Section 4: Math Test – Calculator

QUESTION 1

Choice A is correct. If one pound of grapes costs $2, two pounds of grapes will cost 2 times $2, three pounds of grapes will cost 3 times $2, and so on. Therefore, c pounds of grapes will cost c times $2, which is $2c$ dollars.

Choice B is incorrect and may result from incorrectly adding instead of multiplying. Choice C is incorrect and may result from assuming that c pounds cost $2, and then finding the cost per pound. Choice D is incorrect and could result from incorrectly assuming that 2 pounds cost $$c$, and then finding the cost per pound.

QUESTION 2

Choice C is correct. According to the graph, the number of figurines decreased between 1 and 2 months and between 3 and 4 months. Because the line segment between 3 and 4 months is steeper than the line segment between 1 and 2 months, it follows that the number of figurines decreased the fastest between 3 and 4 months.

Choice A is incorrect. Between 1 and 2 months, the number of figurines decreased. However, the number of figurines decreased faster during the interval between 3 and 4 months. Choices B and D are incorrect. The number of figurines during these intervals was increasing, not decreasing.

QUESTION 3

Choice A is correct. The fraction of the cars in the random sample that have a manufacturing defect is $\frac{3}{200} = 0.015$. At this rate, out of 10,000 cars there would be $0.015 \times 10{,}000 = 150$ cars that have a manufacturing defect.

Choices B, C, and D are incorrect because the fractions of cars in the population that have a defect, $\frac{200}{10{,}000} = 0.02$ in choice B, $\frac{250}{10{,}000} = 0.025$ in choice C, and $\frac{300}{10{,}000} = 0.03$ in choice D, are all different from the fraction of cars in the sample with a manufacturing defect, which is 0.015.

QUESTION 4

Choice C is correct. The given line of best fit can be used to predict the length when the width is known. The equation of the line of best fit is given as $y = 1.67x + 21.1$, where x is the width in millimeters and y is the predicted length in millimeters. If the width of the petal is 19 millimeters, then $x = 19$ and $y = 1.67(19) + 21.1 = 52.83$.

Choice A is incorrect and may result from incorrectly using $x = 0$ in the equation. Choice B is incorrect and may result from neglecting to add 21.1 in the computation. Choice D is incorrect and may result from an arithmetic error.

QUESTION 5

Choice B is correct. Let the measure of the third angle in the smaller triangle be $a°$. Since lines ℓ and m are parallel and cut by transversals, it follows that the corresponding angles formed are congruent. So $a° = y° = 20°$. The sum of the measures of the interior angles of a triangle is 180°, which for the interior angles in the smaller triangle yields $a + x + z = 180$. Given that $z = 60$ and $a = 20$, it follows that $20 + x + 60 = 180$. Solving for x gives $x = 180 - 60 - 20$, or $x = 100$.

Choice A is incorrect and may result from incorrectly assuming that angles $x + z = 180$. Choice C is incorrect and may result from incorrectly assuming that the smaller triangle is a right triangle, with x as the right angle. Choice D is incorrect and may result from a misunderstanding of the exterior angle theorem and incorrectly assuming that $x = y + z$.

QUESTION 6

Choice D is correct. Since only two types of tickets were sold and a total of 350 tickets were sold, the sum of the numbers of both types of ticket sold must be 350. Therefore, $B + L = 350$. Since the bench tickets were $75 each, the income from B bench tickets was $75B$. Similarly, since the lawn tickets were $40 each, the income from L lawn tickets sold was $40L$. The total income from all tickets was $19,250. So the sum of the income from bench tickets and lawn tickets sold must equal 19,250. Therefore, $75B + 40L = 19{,}250$. Only choice D has both correct equations.

Choice A is incorrect and may result from incorrectly multiplying the income from each type of ticket instead of adding them. It also incorrectly uses 1,950 instead of 19,250. Choice B is incorrect and may result from confusing the cost of bench tickets with the cost of lawn tickets. Choice C is incorrect and may result from confusing the total number of tickets sold with the total amount raised.

