TEST YOUR ZERO WASTE MATH SKILLS

These math equations address problems or challenges that Public Works employees may face on any given day. Some of the numbers are fictitious and used only for the purpose of the question.

Let's get started!

Name: _____

Grade Level: _____

Date: _____

Score: _____ / 8

SHOW YOUR WORK IN THE SPACE PROVIDED BELOW EACH QUESTION.

1. Phoenix's recycling facility or Materials Recovery Facility (MRF) can process (sort) 30 tons of recyclable materials per hour. A normal work day is 10 hours. On Friday, the MRF had to shut down 3 times for 30 minutes each time, to cut plastic bags out of the machines. (FYI plastic bags cannot be placed in the recycle container.) How many tons of material did the MRF process on Friday?

Answer: _____ tons

2. Semi-trucks carry trash from the transfer station to the landfill six days a week. From North Gateway Transfer Station, the landfill is 65 miles away one way. From 27th Avenue Transfer Station, the landfill is 45 miles away one way. The semi-trucks drive back and forth about 60 times from each transfer station per day. How many miles do these trucks drive in a six-day work week?

Answer: _____ miles

3. Per Maricopa County air quality standards, landfills must use water to control dust. The landfill averages 14 truckloads of water per day. Each load is 8,000 gallons. How much water does the landfill use over the course of a year (excluding Sundays)?

Answer: _____ gallons per year

4. *Save as you Reduce and Recycle* is a program that offers residents a smaller curbside trash container for a discount of $3 per month. Approximately 42,375 Phoenix residents are signed up for this program. Collectively, what is their annual savings?

Answer: $_____

5. All 415,735 residential customers have a recycle container, but only 374,161 use their container. What percentage of the total is actively using their container?
Round to the nearest whole percentage.

Answer: _____ %

6. Hauling material to the landfill costs the city $9.50 per ton. In addition to hauling costs, the city pays a $1.45 per ton royalty to the city of Buckeye, and a fee of $0.15 per ton to the Arizona Department of Environmental Quality. The city landfilled 673,451 tons last year. How much did it cost to landfill all that material?
Round up to the nearest dollar.

Answer: $_____

7. The city's compost facility processed 84,243 tons of organic material last year. Commercial landscapers brought the compost facility 55,700 tons of material, while the difference was brought in by 20,015 residential customers that have subscribed to Phoenix's curbside compost service. How many tons of material, on average, did each residential customer generate?
Round to the nearest tenth place.

Answer: _____ tons

8. Phoenix currently picks up trash and recycling from 407,120 households. Next year, the city anticipates a 2.5% growth in the number of households it services. How many households will it service next year?

Answer: _____ households

ANSWERS

Question 1 answer: 255 tons

A full work day can process 300 tons of material. Since the MRF was down for 1.5 hours on Friday, we deduct 1.5 hours' worth of materials from the total.
1.5 hours x 30 tons = 45 tons
300 tons – 45 tons = 255 tons

Question 2 answer: 79,200 miles

60 times x 90 miles from 27th Avenue = 5,400 miles
60 times x 130 miles from North Gateway = 7,800 miles

5,400 + 7,800 = 13,200 miles x 6 days = 79,200 miles

Question 3 answer: 34,944,000 or 35,056,000 gallons per year

There are two ways to calculate this question, since you don't know the exact number of work days in this year, you can make one of two assumptions:

Calculation 1
52 weeks x 6 days = 312 days
312 days x 14 truckloads x 8,000 gallons = 34,944,000 gallons per year

Calculation 2
365 – 52 = 313 days
313 days x 14 truckloads x 8,000 gallons = 35,056,000 gallons per year

Question 4 answer: $1,525,500

42,375 residents x $3 x 12 months = $1,525,500

ANSWERS

Question 5 answer: 90%

374,161 residents / 415,735 residents = 90%

Question 6 answer: $7,475,306

$9.50 + $1.45 + $0.15 = $11.10
$11.10 x 673,451 = $7,475,306

Question 7 answer: 1.4 tons

84,243 – 55,700 = 28,543
28,543 tons / 20,015 containers = 1.426 tons
Round up – 1.4 tons

Question 8 answer: 417,298 households

407,120 households x 1.025 = 417,298 households