College Admission

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Question: 1

Mrs. Patterson's classroom has sixteen empty chairs. All the chairs are occupied when every student is present. If $\frac{2}{5}$ of the students are absent, how many students make up her entire class?

a. 16 students
b. 24 students
c. 32 students
d. 40 students

Answer: D

Explanation:

There are 16 empty chairs. This gives $\frac{2}{5}$ of the total enrollment. So, the full class must be:

$$\text{Class} = \frac{5}{2} \times 16 = 40 \text{ students}$$

Another option is to use proportions.

$$\frac{2}{5} = \frac{16}{x}$$

First, cross multiply to get: $2x = 80$. Then, divide each side by 2 to solve for x. So, $x = 40$, which means there are 40 students in the entire class.

Question: 2

50 is what percent of 40?

a. 80
b. 90
c. 120
d. 125

Answer: D

Explanation:

Taking a percent of a number means multiplying by that percent: if 50 is $P\%$ of 40, then $50 = 40 \times P\%$. That means $P\%$ is just $\frac{50}{40}$. We can write that as a decimal by dividing, putting a decimal point after the dividend and adding zeroes as necessary.

$$
\begin{array}{r}
1.25 \\
40\overline{)\,50.00} \\
-40 \\
\hline
100 \\
-80 \\
\hline
200 \\
-200 \\
\hline
0
\end{array}
$$

So $\frac{50}{40} = 1.25$. To convert to a percent, we can multiply by 100, which is equivalent to moving the decimal point two places to the right: $1.25 = 125\%$.

Question: 3

A dress is marked as 20% off. With the discount, the current price is $40.00. What is the price of the dress without the discount?

a. $32
b. $45
c. $48
d. $50

Answer: D

Explanation:

If the dress's price is 20% off, it is $(100\% - 20\%) = 80\%$ of the regular price. So, the sales price of the dress, $40, is 80% of what price? To find the answer, divide 40 by 80%, which is equivalent to the fraction $\frac{80}{100}$. Dividing by the fraction $\frac{80}{100}$ is the same as multiplying by its reciprocal, $\frac{100}{80}$. $40 \times \frac{100}{80} = 40 \times \frac{5}{4} = \frac{200}{4} = 50$, so, the original price was $50.00.

Question: 4

What is the proper ordering (from greatest to least) of the following numbers?

I. $\frac{58}{67}$
II. 0.58%
III. 58%
IV. 5.8%

a. I, III, II, IV
b. III, IV, II, I
c. I, III, IV, II
d. IV, I, III, II

Answer: C

Explanation:

Recall that "percent" just means "divided by 100." Find the equivalent fraction for each number:

I. $\frac{58}{67}$

II. $0.58\% = \frac{0.58}{100} = \frac{58}{10{,}000}$

III. $58\% = \frac{58}{100}$

IV. $5.8\% = \frac{5.8}{100} = \frac{58}{1{,}000}$

All of the fractions share the same numerator. Among fractions with the same numerator, the largest fraction has the smallest denominator. We can order these fractions from greatest to least by ordering the denominators from least to greatest. The correct order is $\frac{58}{67} > \frac{58}{100} > \frac{58}{1{,}000} > \frac{58}{10{,}000}$.

Question: 5

What is $\frac{2}{5} \times 2.5$?

a. 1
b. 2
c. 4
d. 6

Answer: A

Explanation:

To multiply a fraction by a decimal, it is helpful to either convert both numbers to decimals or both numbers to fractions. If we convert $\frac{2}{5}$ to a fraction, we divide 2 by 5, putting a decimal point after the 2 and keeping track of where the digits of the quotient are relative to the decimal point.

$$\begin{array}{r} 0.4 \\ 5\overline{)\,2.0} \\ -\,2\,0 \\ \hline 0 \end{array}$$

So $\frac{2}{5} = 0.4$, and $\frac{2}{5} \times 2.5 = 0.4 \times 2.5$. $4 \times 25 = 100$, and since 0.4 and 2.5 each have one digit after the decimal point, the product should have two digits after the decimal point, so the answer is 1.00, or simply 1.

