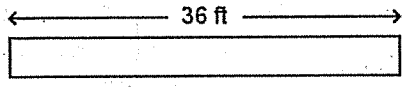
Name _____ Date _____ Class _____

A.CED.1*

SELECTED RESPONSE

Select the correct answer.

1. A landscaper is planting a row of 10 shrubs along the walkway shown below. There must be one shrub at the very beginning and one shrub at the very end, and the shrubs in between will be equally spaced along the length of the walkway. Which equation can the landscaper use to find the distance d in feet to leave between the shrubs?



   (A) $36d = 10$
   (B) $9d = 36$
   (C) $10d = 36$
   (D) $36d = 9$

2. National Cell charges a $5 flat fee for a text messaging plan and $0.15 per text. World Wireless doesn't charge a flat fee, but it charges $0.19 per text. Which inequality and solution represent the number t of texts for which World Wireless is cheaper than National Cell?
   (A) $19t > 15t + 5$; $t > 1.25$
   (B) $0.19t > 0.15t + 5$; $t > 125$
   (C) $19t < 15t + 5$; $t < 1.25$
   (D) $0.19t < 0.15t + 5$; $t < 125$

3. Jennifer, Luis, Robert, Anna, and Tonya are figuring out how to split the check for lunch. The total bill is $65.45. Anna puts in $15, and Tonya puts in $8. The rest of the group splits the rest of the bill equally. Which equation and solution represent the amount a that each of the remaining people pay?
   (A) $3a + 23 = 65.45$; $a = \$14.15$
   (B) $5a = 65.45 + 15 + 8$; $a = \$17.69$
   (C) $3a = 88.45$; $a = \$29.49$
   (D) $5a + 23 = 65.45$; $a = \$8.49$

4. Asako deposits $1000 into a bank account that pays 1.5% interest compounded annually. Which inequality can she use to determine the minimum time in years t she needs to wait before the value of the account is 20% more than its original value?
   (A) $1000 \cdot 1.015t > 1200$
   (B) $1000 \cdot 1.015t > 1.2$
   (C) $1.015^t > 1200$
   (D) $1.015^t > 1.2$

5. Which inequality and solution represent keeping the area of a triangle under 36 square feet if the height is twice the length of the base b?
   (A) $2b < 36$; $b < 18$
   (B) $\frac{1}{2}b^2 < 36$; $b < 6\sqrt{2}$
   (C) $b^2 < 36$; $b < 6$
   (D) $2b^2 < 36$; $b < 3\sqrt{2}$

Select all correct answers.

6. A department store offers a frequent-buyers reward card. Every time a customer earns 100 or more points, the customer receives a gift certificate. Each purchase is worth 12 points, and customers automatically earn 25 points when they sign up. Which inequalities could be used to find the number p of purchases a customer needs to make to earn the first gift certificate?
   (A) $12p + 25 < 100$
   (B) $12p \geq 100 - 25$
   (C) $12p + 25 \geq 100$
   (D) $12p - 25 \leq 100$
   (E) $12p \geq 100$

Name _____ Date _____ Class _____

Select the correct answer for each lettered part

7. While rock climbing, Farrell starts at 10 feet above sea level and climbs upward at a rate of 3 feet per minute. Theresa starts at 250 feet above sea level and climbs down at a rate of 2.5 feet per minute. Tell whether each equation can be used to find the time t in minutes it takes for the two climbers to reach the same height.

   a. $10 + 3t = 250 - 2.5t$ ○ Yes ○ No

   b. $10 + 3t = 250 + 2.5t$ ○ Yes ○ No

   c. $3t + 2.5t = 240$ ○ Yes ○ No

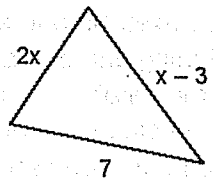
   d. $3t = 2.5t$ ○ Yes ○ No

CONSTRUCTED RESPONSE

8. A computer user is downloading a document that is 58 megabytes. The download speed is 0.7 megabytes per second, and 25% of the file has been downloaded. Write and solve an equation to find how many seconds are left before the download is complete. Round your answer to the nearest second.

