2025 Summer Math Packet for Incoming Algebra I Students

Welcome to the 2025-2026 school year! The attached packet has been developed to help you prepare for Algebra I. Please space out your work on the packet, making a goal of **20 minutes per day, three days per week** on average. The packets will be collected the first week of school, and will count as an assessment grade for fall trimester. Packets will be graded for effort, not full completion or perfect accuracy.

Please spend the time needed to do a quality job on this packet. Show and organize your work for each problem. Use a calculator where indicated, but write down your calculations and show all of your work!

If you don't remember how to solve a particular type of math problem, please use Khan Academy and IXL as resources. Both have excellent tutorials.

Enjoy your summer vacation, and keep your education moving forward during this break.

For the start of seventh grade math, you will need a 3 subject notebook for notes, a folder for handouts, pencils and a **large eraser** for daily work, and a calculator (preferably TI-30Xa, but another scientific calculator will be fine).

If you have any questions, I am available at hgeiser@stlukesri.org.

Best wishes,
Mrs. Geiser

1. Six friends are going to buy pizza. Their choices are to buy 2 medium 10-inch diameter pizzas for $7.00 each or 1 large 14-inch diameter pizza for $15.00. Both include tax and tip. The friends agree that their best choice is the one that gives them the most pizza for their money.

   Which is the best choice? Explain your answer.

2. Rachel says the sum of a positive number and a negative number always equals a negative number or zero.

   a. Create an example that that supports Rachel's claim.

   b. Create an example that that shows Rachel's claim is false.

A. Supports Rachel's Claim

□ + □ = □

B. Shows Rachel's Claim is False

□ + □ = □

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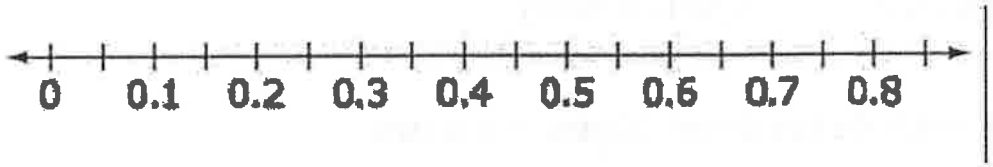
3. Graph each value appropriately in the correct position on the number line.

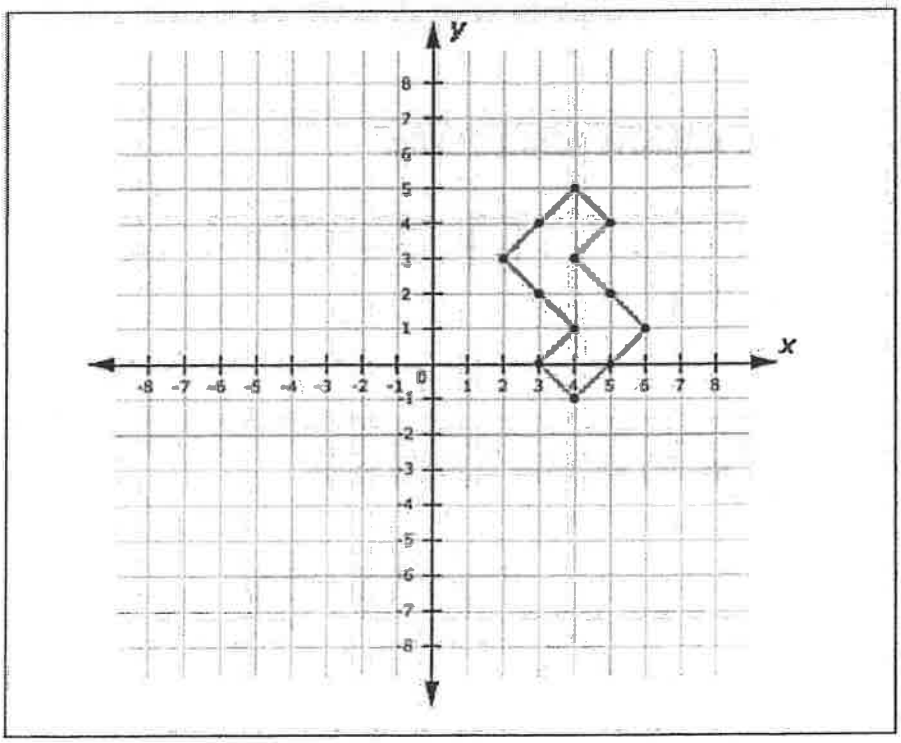


$\frac{\sqrt{4}}{5}$ $\frac{\pi}{5}$ $\frac{3}{10}$

4. Draw the image of the figure after the following translations.

a. A reflection over the x-axis.

b. A horizontal translation 7 units to the left.



