1. The graph shows two savings plans. If the same savings rates are continued, what will be the difference in the amount saved at the end of two years?

A. $600  
B. $1,200  
C. $2,400  
D. $3,600

2. Which of the graphs most accurately depicts the wages earned with respect to the time worked?

A.  
B.  
C.  
D.  

3. A repair service charges $25 to send a service person on a call and $30 per hour for labor. If \( h \) stands for the number of hours of labor, which expression below can the company use to compute the charge for the service call?

A. \( 25h + 30 \)  
B. \( 55h \)  
C. \( \frac{25}{30h} \)  
D. \( 25 + 30h \)
4. The two graphs show Carol's drive from home to school and from school to home. What is the difference in her average speed in miles per hour for the two trips?

![Drive From Home to School Graph](image1)

![Drive From School to Home Graph](image2)

A. 5 mph  
B. 10 mph  
C. 15 mph  
D. 20 mph

5. Based on the graph, which organization showed the most growth in membership over the 10-year period?

![Club Membership Graph](image3)

A. The Math Club  
B. The Hiking Club  
C. The Drama Club  
D. The Drama Club and the Hiking Club are tied for the most growth.

6. Which of the points below is not collinear with the others?

![Points Graph](image4)

M (3, –2)  
N (–5, 6)  
S (–9, 10)  
T (10, –21)

A. N only  
B. S only  
C. T only  
D. They are all collinear.
7. (Use the graphs below to answer this question.) Which of the two parking facilities will charge the least for 24 hours of parking?

A. City Garage
B. Pete’s Garage
C. They both charge the same.
D. 24-hour rates for City Garage are not available.

8. (Use the graphs below to answer this question.) The graphs show numbers of baskets made by Paul and Terrell during 5 basketball practice sessions. They each take 100 practice shots in each practice session. According to the information in these graphs, who was more successful at making baskets?

A. Paul did much better.
B. Terrell did much better.
C. Their scores appear to be about the same.
D. More information is needed to make a decision.
9. (Use the graph to answer this question.)
According to the graph, when the speed of an object is 100 m/sec, then the time is

A. greater than 300 seconds.
B. greater than 30 seconds but less than 300 seconds.
C. less than 10 seconds but greater than 0 seconds.
D. 0 seconds.

10. The circumference, $C$, of a circle is found by using the formula $C = \pi d$, where $d$ is the diameter. Which graph best shows the relationship between the diameter of a circle and its circumference?

A. 
B. 
C. 
D. 

11. (Use the graph on the right to answer this question.) Point $C$ on the graph represents the distance and time that Catlyn traveled on her trip. Which of the following represents her average speed?

A. $x$-coordinate of point $C$
B. $y$-coordinate of point $C$
C. slope of line through $C$ and $(0, 0)$
D. distance from the origin to point $C$
12. Use the following graph to answer the questions.

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<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
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<tr>
<td>Meters</td>
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</table>

(D) At what time interval is the object moving the fastest?

A. 0 to 3 seconds  
B. 3 to 5 seconds  
C. 5 to 7 seconds  
D. Not enough information is provided to determine the answer.

(E) At what time interval is the object moving the slowest?

A. 0 to 3 seconds  
B. 3 to 5 seconds  
C. 5 to 7 seconds  
D. Not enough information is provided to determine the answer.

(F) If enough information is given, determine the velocity of the object during the 2\textsuperscript{nd} part of the trip. If there is not enough information given, place an “\x” this box: \_

Answer:
13. From the ground, an Ant crawls along a flower stem. The graph on the right displays its height on the flower (above the ground) for 7 seconds.

At what time does the ant change direction on the flower stem?

(A) 2 seconds  
(B) 4 seconds  
(C) 6 seconds  
(D) 2 and 4 seconds
14. The picture below shows the amount of money in a bank account over an 8-day period. The dot marks the initial amount of money in the account and the X’s show how much is in the account at the end of each day.

Below are four Withdrawal Rates, A, B, C, and D.
   A. $10/day
   B. $40 each day
   C. $80 every 2 days
   D. $20 every half day

Circle the letter(s) of the Withdrawal Rate(s) that matches the picture. If all of them match, then circle the letter E.

   A  B  C  D  E: All of these
15. Bob drove 140 miles in 2 hours and then drove 150 miles in 3 more hours.

Circle the letter(s) of the Velocity Graph(s) above that describe Bob’s trip. If none describe Bob’s trip, then circle the letter E.

A  B  C  D  E: None of these
16. The following graph shows the temperature of an oven over an 8-hour period.

Below are four Temperature Change Rates, A, B, C, and D.
   (A) 2 deg/hr
   (B) 4 deg/hr
   (C) 3 deg/hr
   (D) 8 deg/hr

Circle the letter(s) of the Temperature Change Rate(s) that matches the above graph. If all of them match, then circle the letter E.

   A       B       C       D       E: All of these
17. A Company measures its production of microchips every six and one half days. The total number of microchips produced was 637.