QUESTION 7

Choice C is correct. The graph of an equation given in the form $y = mx + b$ has slope m. The equation in choice C is $y = 3x + 2$, so the slope of its graph is 3.

Choices A, B, and D are incorrect. They are all given in the form $y = mx + b$, where m is the slope. Therefore, choice A has a graph with a slope of $\frac{1}{3}$, choice B has a graph with a slope of 1 (because $x = 1 \cdot x$), and choice D has a graph with a slope of 6.

QUESTION 8

Choice B is correct. Multiplying both sides of the equation by $x + 1$ gives $(x + 1)^2 = 2$. This means $x + 1$ is a number whose square is 2, so $(x + 1)$ is either $\sqrt{2}$ or $-\sqrt{2}$. Therefore, $\sqrt{2}$ is a possible value for $x + 1$.

Choice A is incorrect and may result from trying to find the value of x instead of $x + 1$ and making a sign error. Choice C is incorrect and may result from solving for $(x + 1)^2$ instead of $x + 1$. Choice D is incorrect and may result from squaring instead of taking the square root to find the value of $x + 1$.

QUESTION 9

Choice D is correct. Using the volume formula $V = \frac{7\pi k^3}{48}$ and the given information that the volume of the glass is 473 cubic centimeters, the value of k can be found as follows:

$$473 = \frac{7\pi k^3}{48}$$

$$k^3 = \frac{473(48)}{7\pi}$$

$$k = \sqrt[3]{\frac{473(48)}{7\pi}} \approx 10.10690$$

Therefore, the value of k is approximately 10.11 centimeters.

Choices A, B, and C are incorrect. Substituting the values of k from these choices in the formula results in volumes of approximately 7 cubic centimeters, 207 cubic centimeters, and 217 cubic centimeters, respectively, all of which contradict the given information that the volume of the glass is 473 cubic centimeters.

QUESTION 10

Choice C is correct. Due to the shape of the glass, if the water is poured at a constant rate, the height of the water level will increase faster initially, where the diameter of the glass is smaller, and increase more slowly later, as the diameter of the glass increases. Choice C is the only graph that shows this behavior: it is steeper initially and then gets less steep.

Choice A is incorrect since it shows the height of the water level increasing at a constant rate over time. Choice B is incorrect since it shows the height of the water level increasing slowly at first and faster later. Choice D is incorrect since it shows the height of the water level staying constant even as water is being poured into the glass.

QUESTION 11

Choice B is correct. It is given that the volume of the glass is approximately 16 fluid ounces. If Jenny has 1 gallon of water, which is 128 fluid ounces, she could fill the glass $\frac{128}{16} = 8$ times.

Choice A is incorrect because Jenny would need 16 × 16 fluid ounces = 256 fluid ounces, or 2 gallons, of water to fill the glass 16 times. Choice C is incorrect because Jenny would need only 4 × 16 fluid ounces = 64 fluid ounces of water to fill the glass 4 times. Choice D is incorrect because Jenny would need only 3 × 16 fluid ounces = 48 fluid ounces to fill the glass 3 times.

QUESTION 12

Choice C is correct. Since Roberto sells only two types of policies and he didn't meet his goal of selling at least 57 policies, the sum of x, the number of $50,000 policies, and y, the number of $100,000 policies, must be less than 57. Symbolically, that is $x + y < 57$. The total value, in dollars, from selling x number of $50,000 policies is $50{,}000x$. The total value, in dollars, from selling y number of $100,000 policies is $100{,}000y$. Since the total value of the policies he sold was over $3,000,000, it follows that $50{,}000x + 100{,}000y > 3{,}000{,}000$. Only choice C has both correct inequalities.

Choice A is incorrect because the total value, in dollars, of the policies Roberto sold was greater than, not less than, 3,000,000. Choice B is incorrect because Roberto didn't meet his goal, so $x + y$ should be less than, not greater than, 57. Choice D is incorrect because both inequalities misrepresent the situation.