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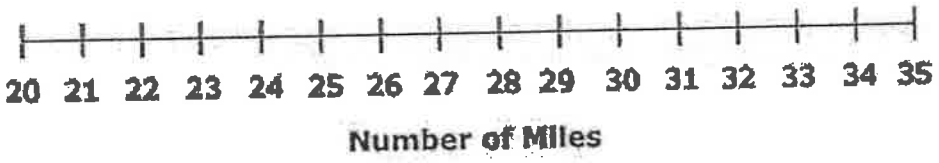
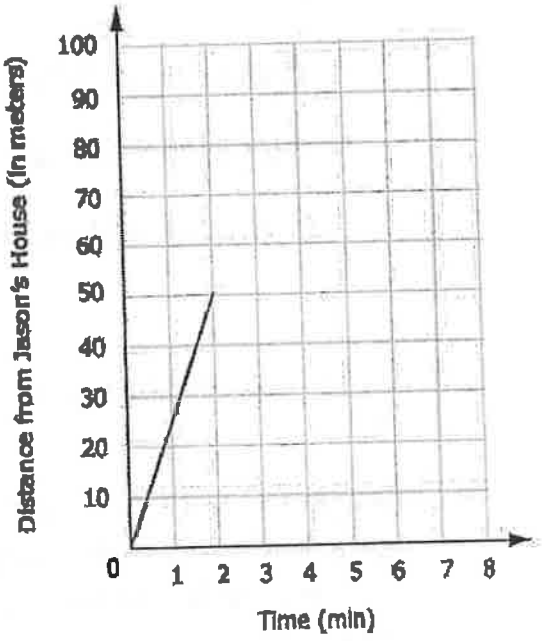
5. Justin's car can travel $77\frac{1}{2}$ miles with $3\frac{1}{10}$ gallons of gas. Kim's car can travel $99\frac{1}{5}$ miles with $3\frac{1}{5}$ gallons of gas. At these rates, how far can each car travel with one gallon of gas? Graph the number of miles for each car on the number line.



6. The school is 100 meters from Jason's house. The following describes his most recent trip:

- He walked 50 meters toward school in 2 minutes. He realized that he left a book at home.
- He turned around and walked home at the same speed.
- He spent 1 minute looking for his book.
- He walked all the way to school at twice his original speed.



Finish the graph so that it accurately represents Jason's trip.

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7. Two sides of a right triangle have lengths of $\sqrt{10}$ and $\sqrt{6}$ units. There are two possible lengths for the third side.

   What is the shortest possible side length, in units?

   What is the longest possible side length, in units?

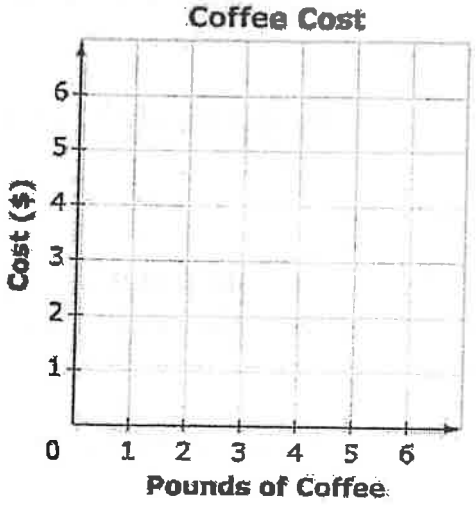
8. Kayla asked 10 students in her class whether they owned a dog or a cat or both. Write any number 0-9 to complete the table, given this information:

	Dog	No Dog	Total
Cat	☐	☐	☐
No Cat	☐	☐	☐
Total	☐	☐	10

   - 40% of the students own a dog.
   - 30% of the students own a cat.
   - 10% of the students own both a cat and a dog.