Question: 6

A cookie recipe calls for $2\frac{1}{4}$ cups of milk. Brian has $1\frac{1}{2}$ cups available. How much more milk does he need in order to make cookies according to the recipe?

a. $1\frac{1}{2}$ cups
b. $1\frac{1}{4}$ cups
c. $\frac{3}{4}$ cup
d. $\frac{1}{4}$ cup

Answer: C

Explanation:

To find out how much more milk he needs, subtract the amount he has from the amount he needs: $2\frac{1}{4} - 1\frac{1}{2}$. To add or subtract mixed numbers, first convert them to improper fractions. We can do this by multiplying the integer part by the denominator and adding that to the numerator. So, $2\frac{1}{4} = \frac{2\times4+1}{4} = \frac{9}{4}$, and $1\frac{1}{2} = \frac{1\times2+1}{2} = \frac{3}{2}$. Now convert both fractions so that they share the lowest common denominator, which in this case is 4. $\frac{9}{4}$ already has a denominator of 4, so we need to convert $\frac{3}{2}$: $\frac{3}{2} = \frac{3\times2}{2\times2} = \frac{6}{4}$. We can now subtract: $\frac{9}{4} - \frac{6}{4} = \frac{3}{4}$. Therefore, Brian needs $\frac{3}{4}$ cup of milk in order to make the cookies.

Question: 7

5(80 / 8) + (7 – 2) – (9 × 5) =

a. -150
b. 10
c. 100
d. 230

Answer: B

Explanation:

5 × (80 / 8) + (7 – 2) – (9 × 5) =

Remember the order of operations: Parentheses, exponents, multiplication, division, addition, subtraction.

Perform the operations inside the parentheses first:

5 × (10) + (5) – (45) =

Then, do any multiplication and division, working from left to right:

50 + 5 – 45 =

Finally, do any adding or subtracting, working from left to right:

55 – 45 = 10

Question: 8

9.5% of the people in a town voted for a certain proposition in a municipal election. If the town's population is 51,623, about how many people in the town voted for the proposition?

a. 3,000
b. 5,000
c. 7,000
d. 10,000

Answer: B

Explanation:

The number of people who voted for the proposition is 9.5% of 51,623. If we only require an approximation, we can round 9.5% to 10%, and 51,623 to 50,000. Then 9.5% of 51,623 is about 10% of 50,000, or $0.1 \times 50{,}000 = 5{,}000$. Therefore, about 5,000 people voted for the proposition.

Question: 9

What is $\frac{7}{8} \times \frac{2}{3} \times \frac{4}{5} \times \frac{3}{7}$?

a. $\frac{1}{7}$
b. $\frac{1}{5}$
c. $\frac{3}{8}$
d. 1

Answer: B

Explanation:

While we could multiply together all the numbers in the numerator and all the numbers in the denominator and then simplify, it would be easier to cancel what we can first. There is a factor of 7 in both the numerator and the denominator; we can cancel those. The same goes for a factor of 3. That leaves us with $\frac{1}{8} \times \frac{2}{1} \times \frac{4}{5} \times \frac{1}{1}$. We can go further, though; since $2 \times 4 = 8$, the 2 and the 4 in the numerator cancel the 8 in the denominator, leaving us with just $\frac{1}{1} \times \frac{1}{1} \times \frac{1}{5} \times \frac{1}{1}$, or simply $\frac{1}{5}$.

Question: 10

Lauren had $80 in her savings account. When she received her paycheck, she put some money in her savings account. This brought the balance up to $120. By what percentage did the total amount in her account increase by putting this amount in her savings account?

a. 35%
b. 40%
c. 50%
d. 80%

Answer: C

Explanation:

To solve, use the percentage increase formula.

$$\text{Percentage Increase} = \frac{\text{new} - \text{initial}}{\text{initial}} \times 100$$

In this case, the initial value is $80, and the new value is $120.

$$\text{Percentage Increase} = \frac{120 - 80}{80} \times 100 = \frac{40}{80} \times 100 = 50\%$$

Therefore, the total amount in her account increased by 50%.

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