

CALCULATOR RACE EXPLANATIONS

1. **(D) Mathematics/Number and Quantity/Basic Arithmetic Manipulations**

CC: 5.NF.A.1 CCRS: BSC.AF.1

Manipulate the fractions:

$$2\frac{2}{7} + 1\frac{1}{3} = \frac{16}{7} + \frac{4}{3} = \frac{(48+28)}{21} =$$

$$\frac{76}{21} = 3\frac{13}{21}.$$

Contrast this with the calculator method. First, convert the total gasoline used on Monday and Tuesday to decimals:

$$2\frac{2}{7} \approx 2 + 0.29 = 2.29, \text{ and}$$

$$1\frac{1}{3} \approx 1 + 0.33 = 1.33. \text{ Then add:}$$

$2.29 + 1.33 = 3.62$. Now, convert the answer choices to decimals. After converting, it is easy to see that (D) is the correct answer choice. Note that having to convert the fractions in the answer choices makes the calculator an inefficient tool for solving this item (unless the calculator includes a “FRAC” key).

2. **(J) Mathematics/Geometry/Rectangles and Squares**

CC: 4.MD.A.3 CCRS: BSC.G.2

The dimensions are 250, 250, 300, and 300, which quickly adds to $500 + 600 = 1,100$. Doing the calculation in your head is faster than pushing the buttons on a calculator.

3. **(D) Mathematics/Number and Quantity/Basic Arithmetic Manipulations**

CC: 6.RP.A.3b CCRS: AVG.AF.1

This is another problem easily solved in

your head: $\frac{\$18}{12} = \frac{\$3}{2} = \$1.50$ per rose.

4. **(K) Mathematics/Number and Quantity/Percentages**

CC: 6.RP.A.3c CCRS: BSC.AF.1

This item can be solved using a calculator, but it is simple enough to solve by hand:

the fraction $\frac{39}{61}$ is very close to $\frac{40}{60} = \frac{2}{3}$,

or $66\frac{2}{3}\%$. Therefore, 64% must be the

correct answer.

5. (B) *Mathematics/Number and Quantity/Properties of Numbers*

CC: 7.NS.A.1c CCRS: AVG.NS.1

Again, it is faster to perform the calculations by hand: $|-4| - |5 - 12| = 4 - |-7| = 4 - 7 = -3$.

6. (K) *Mathematics/Algebra and Functions/Evaluating, Interpreting, and Creating Algebraic Functions/Functions as Models*

CC: 6.EE.A.2c CCRS: AVG.A.1

This problem is easier with a calculator but can be quickly solved without one:

$$F = \frac{9}{5}(34) + 32. \text{ If the 34 were 35, then it}$$

would be possible to simplify the

$$\text{equation: } F = \frac{9}{5}(35) + 32 = (9)(7) + 32 =$$

$63 + 32 = 95^\circ$. So, the actual value is just a tad less than 95° , so 93° must be the correct answer.

7. (C) *Mathematics/Number and Quantity/Rates and Proportions*

CC: 6.RP.A.3d CCRS: AVG.AF.1

A calculator isn't necessary: $\frac{3.1 \text{ miles}}{20 \text{ minutes}} = \frac{3.1 \text{ miles}}{\frac{1}{3} \text{ hour}} = (3.1)(3) = 9.3 \text{ miles per hour.}$

8. (K) *Mathematics/Geometry/Rectangles and Squares and Circles*

CC: 7.G.B.6 CCRS: AVG+.G.6

Again, it's faster to do the mental calculations. The radius of the circle is 5, so the diameter is 10, and the diameter is equal to the side of the square. The area of the square is $10(10) = 100$.

9. (E) *Mathematics/Number and Quantity/Rates and Proportions*

CC: 6.RP.A.3b CCRS: AVG.AF.1

Set up a direct proportion: $\frac{1 \text{ fastener}}{0.03 \text{ ounces}} =$

$\frac{x \text{ fasteners}}{12 \text{ ounces}}$. Now, solve for x :

$$x = \frac{12(1)}{0.03} = 400 \text{ fasteners. This}$$

calculation is simple enough to do in your head.

10. (F) *Mathematics/Algebra and Functions/Solving Quadratic Equations and Relations*

CC: 8.EE.A.2 CCRS: AVG+.A.9

On this item, using a calculator could actually get you into trouble. A calculator will indicate that the square root of 81 is 9 and the square root of 49 is 7, which means that a possible value for $x + y$ is 16—not one of the answer choices. Of course, other possible values are -9 and -7 , which total -16 , or -9 and 7 , which total -2 , or 9 and -7 , which total 2 . Only (F) offers one of these choices: -16 .