9. Coffee costs $2.00 per pound at a coffee shop.

   Graph a line that shows the proportional relationship between the number of pounds of coffee purchased and the total cost.



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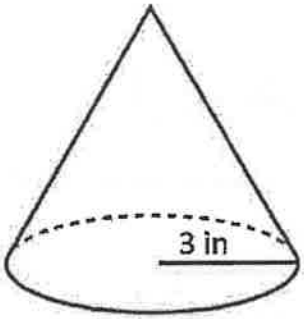
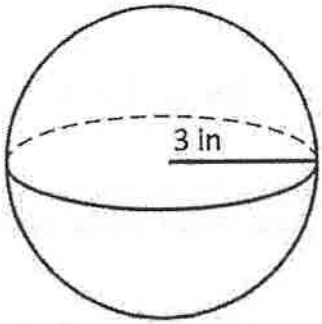
10. A sphere and a cone have the same volume. Each figure has a radius of 3 inches.

What is the height of the cone?





11. Joe solved this linear system correctly.

$$6x + 3y = 6$$
$$y = -2x + 2$$

These are the last two steps of his work.

$$6x - 6x + 6 = 6$$
$$6 = 6$$

Which statement about this linear system must be true?

a. x must equal 6.

b. y must equal 6.

c. There is no solution to this system.

d. There are infinitely many solutions to this system.

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12. Using digits 0-9, write numbers in each of the boxes to complete each equation given the number of solutions.

A. Equation with no solutions

$8x - 3x + 2 - x = \square x + \square$

B. Equation with one solution

$8x - 3x + 2 - x = \square x + \square$

C. Equation with infinitely many solutions

$8x - 3x + 2 - x = \square x + \square$

13. Look at these numbers.

$$\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7}$$

Classify the numbers by ALL that apply.

Integer

Irrational

Rational

Real

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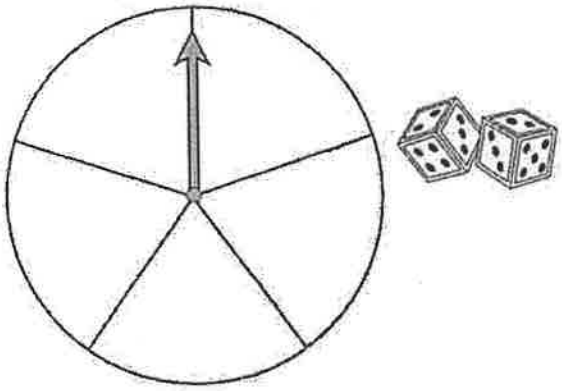
14. A game that uses a spinner and two number cubes is played at a game night. To win the game, a player must have two results:

- The spinner's arrow stops in a red section.
- The number cubes both land with an even number facing up.



The person in charge of the night wants 10% of the players to win.

Label the spinner with the colors red, green, and blue to design one that reaches the goal.

15. Kyle was given a problem to solve. The problem and his work are shown. What part of Kyle's work contains the mistake? What part of the problem should Kyle read again to fix his mistake?

A company sells baseball gloves and bats. The gloves regularly cost $30 and the bats regularly cost $90. The gloves are on sale for $4 off, and the bats are on sale for 10% off. The goal is to sell $1200 worth of bats and gloves each week. Last week, the store sold 14 gloves and 9 bats.

Did the store meet its goal?

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1. $30 − $4 = $26

   $26 × 14 = $364

2. $90 ÷ 0.9 = $100

   $100 × 9 = $900

3. $900 + $364 = $1264

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16. Solve all problems and show all work.

a. $-4t-6=22$

b. $\frac{m}{-5}+6=-4$

c. $-4r+5=-25$

d. $\frac{x}{-3}+(-7)=6$

e. $5g+(-3)=-12$

f. $\frac{y}{-2}+(-4)=8$

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17. Solve all problems and show all work.