QUESTION 13

Choice C is correct. Since a has the exponent $-\frac{1}{2}$, a can be isolated by raising both sides of the equation to the −2 power.

$$a^{\left(-\frac{1}{2}\right)(-2)} = x^{-2}$$

$$a = x^{-2}$$

$$a = \frac{1}{x^2}$$

Alternate method:

$$a^{-\frac{1}{2}} = \frac{1}{a^{\frac{1}{2}}} = \frac{1}{\sqrt{a}}$$

So,

$$\frac{1}{\sqrt{a}} = x$$

Square both sides of the equation:

$$\frac{1}{a} = x^2$$

Then take the reciprocal of both sides:

$$a = \frac{1}{x^2}$$

Choice A is incorrect and may result from incorrectly taking the square root of both sides to eliminate the exponent of a. Choice B is incorrect and may result from incorrectly taking the square root of both sides to eliminate the exponent of a, and incorrectly multiplying by −1 to make the exponent positive. Choice D is incorrect and may result from incorrectly multiplying by −1 to make the exponent positive.

QUESTION 14

Choice D is correct. A rational expression is undefined when the denominator is 0. To determine the values of x that result in a denominator of 0, set the denominator equal to 0 and solve for x:

$x^2 + 3x - 10 = 0$

$(x + 5)(x - 2) = 0$

$x + 5 = 0$ or $x - 2 = 0$

$x = -5$ or $x = 2$

Among the answer choices, only the value $x = 2$ is listed, so choice D is correct.

Choice A is incorrect. When $x = -3$, the denominator is $(-3)^2 + 3(-3) - 10 = -10$, so the given expression is not undefined. Choice B is incorrect and may result from incorrectly factoring the denominator or incorrectly assuming that if $(x - 2)$ is a factor, then $x = -2$ is a solution. Choice C is incorrect and may result from giving the value of the denominator that makes the given expression undefined rather than the value of x that makes the denominator equal to 0.

QUESTION 15

Choice D is correct. Since density is mass per unit volume, the mass is the density times volume. The volume of a right rectangular prism is the product of the lengths of the sides. Therefore:

mass = (2.8 grams per cubic centimeter) × (30 centimeters × 40 centimeters × 50 centimeters)

mass = (2.8 grams per cubic centimeter) × (60,000 cubic centimeters)

mass = 168,000 grams

Choice A is incorrect and may result from adding, instead of multiplying, the lengths of the sides to find the volume. Choice B is incorrect and may result from the same error as in choice A, as well as a place value error. Choice C is incorrect and may result from a place value error when finding the volume.

QUESTION 16

Choice B is correct. A total of 150 adults received the sugar pill. Of those, 33 reported contracting a cold. Therefore, $\frac{33}{150}$, or the equivalent $\frac{11}{50}$, is the proportion of adults receiving a sugar pill who reported contracting a cold.

Choice A is incorrect. This is the proportion of adults receiving a sugar pill and contracting a cold to all adults contracting a cold $\left(\frac{33}{54}\right)$. Choice C is incorrect. This is the proportion of adults who reported contracting a cold to all the participants in the study $\left(\frac{54}{300} = \frac{9}{50}\right)$. Choice D is incorrect. This is the proportion of adults who received a sugar pill and reported contracting a cold to all the participants in the study $\left(\frac{33}{300} = \frac{11}{100}\right)$.

QUESTION 17

Choice A is correct. The mode is the data value with the highest frequency. So for the data shown, the mode is 18. The median is the middle data value when the data values are sorted from least to greatest. Since there are 20 ages ordered, the median is the average of the two middle values, the 10th and 11th, which for these data are both 19. Therefore, the median is 19. The mean is the sum of the data values divided by the number of the data values. So for these data, the mean is $\frac{(18 \times 6) + (19 \times 5) + (20 \times 4) + (21 \times 2) + (22 \times 1) + (23 \times 1) + (30 \times 1)}{20} = 20$. Since the mode is 18, the median is 19, and the mean is 20, mode < median < mean.

