain flat-screen television that has an original price of $2,250.00. Jacob saw these two ads and decided he should buy the television from Store B because he will save 55% while he would only save 50% at Store A.

**PART (A):**
Assuming the original price of $2,250.00 is the same at both stores, did Jacob make the correct decision when he bought the television from Store B? Explain.

**PART (B):**
Store B offers to sell Jacob the television for the same price that he could buy it at store A. What original discount would Store B have to give, assuming that Store B continued to offer an additional 20% off any sale price?
56.

Use the information below about the two data sets that represent points on a line.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
<td>x</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

PART A:
Plot the data from the tables in the previous question on the same set of axes and draw a line through each set of points.

PART B:
By looking at the graph, how could you recognize which set represents a proportional relationship? What similarities and differences are there between the two lines drawn?

57.

In a game, a player must spin each spinner shown in the diagram below once.

PART (A): Draw a tree diagram or list a sample space showing all possible outcomes.

PART (B): Determine the number of outcomes that consist of a prime number and a letter in the word “CAT.”
58.
Isaac has already saved $2,200. He plans to save $500 per month until he has enough money to buy a car. How many months must Isaac save money if he wants to buy a car that costs $7,400?

Write an inequality to help solve the problem and explain the solutions in the context of the problem.

59.
Your math teacher wants to buy a very large round cookie for the students that get 90% or better on the next test. Two bakeries in town make big cookies. Here is a list of the prices.

**Mamma’s Pastries**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 cm</td>
<td>$3.25</td>
</tr>
<tr>
<td>15 cm</td>
<td>$4.50</td>
</tr>
<tr>
<td>20 cm</td>
<td>$5.75</td>
</tr>
<tr>
<td>25 cm</td>
<td>$7.00</td>
</tr>
</tbody>
</table>

**Cookie’s Bakery**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 cm</td>
<td>$3.50</td>
</tr>
<tr>
<td>18 cm</td>
<td>$5.50</td>
</tr>
<tr>
<td>23 cm</td>
<td>$7.25</td>
</tr>
<tr>
<td>28 cm</td>
<td>$9.00</td>
</tr>
</tbody>
</table>

What advice would you give your teacher about purchasing from these two bakeries? Defend your advice with mathematical representation and reasoning about which bakery provides the better buy.

60.
Miller’s Department Store is having a sale with a 25% discount on mattresses. If the sales tax rate is 8%, how much change will Frank receive from $800 if he purchases a mattress regularly priced at $895 during this sale?
1. A
2. D
3. B
4. D
5. A
6. B
7. D
8. C
9. B
10. D
11. B

Bin 1 contains 15 red and 14 blue blocks.
Bin 2 contains 16 white and 15 blue blocks.
Bin 3 contains 15 red and 15 white blocks.

Total the colors for all three bins.
30 red   29 blue   31 white

Total the number of blocks all together. 30 + 29 + 31 = 90 total blocks

The color with the best or highest probability to be chosen is white because there are more white blocks than any other color. The probability is the ratio of the number of white blocks to the total number of blocks: \( \frac{31}{90} \).

12. B

Sample Answer:

Let the width of the garden be represented by the variable \( w \) yards. So, the length of the garden can be represented by the expression \( w + 5 \) yards.

The units for the measurements of the garden are in yards. The units of the pathway is given in feet. Six feet is equal to two yards. The stone pathway then is 2 yards wide.

The diagram below is labeled to help find the perimeter.
The simplified expression for the perimeter of the garden and stone pathway is \(4w + 26\).

Sample Answer:

Alex and Jonny are standing 20 meters apart after each taking 16 steps.

The total distance that Alex walked is \(16 \times 0.58\) meters, or 9.28 meters. This means that Jonny walked 20 - 9.28, or 10.72 meters.

Find the distance for each of Jonny's steps.

Let \(d\) = the distance of each of Jonny's steps.
Each of Jonny’s steps are 0.67 meters long.

