Warm-Up 2 Solutions

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Problem 1

The perimeter of a rectangle is 12 units. The width of the rectangle is 9 units less than twice its length. What is the length of the rectangle?

$$\text{Perimeter} = 2(L + W)$$

$$12 = 2(L + W) \implies 6 = L + W = L + (2L - 9) = 3L - 9$$

$$3L = 6 + 9 = 15$$

$$L = \boxed{5}$$

Problem 2

An IV-bag with 1000 mL of fluid is delivering fluid to a patient at the rate of 3 mL/min. After the first three hours, how many milliliters of fluid will remain in the IV-bag?

$$\begin{aligned}\text{Fluid Remaining} &= 1000\,\text{mL} - 3\,\text{mL/min} \times (3 \times 60)\,\text{min} \\ &= 1000 - 540 = \boxed{460\,\text{ml}}\end{aligned}$$

Problem 3

For how many positive integers x is $100 \leq x^2 \leq 200$?

Make a table:

x	x^2
10	100
11	121
12	144
13	169
14	196
15	225

so that there are $\boxed{5}$ such x.

Problem 4

What is the probability of Jonah picking a vowel if he randomly chooses a letter from the word “CAT”? Express your answer as a common fraction.

There is one vowel among a total of three letters so the probability is

$$\boxed{\frac{1}{3}}$$

Problem 5

If a certain recipe requires five tablespoons of flour for every two ounces of butter, how many tablespoons of flour are needed if two pounds of butter are used? There are 16 ounces of butter in one pound.

Let N be the number of tablespoons of flour required. Then

$$\begin{aligned} N &= \frac{5\,\text{T flour}}{2\,\text{oz butter}} \times \left(2\,\text{lb butter} \times \frac{16\,\text{oz}}{1\,\text{lb}}\right) \\ &= \frac{5\,\text{T flour}}{2\,\text{oz butter}} \times 32\,\text{oz butter} \\ &= \boxed{80\,\text{T flour}} \end{aligned}$$

Problem 6

At the mall's food court, Crystal wants to buy a meal consisting of one entree, one drink and one dessert. The table below lists Crystal's favorite foods in the food court. How many distinct possible meals can she buy from these options?

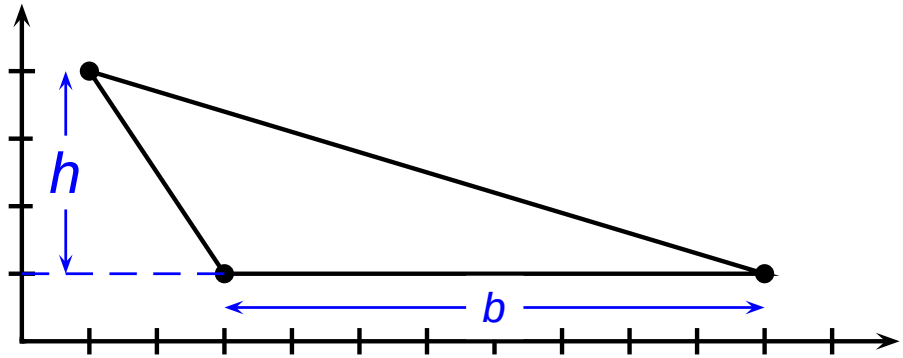
Entrees	Drinks	Desserts
Pizza	Lemonade	Frozen Yogurt
Chicken Teriyaki	Root Beer	Cookies
Corn Dog		
Fish & Chips		

Use the fundamental principle of counting:

$$\#\text{ Choices} = 4 \times 2 \times 2 = \boxed{16}$$

Problem 7

What is the area of the triangle with vertices $(1, 4)$, $(3, 1)$ and $(11, 1)$?



The area A is given by the formula

$$A = \frac{1}{2}bh = \frac{1}{2} \times 8 \times 3 = \boxed{12}$$

Problem 8

A regular chocolate bar weighs 7 ounces. A jumbo chocolate bar weighs 5 pounds. How many regular chocolate bars would you have to eat in order to consume the same total weight as a jumbo chocolate bar? Express your answer as a decimal to the nearest tenth.

The weight of the jumbo chocolate bar is $5\,\text{lb} \times 16\,\text{oz/lb} = 80\,\text{oz}$. So the number of regular bars needed to equal one jumbo bar is

$$\frac{80}{7} \approx \boxed{11.4}$$

Problem 9

What ordered pair of positive integers (m, n) satisfies $7m + 12n = 43$?

First, we note that m must be odd (why?). We can keep subtracting odd multiples of 7 from 43 until the difference is a multiple of 12:

$$43 - 1 \times 7 = 36 = 3 \times 12$$

so

$$(m, n) = \boxed{(1, 3)}$$

works.

Problem 10

A two-inch by six-inch board costs 24 cents per linear foot. Jennifer needs to purchase 18 boards that are each 10 feet long. What is the total cost of the lumber?

Jennifer has purchased $18 \times 10 = 180$ linear feet, so

$$\text{Cost} = 180\,\text{ft} \times \times \frac{\$0.24}{1\,\text{ft}} = \boxed{\$43.20}$$