Choice B and D are incorrect because the mean is greater than the median. Choice C is incorrect because the median is greater than the mode.

Alternate approach: After determining the mode, 18, and the median, 19, it remains to determine whether the mean is less than 19 or more than 19. Because the mean is a balancing point, there is as much deviation below the mean as above the mean. It is possible to compare the data to 19 to determine the balance of deviation above and below the mean. There is a total deviation of only 6 below 19 (the 6 values of 18); however, the data value 30 alone deviates by 11 above 19. Thus the mean must be greater than 19.

QUESTION 18

Choice C is correct. Based on the line of best fit shown, the predicted percent of leaf litter mass remaining for a forest with a mean annual temperature of −2°C is about 70%.

Choice A is incorrect; it is the predicted percent of leaf litter mass remaining at about 6.5°C. Choice B is incorrect; it is the predicted percent of leaf litter mass remaining at 2°C instead of at −2°C. Choice D is incorrect; it is the predicted percent of leaf litter mass remaining at about −7°C.

QUESTION 19

Choice A is correct. Since zeros of f correspond to the x-intercepts of the graph of f, and the range of f gives all the possible y-values on the graph of the function, the correct graph of the function has only points with y-values less than or equal to 4, and crosses the x-axis at only $(-3, 0)$ and $(1, 0)$. The graph in choice A satisfies both of these conditions.

Choice B is incorrect. The graph of the function matches the range given, but the zeros are at -1 and 3, not -3 and 1. Choice C is incorrect. The graph has y-values greater than 4. Choice D is incorrect. Even though the graph has zeros at -3 and 1, it has an additional zero at 0, and the range of the graph is the set of all real numbers.

QUESTION 20

Choice B is correct. The savings each year from installing the geothermal heating system will be the average annual energy cost for the home before the geothermal heating system installation minus the average annual energy cost after the geothermal heating system installation, which is $(4{,}334 - 2{,}712)$ dollars. In t years, the savings will be $(4{,}334 - 2{,}712)t$ dollars. Therefore, the inequality that can be solved to find the number of years after installation at which the total amount of energy cost savings will exceed (be greater than) the installation cost, \$25,000, is $25{,}000 < (4{,}334 - 2{,}712)t$.

Choice A is incorrect. It gives the number of years after installation at which the total amount of energy cost savings will be less than the installation cost. Choice C is incorrect and may result from subtracting the average annual energy cost for the home from the onetime cost of the geothermal heating system installation. To find the predicted total savings, the predicted average cost should be subtracted from the average annual energy cost before the installation, and the result should be multiplied by the number of years, t. Choice D is incorrect and may result from misunderstanding the context. The ratio $\frac{4{,}332}{2{,}712}$ compares the average energy cost before installation and the average energy cost after installation; it does not represent the savings.

QUESTION 21

Choice D is correct. The number 3.39 in the equation $y = 3.39x + 46.89$ is the slope, which is the change in y per unit change in x. Because y represents the amount of plastic produced annually, in billions of pounds, and x represents the number of years since 1985, the number 3.39 represents the rate of change of the amount of plastic produced with respect to time, in units of billions of pounds per year. The change is an increase since 3.39 is positive, and it is described as an average change because the data show increases that are sometimes more and sometimes less than 3.39.

Choice A is incorrect. It is the interpretation of the number 46.89 in the line of best fit equation, $y = 3.39x + 46.89$. Choices B and C are incorrect because they are expressed in the wrong units. The number 3.39 has units of billions of pounds per year, but choice B has units of years and choice C has units of billions of pounds.