a. $4x+8-6=2(9-2)$

b. $\frac{t}{5}-7+31=8(6-4)$

c. $9-5(4-3)=-16+\frac{x}{3}$

d. $6t-9-3t=8(7-4)$

e. $4r-7=8r+13$

f. $6y+5=4y+5$

g. $3(4+4x)=12x+12$

h. $7(1-y)=-3(y-2)$

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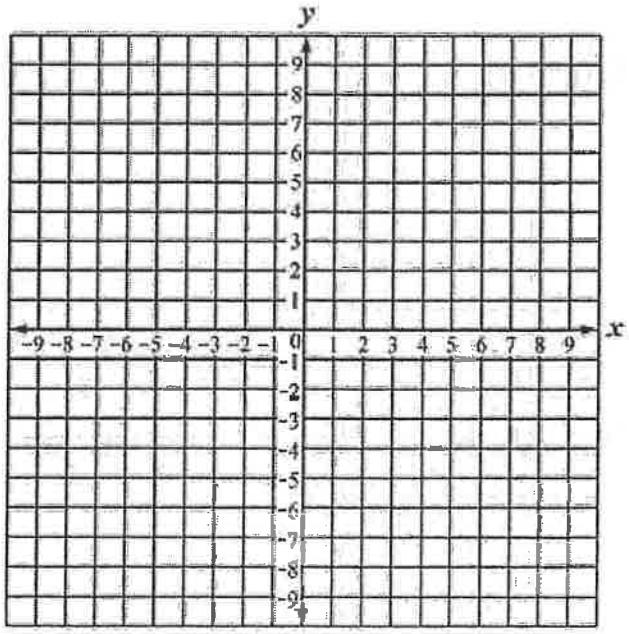
18. Solve and graph each inequality below.

$5x + 4 < 29$

$-\frac{x}{3} - 5 > 2$

19. Solve for y and graph using the slope (rise/run) and y-intercept.

$$2y - 4x = 10$$



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20. In this task, you will be given clues about particular perfect squares and square roots. Using the clues name the perfect square.

EXAMPLE: Doubled, my value is -12, but my product is 36. What number am I?

Answer: -6

a. Doubled, my value is 18, but my product is 81. What number am I? ____

b. Doubled, my value is 22, but my product is 121. What number am I? ____

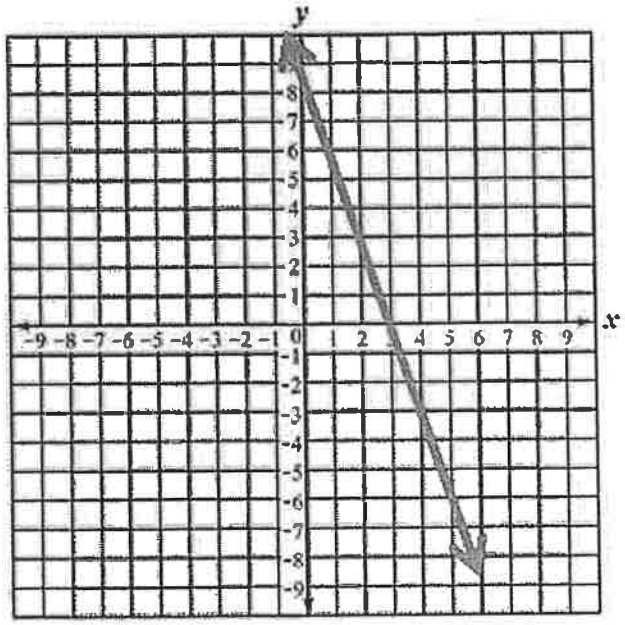
c. Doubled, my value is 16, but my product is 64. What number am I? ____

d. Doubled, my value is -24, but my product is 144. What number am I? ____

21. Using the graph at below, define the slope of the line and the y-intercept.

Slope = _____

y-intercept = _____



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22. Write the next three terms in the patterns below. Then write the rule.

a. -10, -7, -4, -1, …

b. -6, -12, -24, -48, …

c. 1, 4, 9, 16, …

d. 729, 243, 81, 27, …

e. 24, 19, 14, 9, …

f. 8, -8, 8, -8, …

g. 16, 8, 4, 2, …

23. Simplify each problem below according to the Laws of Exponents.

Multiplying: $a^m a^n = a^{m+n}$

Power to a power: $(a^m)^n = a^{mn}$

Dividing: $\frac{a^m}{a^n} = a^{m-n}$

Negative power: $a^{-n} = \frac{1}{a^n}$

Zero power: $a^0 = 1$

a. $(a^2b^2c) + (a^2bc) + (a^2b^2c) =$ _____

b. $(3a^2b^4c)(6a^3b^4c) =$ _____

c. $(5x^3y^4z)^2 =$ _____

d. $\frac{(12\,x^7y^3)}{(6x^5y^2)} =$ _____

e. $\frac{54x^2y^7}{9x^4y^3} =$ _____

f. $\frac{x^4}{x^7} =$ _____

For the next set, fill each blank with an exponent or exponents that would make the equation true.