Below are four Production Rates, A, B, C, and D.
(A) 100 chips/day
(B) 92 chips/day
(C) 98 chips/day
(D) 66.6 chips/day

Circle the letter of the Production Rate(s) that matches the description. If none match, then circle the letter E.

A   B   C   D   E: None of these
18. The graph on the right represents the Total Cost of making Xbox™ (Product A) and Sony PlayStation 2™ (Product B) over an 8-month period. XBox’s graph is above PlayStation 2's graph for the first few months.

Write two functions—one for XBox and one for PlayStation 2—that will give the Total Cost of manufacturing as a function of Time $T$ during the 8-month period.

(A) Function for Product A (Xbox™):

(B) Function for Product B (Sony PlayStation 2™):

(C) Is there a time when the Total Cost for each product is the same? If so, when?

(D) Is there a value for $T$ that when substituted into the function, it makes both equal to the same number? Yes ______  No ______

If yes, what is that number?
19. On the given coordinate systems below, sketch 3 graphs with:

(A) A Slope of 0

(B) A Negative Slope
20. Mr. Chrostowski is choosing one of the billing plans shown above for his cellular phone. He estimates that he will use the phone less than 50 minutes per month. *(Use the chart below to answer this question.)*

(A) If he chooses Plan 1 and uses the phone exactly 50 minutes in one month, what will his bill be for that month?

(B) Suppose that he chooses Plan 1 and uses the phone \( m \) minutes in one month. Write an equation for his total bill, \( B \), for that month.

(C) On the grid below, construct a graph that shows the monthly bills for Plan 1 for between 0 and 50 minutes of calls.

(D) Using your equation or graph, find the number of minutes of phone use for which the two plans cost the same. Show or explain how you found your answer.
21. The motion of a dot D is given by \( Y = mX+b \), where \( Y \) is Position in Feet and \( X \) is Time in Seconds.

**Circle all the items that are essentially the same as the \( m \) in \( Y = mX+b \).**

(A) The dot’s starting position
(B) The distance between marks as time increases by 1-second intervals
(C) The slope of the formula’s Position vs. Time graph
(D) The number of seconds that the dot moves
(E) The dot’s velocity
(F) The height on the Y-axis where the Position vs. Time graph hits the Y-axis
(G) In a vertical table of data for the formula, the amount that the Y column increases when X increases by 1
(H) The dot’s starting time
(I) The dot’s ending position
(J) The Y-intercept of the formula’s graph
(K) The X-intercept of the formula’s graph

**Circle all the items that are essentially the same as the \( b \) in \( Y = mX+b \).**

(A) The dot’s starting position
(B) The distance between marks as time increases by 1-second intervals
(C) The slope of the formula’s Position vs. Time graph
(D) The number of seconds that the dot moves
(E) The dot’s velocity
(F) The height on the Y-axis where the Position vs. Time graph hits the Y-axis
(G) In a vertical table of data for the formula, the amount that the Y column increases when X increases by 1
(H) The dot’s starting time
(I) The dot’s ending position
(J) The Y-intercept of the formula’s graph
(K) The X-intercept of the formula’s graph
22. Below are Position vs. Time graphs for five motions (a-e).

(A) Write the specific formula for each motion in the spaces provided.

<table>
<thead>
<tr>
<th>Formula for a:</th>
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<tbody>
<tr>
<td>Formula for b</td>
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<td>Formula for c</td>
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<td>Formula for d</td>
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<td>Formula for e</td>
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</tbody>
</table>

(B) Write a generic position formula that describes all motions in a single formula.

| Generic Formula: |   |
23. The position graph below shows a race that took place among five people. Be careful regarding the scale on the vertical axis.

(A) Write the position formula for the person marked A.

Formula for A:

(B) Write a generic position formula that describes all the motions in a single generic formula.

Generic Formula:
24. Your Count-Off # is _____. You are running a race with your friend. Your friend runs the race from the starting line at \((6 - \text{Count-Off #})\) km per hour. You start the race 2 km ahead of the starting line and run at \((5 - \text{Count-Off #})\) km per hour. You and your friend race finish the race in a tie. The picture below contains you and your friend’s position graph as well as the graphs for other people and their friends who are running their own races.

(A) Clearly label the graph of your motion and the graph of your friend’s motion in the picture above.

(B) Write a formula for your motion and your friend’s motion.

   My Position Formula: ________________________________

   My Friend’s Position Formula: ________________________________

(C) How much time does it take your friend to catch up with you? ______________ hours

(D) At what distance from the starting line does your friend catch up with you? ______________ km

(E) If you both keep on running at the same speeds, at what time would your friend be 0.5 km (500 meters) ahead of you? _____________________________ hours

(F) At what positions would you and your friend be at that time?

   My Position: ________________________________ km

   My Friend’s Position: ________________________________ km

(G) How far apart would you and your friend be if you continued to run for a total of 5 hours at the same speeds? _____________________________ km
Suppose another friend starts the race at 4km ahead of the starting line.

(H) At what velocity would she need to run to finish the race in a tie with you? _______________ km/hr

(I) What would her position formula be?

My Other Friend’s Position Formula: _______________________________

(J) On the blank graph below, draw the graph based on her formula.