QUESTION 22

Choice A is correct. Since x is the number of years since 1985, the year 2000 corresponds to $x = 15$ and the year 2003 corresponds to $x = 18$. The corresponding points on the line of best fit are approximately (15, 98) and (18, 107). This means that approximately 98 billion pounds of plastic were produced in 2000 and approximately 107 billion pounds of plastic were produced in 2003. To calculate the percent increase, subtract the amount of plastic produced in 2000 from the amount of plastic produced in 2003 and then divide the result by the amount of plastic produced in 2000 and multiply by 100. This yields $\left(\frac{107 - 98}{98}\right) \cdot 100 = 9.2$, or approximately 10%.

Choices B and C are incorrect and may be the result of misreading the graph or making an arithmetic error. Choice D is incorrect and may be the result of approximating the amount of plastic produced, in billions of pounds, in the year 2003 ($x = 18$).

QUESTION 23

Choice A is correct. In 1 year, there are 4 quarter years, so the number of quarter years, q, is 4 times the number of years, t; that is, $q = 4t$. This is equivalent to $t = \frac{q}{4}$, and substituting this into the expression for M in terms of t gives $M = 1{,}800(1.02)^{\frac{q}{4}}$.

Choices B and D are incorrect and may be the result of incorrectly using $t = 4q$. In choice D, $1.02^{4q} = 1.02^{4(q)}$, which is approximately 1.082^{q}. Choice C is incorrect and may be the result of incorrectly using $t = 4q$ and unnecessarily dividing 0.02 by 4.

QUESTION 24

Choice D is correct. It is given that Contestant 2 earned 70% of the votes cast using social media and 40% of the votes cast using a text message. Based on this information, viewers voting by social media were more likely to prefer Contestant 2 than were viewers voting by text message.

Choices A, B, and C are incorrect. There is not enough information about the viewers to reach these conclusions.

QUESTION 25

Choice A is correct. It is given that the relationship between population and year is linear; therefore, the function that models the population t years after 2000 is of the form $P(t) = mt + b$, where m is the slope and b is the population when $t = 0$. In the year 2000, $t = 0$. Therefore, $b = 862$. The slope is given by $m = \frac{P(10) - P(0)}{10 - 0} = \frac{846 - 862}{10 - 0} = \frac{-16}{10} = -1.6$. Therefore, $P(t) = -1.6t + 862$, which is equivalent to the equation in choice A.

Choice B is incorrect and may be the result of incorrectly calculating the slope as just the change in the value of P. Choice C is incorrect and may be the result of the same error as in choice B, in addition to incorrectly using t to represent the year, instead of the number of years after 2000. Choice D is incorrect and may be the result of incorrectly using t to represent the year instead of the number of years after 2000.

QUESTION 26

Choice C is correct. In order to use a sample mean to estimate the mean for a population, the sample must be representative of the population (for example, a simple random sample). In this case, Tabitha surveyed 20 families in a playground. Families in the playground are more likely to have children than other households in the community. Therefore, the sample isn't representative of the population. Hence, the sampling method is flawed and may produce a biased estimate.

Choices A and D are incorrect because they incorrectly assume the sampling method is unbiased. Choice B is incorrect because a sample of size 20 could be large enough to make an estimate if the sample had been representative of all the families in the community.

QUESTION 27

Choice B is correct. Since the point (p, r) lies on the line with equation $y = x + b$, the point must satisfy the equation. Substituting p for x and r for y in the equation $y = x + b$ gives $r = p + b$. Similarly, since the point $(2p, 5r)$ lies on the line with the equation $y = 2x + b$, the point must satisfy the equation. Substituting $2p$ for x and $5r$ for y in the equation $y = 2x + b$ gives $5r = 2(2p) + b$, or $5r = 4p + b$. Solving each equation for b gives $b = r - p$ and $b = 5r - 4p$, respectively. Substituting $r - p$ for b in the equation $b = 5r - 4p$ gives $r - p = 5r - 4p$. Subtracting r from each side of the equation and adding $4p$ to each side of the equation gives $3p = 4r$. Dividing each side of the equation by p and dividing each side of the equation by 4 gives $\frac{3}{4} = \frac{r}{p}$.