g. $4^{\square}(4^5) = 4^{10}$ h. $(4^4)^{\square} = 4^{16}$ i. $x^{\square}(x^{\square}) = x^{30}$

j. $(x^{\square})^{\square} = x^{48}$ k. $9^{\square}(9^{\square})\,9^{\square} = 9^{24}$ m. $((9^{\square})^{\square})^{\square} = 9^{24}$

24. Determine the values of n that would satisfy the equation.

Example: $-6n$ = some positive number

Response: In order for $-6n$ to be a positive number, n must be any negative number. The product of two negatives is always positive. For example, $-6(-2) = +12$. If n is a positive number, the product would still be negative. Therefore, n must be negative to get a positive answer.

a. $-4n$ = some negative number.

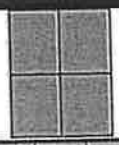
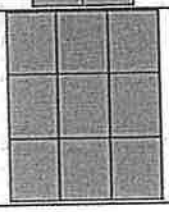
b. $-4n$ = some positive number that is greater than 28.

c. $100 \div n$ = some negative number between -20 and -1

d. $(-3)^n$ = a positive number.

e. For what values of a is -2a > a? In your answer give examples of values of a that make the inequality true.

25. In the table, you must complete the area diagram, the equivalent expression, the exponent form, and the value.

Area Model	Equivalent Expression	Exponential Form	Value
	2 x 2	2^2	4
			
	5 x 5		
			16
		6^2	

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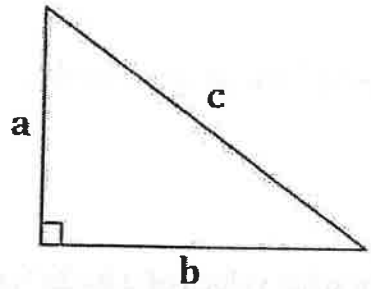
26. The Pythagorean Theorem is the formula relating the 3 sides of a right triangle. Use the formula to find the missing sides.

a. 3, 4, c

b. 5, b, 13

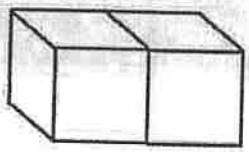
c. a, 8, 10

d. 7, 7, c



$a^2 + b^2 = c^2$
where c is the longest side (hypotenuse)

27. A company makes colored rods by joining cubes in a row and using a sticker machine to place "smiley" stickers on the rods. The machine places exactly 1 sticker on each exposed face of each cube. Every exposed face of each cube has to have a sticker; this rod of length 2 would need 10 stickers.



a. How many stickers would you need for rods of length 1-10? Explain how you determined these values.

b. How many stickers would you need for a rod of length 20? Of length 56? Of length 137? Explain how you determined these values.

c. Write a rule that would allow you to find the number of stickers needed for a rod of any length. Explain your rule.

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28. For each equation, determine if the equation is **always** true, **never** true or **sometimes** true. If the equation is **sometimes** true, determine the numbers that make it true.

a. $6y + 5 = 4y + 5$

b. $5x + 8 = 8 + 5x$

c. $7p - 8 = 7p + 6$

d. $x^2 = 100$

e. $-2(6 - 10n) = 10(2n - 6)$

f. $7(1 - y) = -3(y - 2)$

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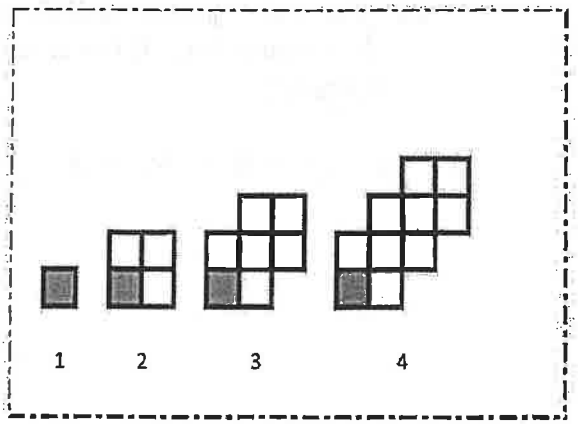
29. In this task you are asked to examine and analyze the sequence represented in the diagram to the right.