9. A grocery store offers a coupon for \$2 off when a customer buys 6 or more bottles of water. The water costs \$1.75 per bottle. Shauna uses the function $t(b) = 1.75b - 2$ to find the total t dollars it costs to buy b bottles of water. When she uses the function to find how many bottles she can buy for \$5, she finds $b = 4$, so she concludes she could buy 4 bottles of water for \$5. Explain what error Shauna made.

10. The length of any side of a triangle is less than the sum of the lengths of the other two sides of the triangle. If three side lengths do not satisfy this requirement, then a triangle cannot be formed from them.



   a. Given the triangle above, use the restriction on side lengths to write three inequalities. Solve all three inequalities for x.

   b. What values of x will satisfy the inequalities you found in part a? Explain how you know.

   c. Give an example of one set of possible side lengths for the triangle above.

Name _____ Date _____ Class _____

A.CED.2*

SELECTED RESPONSE

Select the correct answer.

1. Which of the following equations represents the amount A in a bank account that pays 1.2% interest compounded annually t years after \$2000 is deposited into the account?

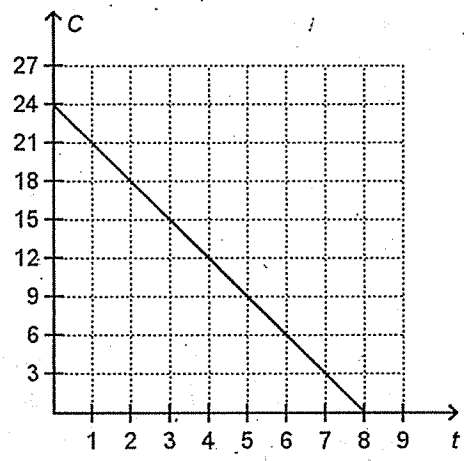
   (A) $A = 2000 + 1.2t$

   (B) $A = 2000 + 1.012t$

   (C) $A = 2000(1.2)^t$

   (D) $A = 2000(1.012)^t$

2. Rita reads a book at a steady pace. Rita graphs her progress through the book by putting the time in hours t on the horizontal axis and chapters remaining C on the vertical axis. Which equation describes Rita's graph?



   (A) $C = -3t + 24$

   (B) $C = 3t - 24$

   (C) $C = -24t + 3$

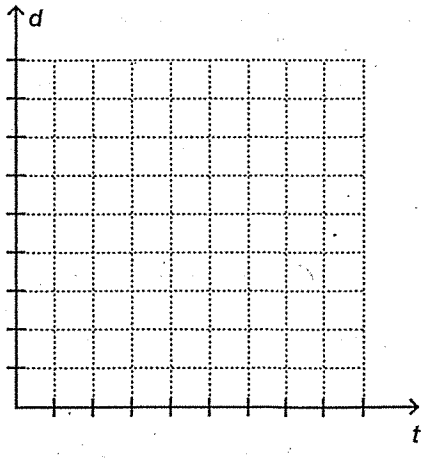
   (D) $C = 24t + 3$

CONSTRUCTED RESPONSE

3. John is taking part in a charity run. He has received \$250 in fixed pledges, and he will receive \$25 more in pledges for each mile he runs. Write an equation for the amount of money P John will earn in terms of the distance d he runs, measured in miles.

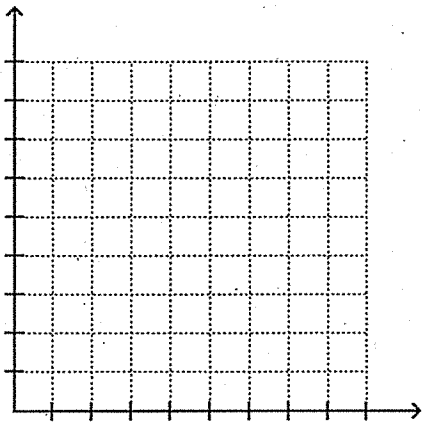
4. The radioactive element Polonium-210 has a half-life of about 138 days. This means that approximately 0.5% of a mass of Polonium-210 will decay every day. Write an equation for the approximate remaining mass m of 50 grams of Polonium-210 after t days.

5. Julius is flying home to Los Angeles from Boston. His distance away from home in miles d can be expressed in terms of t hours by the equation $d = 2600 - 500t$. Graph Julius's distance away from home in miles d after t hours, choosing appropriate scales.



