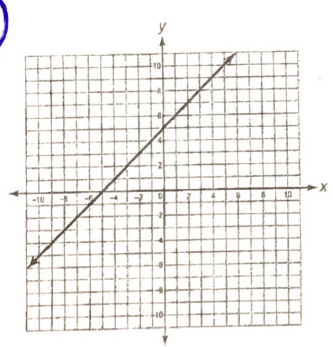
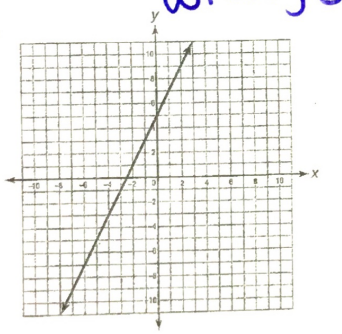
Unit 1 Assessment • Relationships between Quantities

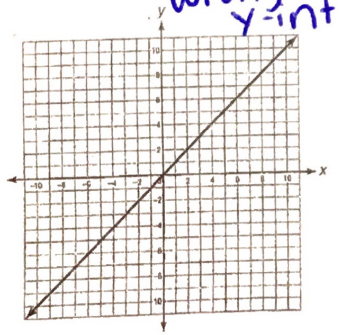
1. Carlisle is going to a fabric supply store to buy materials for her crafts. She knows that she needs 12 feet of blue yarn and is wondering how much she will spend. Which unit will most likely be used to determine the cost of her yarn?

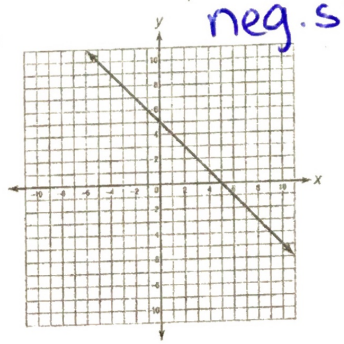
   A. dollars per minute
   B. feet of yarn per minute
   C. dollars per foot of yarn
   D. balls of yarn per day

2. Kieran needs water for an upcoming camping trip. He has one large container that holds 5 gallons of water and is planning on buying some 1-gallon jugs of water. If he lets y represent the total gallons of water and x represent the number of jugs of water that he will buy, the water for the trip can be modeled as part of the line represented by the equation $y = x + 5$. Which is the graph of the equation $y = x + 5$?

   A.
   

   C. wrong slope
   

   B. wrong y-int
   

   D. neg. slope
   

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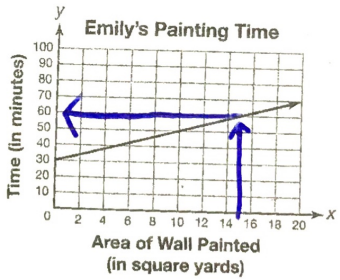
3. Julius went on a volunteer trip to Central America and took medical supplies with him. He packed a bag with 50 pounds of supplies. He brought pieces of equipment that weighed 10 pounds each and bottles of medicine that weighed 1 pound each. If p represents the number of pieces of equipment he brought and b represents the number of bottles of medicine he brought, then the total weight can be represented by the equation $10p + b = 50$. If he brought 3 pieces of equipment, how many bottles of medicine did he bring?

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

   $10(3) + b = 50$
   $30 + b = 50$
   $b = 20$

4. Emily works as a painter. For each job, it takes her 30 minutes to prepare an interior wall of a house before she paints, and 2 minutes per square yard to paint that wall. The graph below shows the total time it would take her to do a job based on the total area of the wall.

   How long does it take her to do a job when she paints a wall with an area of 15 square yards?

   A. 30 minutes
   B. 60 minutes
   C. 90 minutes
   D. 120 minutes

5. In a test, engineers determined that a bicycle can travel at a top speed of 20 feet per second. What is the top speed the bicycle can travel in miles per hour? (1 mile = 5,280 feet)

   A. 0.004 mile per hour
   B. 0.23 mile per hour
   C. 13.6 miles per hour
   D. 105,600 miles per hour

   $\frac{ft}{sec} \rightarrow \frac{20}{1} = \frac{72000}{3600\ hr}$ $\frac{72000}{5280}$

6. Renting a canoe costs an initial $10 fee as well as $8 per hour. If c represents the cost of a canoe rental and t represents the number of hours of the rental, which of the following equations best models this scenario?