Look at the shapes in the diagram to the right.

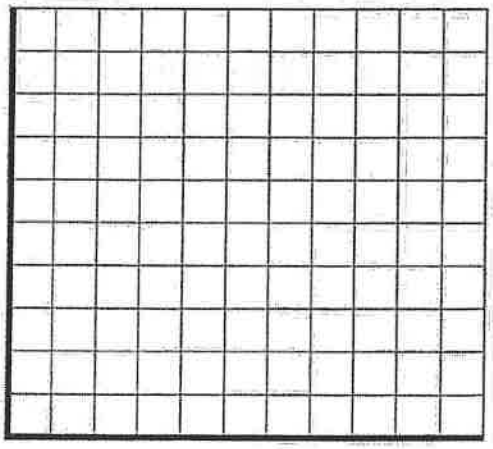
How does the diagram change from stage 1 to stage 2?

a. Describe anything that remains constant at all stages of the diagram.

b. Using the diagram, complete the table of values.

Stage	1	2	3	4	5	6	7	8	9
Number of Tiles									

c. Is this an arithmetic sequence, a geometric sequence, or neither? Justify your answer.



d. Graph the values from the table on the coordinate plane.

e. Write a functional rule to give the number of tiles at any (n) stage.

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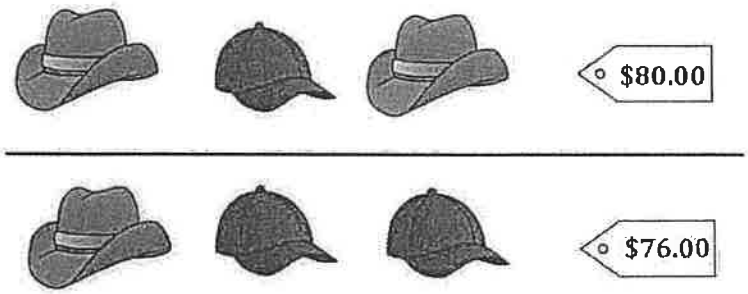
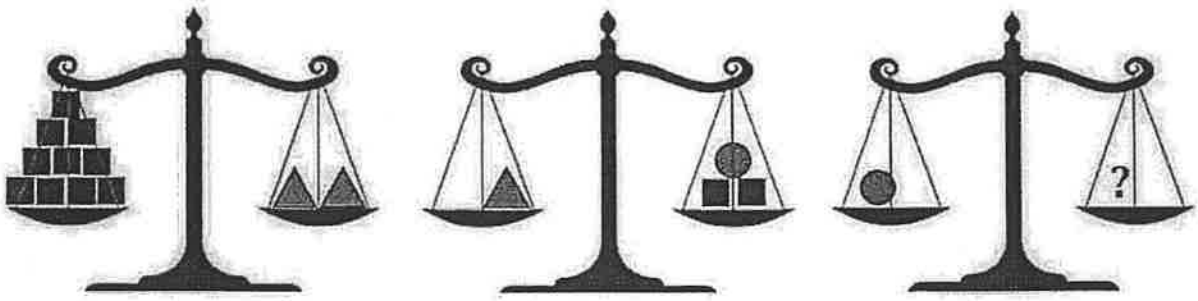
30. How much does one baseball cap cost? How much is one cowboy hat?



31. How many squares are needed to make the third scale balance?



32. A square, with side length s, has an area of 324 square centimeters. This equation shows the area of the square. What is the side length of the square in centimeters?

$$s^2 = 324$$

33. Segment FG begins at point F (-2, 4) and ends at point G (-2, -3). The segment is translated by <x – 3, y + 2> and then reflected across the y-axis to form segment $F'G'$. How long is segment $F'G'$.

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