Another way to find the solution is to find the average distance traveled for one step by both boys. They walked a total of 20 meters in 16 steps.

\[
\frac{16d}{16} = \frac{10.72}{16}
\]

\[d = 0.67 \text{ meters}\]

Now that we know the average distance per step for both boys and the average step distance of Alex, we can find the average step distance of Jonny.

Let \(a\) = Alex’s average step distance
Let \(j\) = Jonny’s average step distance
Let \(d\) = Average step distance of both boys combined

\[
a + j = d
\]
\[
j = d - a
\]
\[
j = 1.25 - 0.58
\]
\[
j = 0.67 \text{ meters}
\]

Each of Jonny’s steps are 0.67 meters long.

Some good answers:

- The actual mean time that people spent in the museum may very well be closer to 100 minutes than it is to 70 minutes since a larger sampling group was asked the question the second time.
- We do not know if there was anything special about the time of day or the days themselves. For example, perhaps one of the Wednesdays was a holiday when people may have taken more time in the museum.
PART (A):
Jacob did not make the correct decision in buying from Store B. He would pay $1,125 at Store A and $1,170 at Store B. He would have saved $45 if he bought from Store A.

\[
\begin{align*}
\text{Store A: } & 2,250 \times 0.50 = 1,125 \\
\text{Store B: } & (2,250 \times 0.65) \times 0.80 = 1,170
\end{align*}
\]

PART (B):
The original discount Store B would have had to offer is 37.5%.

\[
[2250 \times (1 - x)] \times 0.80 = 1,125 \\
x = 0.375
\]

Notes for Teachers
Make sure students understand that a discount of 20% is the same as a sale price of 80%, a discount of 35% is the same as a sale price of 65%, etc.

16. 36. 56.

Sample Response:

PART A:

\[
\begin{array}{c}
\text{PART B: } \\
\text{By looking at the graph, you can determine which line represents a proportional relationship if it passes through the}
\end{array}
\]
origin. The blue line passes through the origin; therefore, it represents a proportional relationship.

The two lines are parallel so they have the same slope, and one difference is that they have different y-intercepts.

PART (A):

- The possibilities in which 1 is spun first on spinner 1 are \((1, A), (1, B)\) and \((1, C)\).
- The possibilities in which 3 is spun first on spinner 1 are \((3, A), (3, B)\) and \((3, C)\).
- The possibilities in which 5 is spun first on spinner 1 are \((5, A), (5, B)\) and \((5, C)\).
- The possibilities in which 7 is spun first on spinner 1 are \((7, A), (7, B)\) and \((7, C)\).
- The possibilities in which 9 is spun first on spinner 1 are \((9, A), (9, B)\) and \((9, C)\).

Here is a tree diagram showing the outcomes:

```
  1       3       5       7       9
 / \     / \     / \     / \     / \   
A   B   A   B   A   B   A   B   A   B   
   C   C   C   C   C   C
```

The sample space is: \{\((1, A), (1, B), (1, C), (3, A), (3, B), (3, C), (5, A), (5, B), (5, C), (7, A), (7, B), (7, C), (9, A), (9, B), (9, C)\)\}.

PART (B): The prime numbers on Spinner 1 are 3, 5 and 7. The letters on Spinner 2 that also appear in the word “CAT” are \(C\) and \(A\). There are 6 outcomes that fit this pattern:

- \((3, A)\), \((3, C)\), \((5, A)\), \((5, C)\), \((7, A)\), \((7, C)\)

Sample Answer:

Step 1: Define the variable first.

Let \(m\) = the number of months.

Step 2: Write the inequality.

\[
\text{Money saved each month} \times \text{number of months} + \text{Money already saved} \geq \text{money needed for car} \]

\[
500 \times m + 2200 \geq 7400
\]

\[
500m + 2200 \geq 7400
\]

Step 3: Solve the inequality and explain the solution.
The number of months is greater than or equal to 10.4, but the solution must be a whole number, round up to 11 months.

Isaac must save money for 11 months to buy the car.