Choices A, C, and D are incorrect. Choices A and D may be the result of incorrectly forming the answer out of the coefficients in the point $(2p, 5r)$. Choice C may be the result of confusing r and p.

QUESTION 28

Choice D is correct. The two data sets have the same range. The first data set has a range of 88 − 56 = 32, and the second data set has a range of 112 − 80 = 32. Alternatively, it can be seen visually that the ranges are the same because the two dot plots are aligned, the scales of the graphs are the same, and the graphs have the same width. The two data sets have different standard deviations. Both dot plots show distributions that have a mean near the center value of the dot plot. The first dot plot shows most values clustered near the mean, while the second dot plot shows most values farther from the mean. Therefore, the standard deviations of the two data sets are not equal—the data represented by the second dot plot has a greater standard deviation.

Choices A, B, and C are incorrect because they incorrectly assert either that the standard deviations are the same or that the ranges are different.

QUESTION 29

Choice B is correct. Since the machine copies at a constant rate, the relationship between p, the number of sheets of paper remaining, and m, the time in minutes since the machine started printing, is modeled by a linear equation. The initial number of sheets of paper is given as 5,000. It is also given that the machine used 30% of those 5,000 sheets in 20 minutes, so it used $0.30 \times 5{,}000 = 1{,}500$ sheets in 20 minutes. Therefore, the number of sheets used per minute is $\frac{1{,}500}{20} = 75$. To determine the number of sheets of paper used m minutes after the machine started printing, multiply 75 by m, which gives $75m$. Therefore, a linear equation modeling this relationship is the number of sheets remaining equals the initial number of sheets of paper minus the number of sheets of paper used m minutes after the machine started printing, which is $p = 5{,}000 - 75m$.

Choice A is incorrect and may be the result of using the given number of minutes, 20, as the rate at which the copy machine uses paper. However, the rate is 75, not 20, sheets per minute. Choices C and D are incorrect because they aren't linear equations; they assume that the copy machine prints at a nonconstant rate.

QUESTION 30

Choice B is correct. The maximum value of the function f occurs at the highest point on the graph of $y = f(x)$; the highest point on the graph is (4, 3). For any point on the graph of f, the y-coordinate gives the value of the function at the x-coordinate; therefore, the maximum value of the function f is 3. It is stated that k is the maximum value of f, so $k = 3$. Thus, $g(k) = g(3)$. From the table of values for g, it can be seen that when $x = 3$, $g(3) = 6$.

Choice A is incorrect and may result from using the x-coordinate of the maximum point as the value of k. Choice C is incorrect; it is the value of k, not of $g(k)$. Choice D is incorrect and may be the result of giving the value of x that makes $g(x) = 3$ instead of finding the value of $g(x)$ when $x = 3$.

QUESTION 31

The correct answer is 102. Since each molecule of water has 2 atoms of hydrogen, 51 molecules of water have a total of (51)(2) = 102 atoms of hydrogen.

QUESTION 32

The correct answer is 2. Substituting $x = 1$ in the equation $x - \frac{1}{2}a = 0$ gives $1 - \frac{1}{2}a = 0$. Adding $\frac{1}{2}a$ to both sides of this equation gives $1 = \frac{1}{2}a$. Multiplying both sides of this last equation by 2 gives $2 = a$.

QUESTION 33

The correct answer is 30. Since the equations $x + 2y = 10$ and $3x + 6y = c$ represent the same line in the xy-plane, they must be equivalent equations. The expression $3x + 6y$ on the left-hand side of the second equation is equivalent to $3(x + 2y)$, which is 3 times the left-hand side of the first equation. Thus, to be equivalent, the right-hand side of the second equation, c, must be 3 times the right-hand side of the first equation, 10. Therefore, $c = 30$.

