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Math-Placement Certification Exam



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Question: 1

$$1.642 - 3.7 =$$

- A. 2.72
- B. 3.35
- C. 6.05
- D. 6.35

Answer: A

Explanation:

In order to subtract decimal numbers, write them one above the other with the decimal points aligned: then, carry out the subtraction normally, placing the decimal point in the same position in the result:

$$\begin{array}{r} 6.42 \\ - 3.70 \\ \hline 2.72 \end{array}$$

Question: 2

Which of the following fractions is equal to 0.375?

- a. $\frac{2}{5}$
- b. $\frac{2}{7}$
- c. $\frac{3}{8}$
- d. $\frac{4}{9}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: C

Explanation:

0.375 is three hundred seventy-five thousandths, which, when written as a fraction, is $\frac{375}{1000}$.

One way this fraction can be reduced by dividing both the numerator and denominator repeatedly

by 5: $\frac{375}{1000} = \frac{75}{200} = \frac{15}{40} = \frac{3}{8}$.

Question: 3

$$5\frac{1}{6} - 2\frac{1}{2} =$$

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

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: B

Explanation:

One way to add or subtract mixed numbers is to first convert them to improper fractions. To get the numerator of the improper fraction, multiply the integer part of the mixed number by the denominator and add that product to the numerator; the denominator remains the same. So $5\frac{1}{6} = \frac{5 \times 6 + 1}{6} = \frac{31}{6}$ and $2\frac{1}{2} = \frac{2 \times 2 + 1}{2} = \frac{5}{2}$. Now convert the improper fractions to so that they have the lowest common denominator, which in this case is 6. $\frac{31}{6}$ already has a denominator of 6, but we need to convert $\frac{5}{2}$ to its equivalent fraction with a denominator of 6: $\frac{5}{2} = \frac{5 \times 3}{2 \times 3} = \frac{15}{6}$. We can now subtract. $\frac{31}{6} - \frac{15}{6} = \frac{16}{6}$, which we can reduce by dividing both sides by 2 to $\frac{16 \div 2}{6 \div 2} = \frac{8}{3}$. Finally, we convert back to a mixed number by dividing the numerator by the denominator; the quotient is the integer part, and the remainder is the new numerator. $8 \div 3 = 2$ with a remainder of 2, so $\frac{8}{3} = 2\frac{2}{3}$.

Question: 4

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

- I. 0.32
- II. 0.32%
- III. 3.2%
- IV. $\frac{32}{99}$

- A. II, III, I, IV
- B. II, III, IV, I
- C. III, II, I, IV
- D. IV, I, III, II

Answer: A

Explanation:

Recalling that percent just means “divided by 100,” each of the given numbers can be represented as fractions:

$$\text{I. } 0.32 = \frac{32}{100}, \quad \text{II. } 0.32\% = \frac{0.32}{100} = \frac{32}{10,000}, \quad \text{III. } 3.2\% = \frac{3.2}{100} = \frac{32}{1,000}, \quad \text{IV. } \frac{32}{99}$$

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 least to greatest by ordering the denominators from greatest to least. The correct order is $\frac{32}{10,000} < \frac{32}{1,000} < \frac{32}{100} < \frac{32}{99}$.

Question: 5

Which of the following is the best estimate for $23.97124 \div 8.023$?

- A. 2
- B. 3
- C. 16
- D. 20

Answer: B

Explanation:

23.97124 is about 24, and 8.023 is about 8. so $23.97124 \div 8.023$ is about $24 \div 8 = 3$.

Question: 6

The two legs of a right triangle have side lengths of 5 and 12. What is the length of the hypotenuse?

- a. 13
- b. 17
- c. $\sqrt{60}$
- d. $\sqrt{119}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: A

Explanation:

The legs and hypotenuse of a right triangle are related through the Pythagorean Theorem, $a^2 + b^2 = c^2$, where a and b are the lengths of the legs and c is the length of the hypotenuse. In this case, $a = 5$ and $b = 12$ (or vice-versa; it doesn't matter which leg we call a and which leg we call b), so $5^2 + 12^2 = c^2 \Rightarrow 25 + 144 = c^2 \Rightarrow 169 = c^2 \Rightarrow c = \sqrt{169} = 13$.

Question: 7

Which of the following fractions cannot be converted to a terminating decimal?

- a. $\frac{1}{2}$
- b. $\frac{1}{3}$
- c. $\frac{1}{4}$
- d. $\frac{1}{5}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: B

Explanation:

A terminating decimal is one that eventually stops; after a certain place all further digits are zeroes. To convert a fraction to a decimal, divide the numerator by the denominator. This quickly produces terminating decimals for $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{5}$: namely 0.5, 0.25, and 0.2, respectively. The decimal expansion of $\frac{1}{3}$, however, repeats indefinitely as 0.33333333.... Alternately, note that in order to correspond to a terminating decimal, a fraction must have a denominator that is a factor of a power of ten; in other words, the only prime factors of the denominator must be 2 and 5. This is true of $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{5}$ but not of $\frac{1}{3}$. So, $\frac{1}{3}$ is the only one of the choices without a terminating decimal expansion.

Question: 8

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 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: 9

Which of the following inequalities is TRUE?

- a. $\frac{4}{5} < \frac{5}{7}$
- b. $\frac{5}{7} > \frac{3}{5}$
- c. $\frac{2}{3} > \frac{4}{5}$
- d. $\frac{1}{2} < \frac{2}{5}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: B

Explanation:

When comparing fractions, it is necessary to find common denominators.

$$\begin{array}{l} \frac{28}{35} = \frac{4}{5} < \frac{5}{7} = \frac{25}{35} \\ \frac{25}{35} = \frac{5}{7} > \frac{3}{5} = \frac{21}{35} \\ \frac{10}{15} = \frac{2}{3} > \frac{4}{5} = \frac{12}{15} \\ \frac{5}{10} = \frac{1}{2} < \frac{2}{5} = \frac{4}{10} \end{array}$$

Once all of the fractions have been represented using common denominators, it is easy to determine which of each pair is greater since the greater is the one with the larger numerator.

Among the four choices, the only valid inequality is $\frac{5}{7} > \frac{3}{5}$.

Question: 10

$$17.92 \div 3.2 =$$

- A. 5.1
- B. 5.6
- C. 6.1
- D. 6.6

Answer: B

Explanation:

To divide decimals, set up a long division problem, but then move the decimal point an equal number of places to the right in both the dividend and the divisor until it is at the right end of the divisor, making the divisor an integer. Then, put the decimal point in the quotient directly above the decimal point in the dividend. Add extra zeroes to the end of the dividend if needed.

$$\begin{array}{r}
 3.2 \overline{) 17.92} = 32 \overline{) 179.2} \\
 \underline{160} \\
 192 \\
 \underline{192} \\
 0
 \end{array}$$

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