Name: _____ Due Date: _____

Completely answer each question below on your own paper.
Show all of your work and completely explain your solution.

1. How many different ways are there to make 25 cents from current U.S. coins?

2. Jacob's faucet started leaking recently. It drips about a pint of water every hour. How long will it take for the faucet to drip one gallon of water? If the faucet continues leaking at the same rate, how much water will leak out in one month?

3. Mount McKinley is the tallest peak in North America. This Alaskan summit is one of the world's most impressive mountains because its base is nearly at sea level. Marvelia starts at the summit of Mt. McKinley (elevation 20,320 feet) and travels down the mountain at a rate of four feet per second. Soledad starts at the bottom at the same time and travels up the mountain at a rate of one foot per second. At what elevation, measured in feet, will they meet?

Sample Solutions

Problem 1:

(This is a good problem to solve with a systematic list.)

The table at the right shows all the possible combinations.

There are 13 ways to create 25 cents from quarters, dimes, nickels, and pennies.

Quarters	Dimes	Nickels	Pennies
1	0	0	0
0	2	1	0
0	2	0	5
0	1	3	0
0	1	2	5
0	1	1	10
0	1	0	15
0	0	5	0
0	0	4	5
0	0	3	10
0	0	2	15
0	0	1	20
0	0	0	25

Problem 2:

There are eight pints in a gallon. If the faucet leaks a pint per hour, it will leak a gallon in eight hours. We will calculate the number of hours in a month and convert that number of pints to gallons:

30 days x 24 hours per day = 720 hours

720 pints ÷ 8 pints per gallon = 90 gallons

It will take eight hours for the faucet to leak a gallon. The faucet will leak about 90 gallons in a month with 30 days.

Problem 3:

Each second they get 5 feet closer together. The mountain's height divided by five tells us how many seconds will pass until they meet.
20320 feet ÷ 5 feet per second = 4604 seconds

Since Soledad climbs at a rate of 1 foot per second, she will be at an elevation of 4,604 feet after she climbs for 4,604 seconds.

Marvelia and Soledad will meet at an altitude of 4,604 feet.

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1. Identify all the prime numbers less than 100.

2. Steve Fossett was the first person to make a solo hot-air balloon trip all the way around the world. This means he traveled about 20,400 miles in 15 days. What was his average speed in miles per hour? (Round your answer to the nearest whole number.)

3. A rectangular table measures 48 inches wide and 60 inches long. A tablecloth covers the table and hangs over the edge of the table by 10 inches on each side. What is the area of the tablecloth measured in square inches?

Sample Solutions

Problem 1:

A prime number has exactly 2 factors: one and itself. (So 1 is NOT a prime number.) Crossing out multiples of numbers will leave behind the prime numbers (as in Eratosthenes' Sieve). Notice you only have to cross out multiples of the numbers up to 10.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Problem 2:

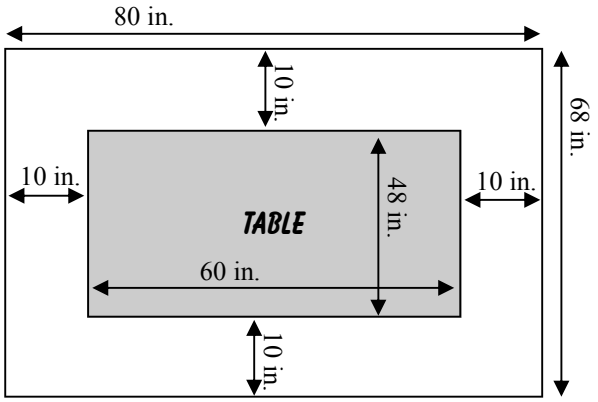
$$\frac{\text{20,400 miles}}{\text{15 days}} \Big| \frac{\text{1 day}}{\text{24 hours}} = \text{20,400 miles/360 hours} = 56.66\ldots \text{ miles/hour}$$

≈ 57 miles per hour

Problem 3:

The outside dimensions of the tablecloth are 80 inches and 68 inches.

The area is 68 in. x 80 in. = **5,440 sq. in.**



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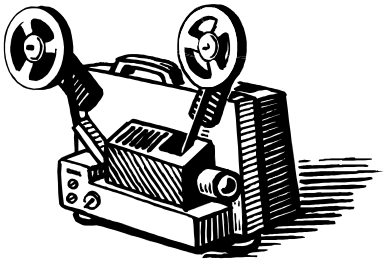

1. Film moves through an IMAX movie projector at a rate of 336.6 feet per minute. If a movie is 40 minutes long, how many miles long is the film? (Round your answers to the nearest hundredths.)

2. A standard 35-mm movie projects 24 images each second. At this rate, how many images are necessary for a 1.5 hour movie?

3. A group of friends are sharing candy in a movie theater. Ben ate half of the jelly beans in the box and passed it to Clarissa. Clarissa ate one-third of the remaining jelly beans, then passed the box to Josh. Josh ate one-fourth of the jelly beans that were left and passed the box to Rebecca. Rebecca ate the last 12 jelly beans. How many jelly beans did Clarissa eat?

Sample Solutions

Problem 1:

To find the length of a 40-minute film, multiply 40 x 336.6 feet = 13,464 feet

Convert 13,464 feet to miles: $= \frac{13464 \text{ feet}}{} \times \frac{1 \text{ mile}}{5280 \text{ feet}}$ **2.55 miles**

Problem 2:

$$\frac{24 \text{ images}}{1 \text{ second}} \times \frac{60 \text{ seconds}}{1 \text{ minute}} \times \frac{90 \text{ minutes}}{1.5 \text{ hours}} = (24 \times 60 \times 90) \div (1 \times 1 \times 1.5)$$

= 86,400 images

Problem 3:

This chart shows that the box originally held 48 jelly beans.