   A. $c = 8t + 10$
   B. $c = 10t + 8$
   C. $t = 8c + 10$
   D. $t = 10c + 8$

7. Which question below would best be answered with an approximation?

   A. How many people are expected to be at the conference tomorrow? - estimation
   B. At what time did the airplane land?
   C. About how long is the piece of string that wraps around the circle? approx.
   D. What was his measured temperature when he wasn't feeling well?

B & D can be exact

- approx is used to represent a true measurement

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- est. is different because it is made inexact on purpose to make calculations easier or to generalize

8. In order to be elected to student council, Jeremy must have at least 50% of the current council members vote in his favor. If x represents the percent of favorable votes received, which inequality represents the percent of favorable votes that Jeremy needs for election to student council?

A. $x > 50$

B. $x < 50$

C. $x \leq 50$

D. $x \geq 50$

9. Marco deposited $300 in a bank account after speaking to a bank representative. The representative showed Marco the exponential equation by which the balance of his account will be determined as it accumulates interest over time. The equation is shown below.

$$P = 300 \cdot 1.03^t$$

What does the value 1.03 represent?

A. the initial amount of money deposited in the account

B. the dollar amount that will be added to the account each year

C. the factor by which the amount of money in the account is multiplied each year

D. the exponent to which the amount of money in the account is raised each year

10. Three friends ate lunch at a restaurant together. The friends want to determine how much they each owe for their share. If Jenn's meal cost $7, Rouen's meal cost $9, and the total cost of lunch was $25, how much did Prachi's meal cost?

A. $9

B. $11

C. $19

D. $41

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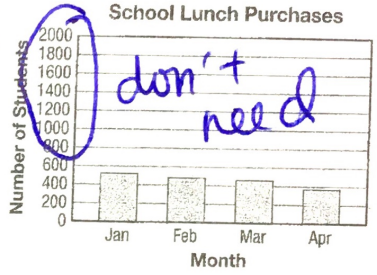
11. A school district kept track of how many students bought school lunches over the course of four months. The data are shown in the table below.

School Lunch Purchases

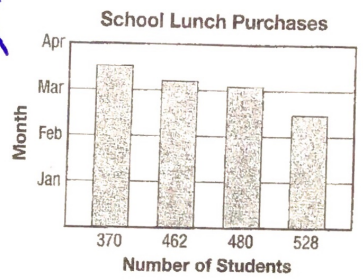
Month	Number of Students
January	528
February	480
March	462
April	370

Which graph below best displays the data in the table?

A.



C.



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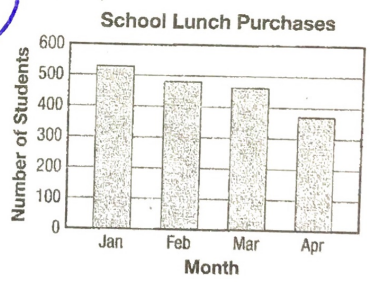
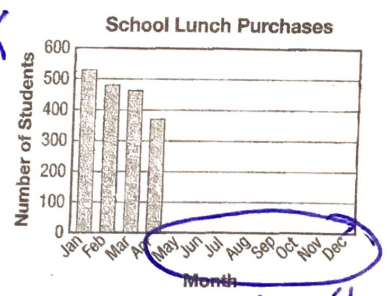


D.



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12. The formula for the surface area of a cylinder is $SA = 2\pi r^2 + 2\pi rh$, where r is the radius of the base and h is the height. If you rewrite the formula as $SA = 2\pi r(r + h)$, what new entity does the product $2\pi r$ in the first term represent?

A. the circumference of the base of the cylinder
B. the area of the base of the cylinder
C. the area of the body of the cylinder
D. the diameter of the base of the cylinder

13. To teach Miguel about saving money, his father told him that he would hold some of Miguel's money and double the amount each year, but he would only hold it so long as the amount was still under \$100. If Miguel gives his father \$1 and his father doubles the money each year, so long as the doubled amount is below \$100, which inequality could Miguel use to track the amount of money?

A. $1 \cdot x^2 < 100$
B. $1 \cdot x^2 > 100$
C. $1 \cdot 2^x < 100$
D. $1 \cdot 2^x > 100$

14. Jessie needs to calculate the circumference of a circle, but she does not have a calculator. Since the formula for the circumference of a circle is $c = \pi d$, should she find an approximate answer or an estimate?

