Late Winter Math Packet

Subject: Mathematics

State: New York

Student Name:_____

Teacher Name:_____

School Name:_____

1 Which number is equivalent to 5^{-1}?

(A) -5

(B) $-\frac{1}{5}$

(C) $\frac{1}{5}$

(D) 5

2 Which of the following is equivalent to the expression below? $(2^5)(2^6)$

(A) 2^{11}

(B) 2^{30}

(C) 4^{11}

(D) 4^{30}

3 Which is equivalent to the expression below?

$7^4 \div 7^9$

(A) -35

(B) $\frac{1}{7^5}$

(C) 7^5

(D) 7^{13}

4 The average distance from Jupiter to the Sun is about 5×10^8 miles. The average distance from Venus to the Sun is about 7×10^7 miles.

The average distance from Jupiter to the Sun is about how many times as great as the average distance from Venus to the Sun?

(A) 1.4 times

(B) 7.1 times

(C) 10 times

(D) 430,000,000 times

5 A dollar bill is about 3×10^{-4} inches thick. A penny is about 6×10^{-3} inches thick.

Which statement correctly compares these measurements?

(A) The thickness of a dollar bill is $\frac{1}{10}$ the thickness of a penny.

(B) The thickness of a dollar bill is $\frac{1}{20}$ the thickness of a penny.

(C) The thickness of a dollar bill is 10 times the thickness of a penny.

(D) The thickness of a dollar bill is 20 times the thickness of a penny.

6 A tree in Oakland has a mass of approximately 3×10^6 kilograms. A tree in Mapleville has a mass of approximately 6×10^4 kilograms.

The mass of the tree in Oakland is about how many times the mass of the tree in Mapleville?

(A) 20

(B) 50

(C) 200

(D) 500

7 Which of the following equations has infinitely many solutions?

(A) $2x + 3 = 5 + 2x$

(B) $2x + 3 = 5 + 3x$

(C) $3x - 5 = -5 + 2x$

(D) $3x - 5 = -5 + 3x$

8 Which equation has the same solution as $4 - 2(x - 5) = x - 19$?

(A) $2(x + 5) = -8$

(B) $3(x - 3) = 9$

(C) $x + 2 = 2x - 3$

(D) $3x - 4 = 2x + 7$

9 Which ordered pair is the solution of the system of equations below?

$x + 2y = 6$

$3x + 8y = 4$

(A) (2, 2)

(B) (4, 10)

(C) (10, −2)

(D) (20, −7)

10 Ted has some red blocks and some green blocks.

- Each red block weighs the same number of ounces.
- Each green block weighs the same number of ounces.
- The total weight of 2 red blocks and 6 green blocks is 23 ounces.
- The total weight of 3 red blocks and 4 green blocks is 22 ounces

What is the total weight of 1 red block **and** 1 green block?

(A) 3 ounces

(B) 6 ounces

(C) 6.5 ounces

(D) 13.5 ounces

11 A store sells white scarves and red scarves.

- A white scarf costs $3.
- A red scarf costs $5.

On Monday, the store sold 12 scarves for a total of $50.

What is the total number of red scarves that the store sold on Monday?

(A) 4

(B) 5

(C) 6

(D) 7

12 What are the solutions to the system of equations below?

$3y = x - 2$

$y = -2x + 4$

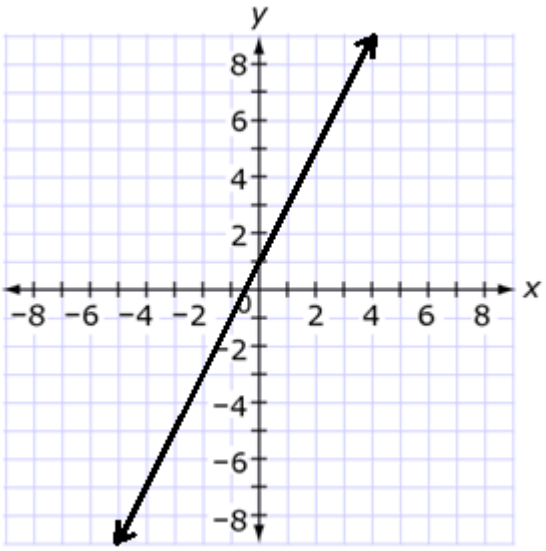
(A) $x = 0;\ y = 2$

(B) $x = 1;\ y = -2$

(C) $x = 2;\ y = 0$

(D) $x = -2;\ y = 4$

13 Look at this graph of a function.



Which equation represents a function with a rate of change that is **greater than** the rate of change of the function shown in the graph?