QUESTION 34

The correct answer is 25.4. The average speed is the total distance divided by the total time. The total distance is 11 miles and the total time is 26 minutes. Thus, the average speed is $\frac{11}{26}$ miles per minute. The question asks for the average speed in miles per hour, and there are 60 minutes in an hour; converting miles per minute to miles per hour gives the following:

$$\begin{aligned}\text{Average speed} &= \frac{11 \text{ miles}}{26 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} \\ &= \frac{660}{26} \text{ miles per hour} \\ &\approx 25.38 \text{ miles per hour}\end{aligned}$$

Therefore, to the nearest tenth of a mile per hour, the average speed of Paul Revere's ride would have been 25.4 miles per hour.

QUESTION 35

The correct answers are 2 and 8. Substituting $x = a$ in the definitions for f and g gives $f(a) = -\frac{1}{2}(a - 4)^2 + 10$ and $g(a) = -a + 10$, respectively. If $f(a) = g(a)$, then $-\frac{1}{2}(a - 4)^2 + 10 = -a + 10$. Subtracting 10 from both sides of this equation gives $-\frac{1}{2}(a - 4)^2 = -a$. Multiplying both sides by −2 gives $(a - 4)^2 = 2a$. Expanding $(a - 4)^2$ gives $a^2 - 8a + 16 = 2a$. Combining the like terms on one side of the equation gives $a^2 - 10a + 16 = 0$. One way to solve this equation is to factor $a^2 - 10a + 16$ by identifying two numbers with a sum of −10 and a product of 16. These numbers are −2 and −8, so the quadratic equation can be factored as $(a - 2)(a - 8) = 0$. Therefore, the possible values of a are either 2 or 8. Either 2 or 8 will be scored as a correct answer.

Alternate approach: Graphically, the condition $f(a) = g(a)$ implies the graphs of the functions $y = f(x)$ and $y = g(x)$ intersect at $x = a$. The graph $y = f(x)$ is given, and the graph of $y = g(x)$ may be sketched as a line with y-intercept 10 and a slope of −1 (taking care to note the different scales on each axis). These two graphs intersect at $x = 2$ and $x = 8$.

QUESTION 36

The correct answer is 0. Note that no matter where point W is on $\overline{RT}$, the sum of the measures of $\angle RSW$ and $\angle WST$ is equal to the measure of $\angle RST$, which is 90°. Thus, $\angle RSW$ and $\angle WST$ are complementary angles. Since the cosine of an angle is equal to the sine of its complementary angle, $\cos(\angle RSW) = \sin(\angle WST)$. Therefore, $\cos(\angle RSW) - \sin(\angle WST) = 0$.

QUESTION 37

The correct answer is 576. According to the table, 5 minutes after the injection, the penicillin in the patient's bloodstream is 152 micrograms per milliliter. Thus, there are $10 \times 152 = 1520$ micrograms of penicillin in 10 milliliters of blood drawn 5 minutes after the injection. Similarly, 10 minutes after the injection, the penicillin concentration is 118 micrograms per milliliter. Thus, there are $8 \times 118 = 944$ micrograms of penicillin in 8 milliliters of blood drawn 10 minutes after the injection. Therefore, there are $1520 - 944 = 576$ more micrograms of penicillin in 10 milliliters of blood drawn 5 minutes after the injection than in 8 milliliters of blood drawn 10 minutes after the injection.

QUESTION 38

The correct answer is 0.8. The value of b in the equation $P(t) = 200b^{\frac{t}{5}}$ can be estimated using any row of the table other than the first one. Substituting $t = 5$ and $P(5) = 152$ from the second row of the table into the definition of P yields $152 = 200b^{\frac{5}{5}}$, or $152 = 200b$. Dividing both sides of this equation by 200 yields $b = \frac{152}{200}$. The fraction can be rewritten as $\frac{76}{100}$, or its decimal equivalent .76. Rounded to the nearest tenth, this value is .8. Other rows of the table also give a value of b that rounds to .8. Therefore, the value of b, rounded to the nearest tenth, is .8. Either .8, or its fractional equivalents, 4/5 or 8/10, can be gridded as the correct answer.