Sample answer:

Since the teacher only wants to buy one cookie, which bakery I recommend depends on the size of the cookie. For all cookies less than 23 cm in diameter, Cookie’s Bakery is the better buy per square centimeter. However, the 25 cm diameter cookie from Mamma’s Bakery is a better buy per square centimeter than the 28 cm cookie from Cookie’s Bakery.

**Mamma’s Pastries**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
<th>Cost per cm²</th>
<th>Better Buy Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 cm</td>
<td>$3.25</td>
<td>$.0414</td>
<td>8</td>
</tr>
<tr>
<td>15 cm</td>
<td>$4.50</td>
<td>$.0255</td>
<td>6</td>
</tr>
<tr>
<td>20 cm</td>
<td>$5.75</td>
<td>$.0183</td>
<td>4</td>
</tr>
<tr>
<td>25 cm</td>
<td>$7.00</td>
<td>$.0143</td>
<td>1</td>
</tr>
</tbody>
</table>

**Cookie’s Bakery**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
<th>Cost per cm²</th>
<th>Better Buy Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 cm</td>
<td>$3.50</td>
<td>$.0264</td>
<td>7</td>
</tr>
<tr>
<td>18 cm</td>
<td>$5.50</td>
<td>$.0216</td>
<td>5</td>
</tr>
<tr>
<td>23 cm</td>
<td>$7.25</td>
<td>$.0175</td>
<td>3</td>
</tr>
<tr>
<td>28 cm</td>
<td>$9.00</td>
<td>$.0146</td>
<td>2</td>
</tr>
</tbody>
</table>

The tables above show the cost per square centimeter. The cookie is a circle (round). The amount of the cookie to be eaten is the area of a circle. The cost per square centimeter is calculated by dividing the cost of a cookie by its area ($\pi r^2$).

For example, the cost per square centimeter of a 10 cm diameter cookie at Mamma’s Cookies is:

\[
\frac{\$3.25}{3.14(5\text{ cm})^2} \approx \$0.0414 \text{ per cm}^2
\]

I also included the ranking of the best price per square centimeter. Mamma’s 10 cm cookie is the “worst” buy, and
Mamma’s 25 cm cookie is the best buy.

Notes for Teachers

Some students will not realize they should be finding the cost per square centimeter. Instead, some may find the cost per centimeter. The tables below show the incorrect calculation when deciding which cookie is the best buy. You can see the better buy ranks are much different.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
<th>Cost per cm</th>
<th>Better Buy Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 cm</td>
<td>$3.25</td>
<td>$0.325</td>
<td>8</td>
</tr>
<tr>
<td>15 cm</td>
<td>$4.50</td>
<td>$0.3</td>
<td>4</td>
</tr>
<tr>
<td>20 cm</td>
<td>$5.75</td>
<td>$0.2875</td>
<td>3</td>
</tr>
<tr>
<td>25 cm</td>
<td>$7.00</td>
<td>$0.28</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Cost</th>
<th>Cost per cm$</th>
<th>Better Buy Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 cm</td>
<td>$3.50</td>
<td>$0.2692</td>
<td>1</td>
</tr>
<tr>
<td>18 cm</td>
<td>$3.50</td>
<td>$0.3056</td>
<td>5</td>
</tr>
<tr>
<td>23 cm</td>
<td>$7.25</td>
<td>$0.3152</td>
<td>6</td>
</tr>
<tr>
<td>28 cm</td>
<td>$9.00</td>
<td>$0.32</td>
<td>7</td>
</tr>
</tbody>
</table>

20. 40. 60.

D C

The mattress is regularly priced at $895. A 25% discount means that Frank is paying 75% of the price. Find 75% of the price by multiplying it by 0.75:

$895 (0.75) = $671.25

Now there is 8% sales tax. When a percentage is added on to a value, we can multiply by 1.(the percentage as a decimal). That is, an increase of 8% results in multiplying by 1.08.

$671.25 (1.08) = $724.95

The amount Frank will pay after the tax and the discount is $724.95.

If he gives the clerk $800, the change Frank will receive is:

$800 – $724.95 = $75.05