A. approximate answer
B. estimate
C. neither
D. There is not enough information.

= easier to calc. if rounded

15. Yolanda bought a new car for \$8,000. She knows that if she takes good care of the car, its value will decrease only by 10% each year. After a certain number of years, the car will be worth \$5,832. According to the formula $8{,}000 \cdot 0.9^t = 5{,}832$, how many years, t, will it take for the car's value to decrease to \$5,832? Plug in answers

A. 1 year
B. 2 years
C. 3 years
D. 4 years

16. To get a special deal at the bookstore, a customer must spend more than \$40. Sean is planning on buying a movie for \$16 and some books, b, that cost \$8 each. The inequality he wants to use to see how many books he needs to buy is $8b + 16 > 40$. Which number of books will not allow Sean to get the special deal?

A. 3 books
B. 4 books
C. 6 books
D. 7 books

17. A local newspaper said that the city of Luttrell is expected to grow by 4% each year. The population in 2012 is 130,457 people. Let t represent the number of years after 2012. Which equation could be used to determine the total expected population, P, of Luttrell in t years?

A. $P = 130{,}457 + 1.04t$
B. $P = 130{,}457 \cdot 1.04^t$
C. $P = 130{,}457t + 1.04t$
D. $P = 130{,}457^{1.04t}$

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18. Geof went to exercise by walking around a track at his local college. He wore a pedometer to record how many steps he took. He started the pedometer when he began walking around the track. Each lap around the track is $\frac{1}{2}$ mile. At the end of 8 laps, the pedometer showed that he took 18,800 steps. Which of the following quantities could be used to describe his exercise?

A. 2,350 miles per step
B. 2,350 steps per mile
C. 2,350 laps per step
D. 2,350 steps per lap

19. To rent a bicycle, a bike shop charges a deposit plus an hourly rate. Martin can determine how much he will have to pay for a rental lasting t hours by using the expression $8t + 20$. What does the coefficient 8 most likely represent?

A. the length of time of the rental
B. insurance for the bicycle
C. the hourly rate for renting the bicycle
D. the deposit for the bicycle

20. A human heart beats at a rate of about 70 beats per minute. Therefore, the total number of beats, b, in m minutes can be represented by the equation $b = 70m$. Which of the following could **not** be a value for m?

A. zero
B. negative numbers ("go back in time much?")
C. decimals
D. numbers greater than 60

21. Dani and Jack went on a hike that started at an elevation of 4,000 feet. During the hike, they gained 500 feet of elevation per hour, h. Their total elevation, E, can therefore be represented by the equation $E = 500h + 4{,}000$.

On the lines below, identify each part of the equation as a coefficient, variable, or term.

E: variable
500: coefficient (# in front of variable)
$500h$: term (variable term)
4,000: term (constant term)

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22. A group of friends decided to raise money for two charities. The friends raised money individually, pooled their money, and split the total in two to give to the charities. The friends individually raised $142, $116, $54, $157, $92, and $87. Carla counted the money, divided the total in two, and determined that they could give each charity $488.

Use estimation to show whether Carla's calculation is reasonable or not. Show all your work.

I hate estimation. HATE IT!

$\frac{140+120+50+160+90+90}{2} = \frac{650}{2} = 325$

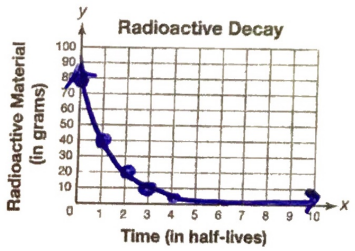
I don't think it is. Carla should just use a calculator.

23. A radioactive chemical element has a half-life. This means that after a specific length of time, the amount of the radioactive material decreases by half. After each half-life, the radioactive material again decreases by half. The initial amount of the element is 80 grams.

A. If t represents the number of half-lives that have passed, write the equation that can be used to determine the amount of radioactive material, R, after t half-lives.

$R = 80(.5)^t$

B. Graph the equation that you wrote in part A.



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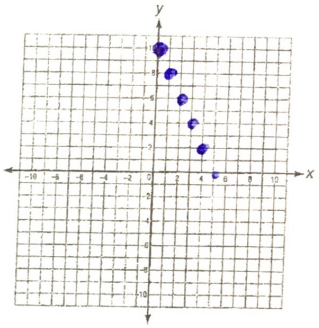
24. Jennifer figures that she uses 2 pens per month for her schoolwork. She started the school year with 10 pens. Let y represent the number of pens that she has, and let x represent the number of months that have passed in the school year.

A. Write an equation that represents the number of pens, y, she will have left after x months.

$y = 10 - 2x$

B. Graph the equation that you wrote in part A. Only include in your graph the x- and y-values that are possible, given the situation.



C. Explain why you excluded certain values in the graph.

She can't have more than 10 pens. She can't have negative pens. She doesn't have ½ pens or any other fractional pen

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