Name _____ Date _____ Class _____

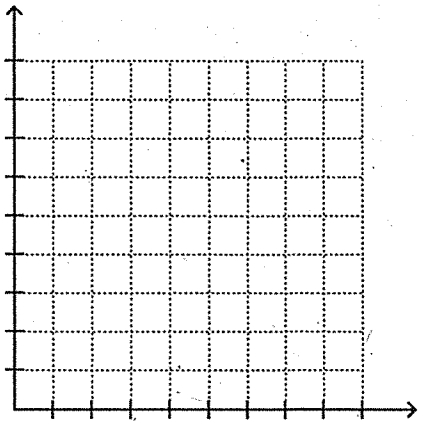
6. The height above the ground in feet of an object h with an initial upward velocity in feet per second v_0 and an initial height in feet h_0 is $h = -16t^2 + v_0t + h_0$, where t is the time in seconds. A baseball player hits a ball 3 feet above the ground with an initial upward velocity of 96 feet per second. Write an equation for the height of the ball above the ground in feet h in terms of time in seconds t, graph the equation, choosing appropriate axis labels and scales, and then determine the maximum height of the ball. Show your work.



7. At the 2012 Summer Olympics in London, Jamaican sprinter Usain Bolt set a new Olympic record by completing the 100-meter dash in 9.63 seconds.

   a. Assuming Bolt ran the race at a steady pace, write an equation for the distance in meters d that Bolt ran after t seconds. Round values to two decimal places as needed.

   b. Graph the equation in part a, choosing appropriate axis labels and scales.



   c. Suppose Bolt raced a competitor who ran at a steady pace of 7 meters per second in a friendly 100-meter dash. If Bolt ran at his Olympic record pace while giving his competitor a 30-meter head start, who would win the race? Use a graph to justify your answer. (You can add to the graph in part b or create a new graph on a separate piece of paper.)

Name _____ Date _____ Class _____

A.CED.3*

SELECTED RESPONSE

Select the correct answer.

1. A local supermarket sells chicken for \$2.49/lb and pork for \$3.19/lb. Todd buys c pounds of chicken and p pounds of pork. Which of the following inequalities represents that Todd only has \$40 to spend?

   (A) $2.49c \leq 40$

   (B) $3.19p \leq 40$

   (C) $c + p \leq 40$

   (D) $2.49c + 3.19p \leq 40$

2. Sheila is organizing desks in her classroom in preparation for a class of at least 25 students. She wants the desks to be arranged in a rectangle. Due to the dimensions of her classroom, she cannot reasonably fit more than 6 desks in any row or 7 desks in any column. When trying to figure out how Sheila can arrange her room, which of the following is not a meaningful criterion in terms of the number of rows of desks r and the number of columns of desks c?

   (A) $r \leq 6$ (C) $r + c \geq 25$

   (B) $c \leq 7$ (D) $rc \geq 25$

Select the correct answer for each lettered part.

3. Tucker is planting corn and tomatoes. He has 100 acres of farmland and wants to plant no less than 20 acres of each crop. Determine if each of the following inequalities are meaningful constraints on whether Tucker can plant c acres of corn and t acres of tomatoes.

   a. $c \geq 20$ ○ Yes ○ No

   b. $t < 20$ ○ Yes ○ No

   c. $c + t \geq 100$ ○ Yes ○ No

   d. $c + t \leq 100$ ○ Yes ○ No

   e. $100 - c \geq 80$ ○ Yes ○ No

CONSTRUCTED RESPONSE

4. Denise wants to burn at least 5000 calories a week through running. Based on her running speed, she estimates that she can burn 550 calories per hour. Write an inequality that represents Denise's goal in terms of the number of hours spent running h. If Denise runs for one half hour each week day and one hour each weekend day, will she meet her goal? Justify your answer.

5. What are the possible dimensions of a 28-square-foot garden if the width is 3 feet shorter than the length? Show your work and explain whether or not the solutions to the equation you write are reasonable answers to the question.

Name _____ Date _____ Class _____

6. Carmen and her family visit a restaurant with $45 on hand. The meal tax in the area is 5%. The family also expects to give an 18% tip.

   a. Write an inequality representing the amount of money Carmen's family can spend on dinner in terms of the cost of their meal *C* if they only spend their on-hand cash.

   b. Could the family order three $8.49 hamburgers, three $2.49 drinks, and one $4.99 appetizer and pay using only their on-hand cash? Justify your answer.