Ben ate half of the box (24) and passed the rest (24) to Clarissa.

Clarissa ate one-third of the remainder. One-third of 24 is 8.

event	leftover	work backwards
Ben ate half	1/2(x)	24 x 2 = 48
Clarissa ate one-third	2/3(x)	16 x 3/2 = 24
Josh are one-fourth	3/4(x)	12 x 4/3 = 16
Rebecca ate 12	x—12 = 0	0 + 12 = 12

Clarissa ate 8 jelly beans.

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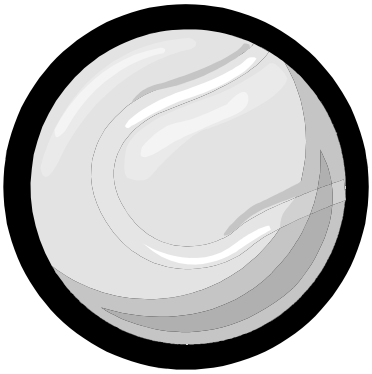
1. The diameter of a tennis ball is 2½ inches. A can of tennis balls contains 3 tennis balls. What is the approximate height of the can of tennis balls? What is the circumference of a single tennis ball?



2. A genie poses a riddle to Marco. Two identical containers hold a total of $15 in quarters. If Marco can correctly guess the number of coins in each container, he can keep the money. Marco has two clues; the difference between the amount of money in the containers is $4, and the left container is heavier than the container on the right. Can you tell Marco how many coins are in each container?

3. Brianna has a bag containing 6 pennies, 5 nickels, 3 dimes, 4 quarters, 2 half-dollars, and 1 silver dollar (dated 1980). She reaches into the bag and removes a single coin. What is the probability of drawing a silver-colored coin? A coin worth more than 20 cents? A coin with ridged edges?

Sample Solutions

Problem 1:

A can of tennis balls will have the height of three stacked tennis balls. Each ball is 2.5 in., so

$$2.5 \text{ in.} \times 3 = 7.5 \text{ in.}$$

The circumference of a sphere is calculated with the formula: $C = \pi d$

$$C \approx 3.14 \times 2.5 \text{ in} \approx 7.85 \text{ in.}$$

The height of a can of tennis balls is about 7.5 inches, and the circumference of a single tennis ball is about 7.85 inches.

Problem 2:

If the two containers held identical amounts of money, they would each hold $7.50. To have a difference of $4, remove $2 from one container and add the $2 to the other container. This will make the amounts $5.50 and $9.50. This means 22 quarters and 38 quarters.

The left container holds 38 quarters. The right container holds 22 quarters.

Problem 3:

There are 21 coins in the bag. The probability can be calculated as the number of desired events divided by the total number of possible events. Using the table below, we get:

P(silver) = 15/21 = 5/7
P(>20 cents) = 7/21 = 1/3
P(ridges) = 10/21

Coin	color	value	edge	quantity
penny	copper	1 cent	smooth	6
nickel	silver	5 cents	smooth	5
dime	silver	10 cents	ridged	3
quarter	silver	25 cents	ridged	4
half dollar	silver	50 cents	ridged	2
silver dollar	silver	1 dollar	ridged	1

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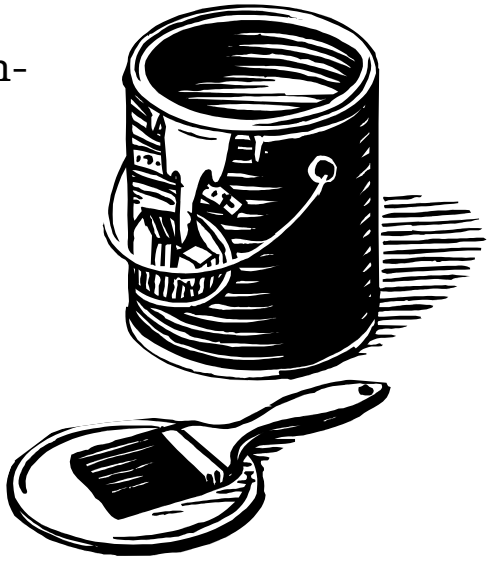
1. During the 8-month shrimping season in the Gulf of Mexico, 325 shrimpers caught 4,913,977 pounds of shrimp and sold the shrimp for $2 per pound. If that money was split evenly between each of the shrimpers, how much money would each receive? (Round your answer to the nearest dollar.)

2. A flea is sitting on the very tip of the minute hand on a grandfather clock. The minute hand measures 6 inches long. How far does the flea travel in a day?

3. Kathleen's room measures eight feet wide and ten feet long. She is painting her room, and one can of paint covers exactly half of one of the smaller walls. How many total cans of paint will it take to paint the entire room (including the can of paint she has already used)?



Sample Solutions

Problem 1:

To find the total value of the shrimp caught, multiply 4,913,977 x $2 = $9,827,954.
To find each shrimper's share, divide $9,827,954 ÷ 325 = $30,239.8584…

Each shrimper earned approx. $30,240.

Problem 2:

The distance around the clock is the circumference of a circle with a radius of 6 inches. The formula for circumference of a circle is $C = 2\pi r \approx 2 \times 3.14 \times 6$ in. ≈ 37.68 in.

In the course of a day, the minute hand goes all the way around the clock 24 times (once every hour). So multiply the circumference of the route by 24: 37.68 in. x 24 = 904.32 in.

The flea travels 904.32 in. or about 75.36 ft. or about 25.12 yards.

Problem 3:

The perimeter of the room is 36 feet. One can of paint covered 4 feet of the perimeter. If each can covers 4 feet, then it will take a total of 9 cans to cover the entire perimeter (since 4 x 9 = 26).

Nine cans of paint will be needed total.