7. John is participating in a charity run. He has gathered $485 in fixed donations and will earn an additional $65 for every mile he runs.

   a. Write an equation for the total amount of money *A* John will raise for running *d* miles.

   b. Rewrite the equation in part a as an inequality that represents that John wants to raise at least $1000.

   c. How far does John need to run to meet his goal? Show your work. Assume John only receives donations for completed miles.

8. Ito has $225, and he wants to expand his media collection by adding some CDs and DVDs.

   a. Ito would like to buy three more CDs than DVDs. Write an equation to represent this condition.

   b. The store charges $15 for a CD and $25 for a DVD. Write an inequality to represent the constraint on total cost, and then use part a to find the maximum number of DVDs Ito can buy.

   c. If Ito purchases the number of DVDs you found in part b and the number of CDs described by part a, how much money will he have left over? Show your work.

Name _____ Date _____ Class _____

A.CED.4*

SELECTED RESPONSE

Select the correct answer.

1. Which of the following operations will solve Ohm's law, $V = IR$, for I?

   (A) Subtract R from both sides.

   (B) Divide both sides by R.

   (C) Subtract V from both sides.

   (D) Divide both sides by I.

Select all correct answers.

2. The ideal gas law, $PV = nRT$, is a well-known equation in science that describes the behavior of gases. P is the pressure of the gas, V is the volume of the gas, n is the amount of the gas, R is a constant, and T is the temperature of the gas. Which of the following statements about the ideal gas law are true?

   (A) Dividing both sides of the equation by V results in an equation solved for P.

   (B) Dividing both sides of the equation by R results in an equation solved for T.

   (C) Subtracting P from both sides of the equation results in an equation solved for V.

   (D) Dividing both sides of the equation by RT results in an equation solved for n.

   (E) Subtracting PV from both sides of the equation and then dividing both sides of the equation by $nT - PV$ results in an equation solved for R.

The surface area A of a rectangular prism with a given length L, width W, and height H is $A = 2LW + 2LH + 2WH$. Match each task with the resulting formula.

_____ 3. Solving for the length of a rectangular prism with a given width, height, and surface area

_____ 4. Solving for the width of a rectangular prism with a given length, height, and surface area

_____ 5. Solving for the height of a rectangular prism with a given length, width, and surface area

A $W = \frac{A}{2H + 2L} - \frac{LH}{H + L}$

B $L = \frac{HW - 0.5A}{W - H}$

C $H = \frac{0.5A - LW}{L + W}$

D $W = \frac{LH - 0.5A}{H - L}$

E $H = \frac{A + 2LW}{2(L + W)}$

F $L = \frac{-WH + \frac{1}{2}A}{H + W}$

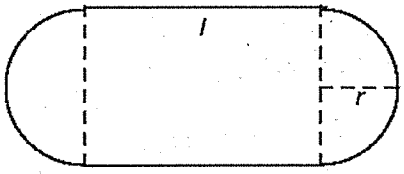
Name _____ Date _____ Class _____

6. The formula for passing efficiency P in NCAA football is

$$P = \frac{8.4Y + 330T + 100C - 200I}{A}$$

where Y is the number of passing yards, T is the number of passing touchdowns, C is the number of completed passes, I is the number of interceptions, and A is the number of attempts. Write an equation that will calculate the completed passes for a quarterback with a given passing efficiency, number of passing yards, number of passing touchdowns, number of interceptions, and number of attempts. Show your work.

7. A high school race track is composed of a rectangle and two semicircles.



a. If the length l of the rectangle is twice as long as the diameter of the semicircles, write a formula for P, the distance around the track, in terms of the radius r of the semicircles.

b. Rewrite the formula from part a so the radius of the semicircles is given in terms of the distance around the track. Show your work.

8. The formula $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ gives the distance between the points (x_1, y_1) and (x_2, y_2) on the coordinate plane.

a. Solve the distance formula for y_2. Show your work.

b. A line with a positive slope passes through the points $(-5, -3)$ and $(1, y)$. If the distance between the two points is 10 units, what is the value of y? How did you decide which of the two values the equation gives is correct? Show your work.