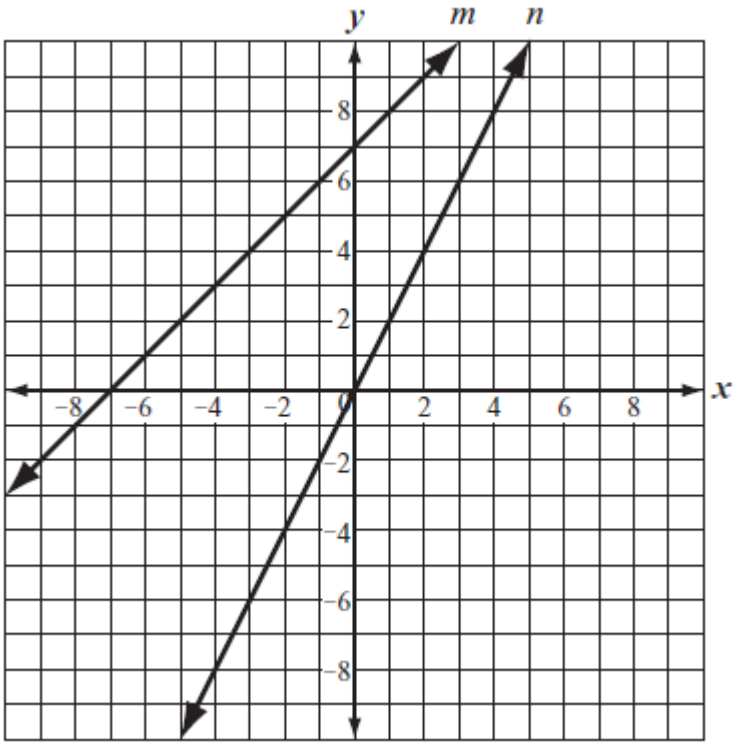
(A) $y = 3x - 1$

(B) $y = \frac{x}{4} + 4$

(C) $y = 2x + 2$

(D) $y = \frac{x}{3} - 3$

14 Amanda graphed line m and line n on a coordinate plane, as shown below.



Which of the following statements is true?

(A) The slope of line m is greater than the slope of line n.

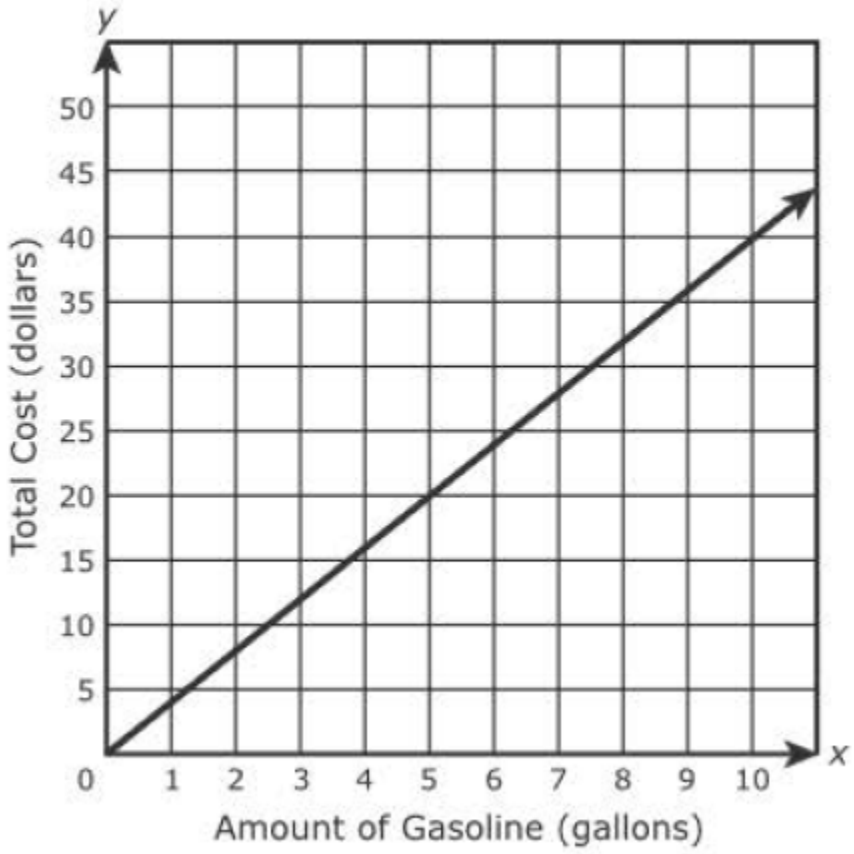
(B) The slope of line n is greater than the slope of line m.

(C) The x-intercept of line m is greater than the x-intercept of line n.

(D) The y-intercept of line n is greater than the y-intercept of line m.

15 The graph and table show the amount of gasoline in gallons, x, and total cost in dollars, y, of gasoline at two gas stations.

Gas Station P



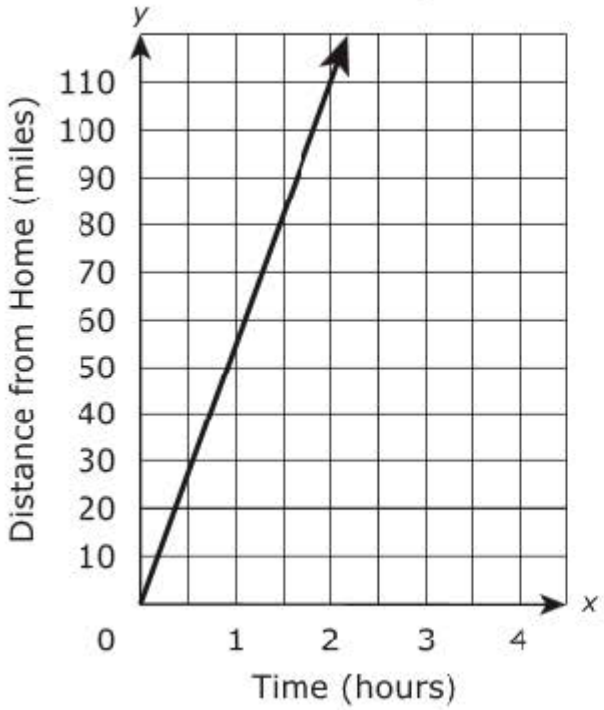
Gas Station M

x	y
5	19.00
10	38.00
15	57.00

Use the unit price of gasoline at both gas stations to determine which gas station charges more for gasoline (gallons). Be sure to include the unit prices in your answer. Show or explain your work.

16 Bill drove his car at a constant speed while on a trip Kevin drove his car at a different constant speed while on the same trip The graph and the table show information about the trips Bill and Kevin took.

Bill's Trip



Kevin's Trip

Time (hours)	Distance from Home (miles)
0	0
2	90
3	135
5	225
6	270

Which sentence correctly compares the rates Bill and Kevin drove on their trips?

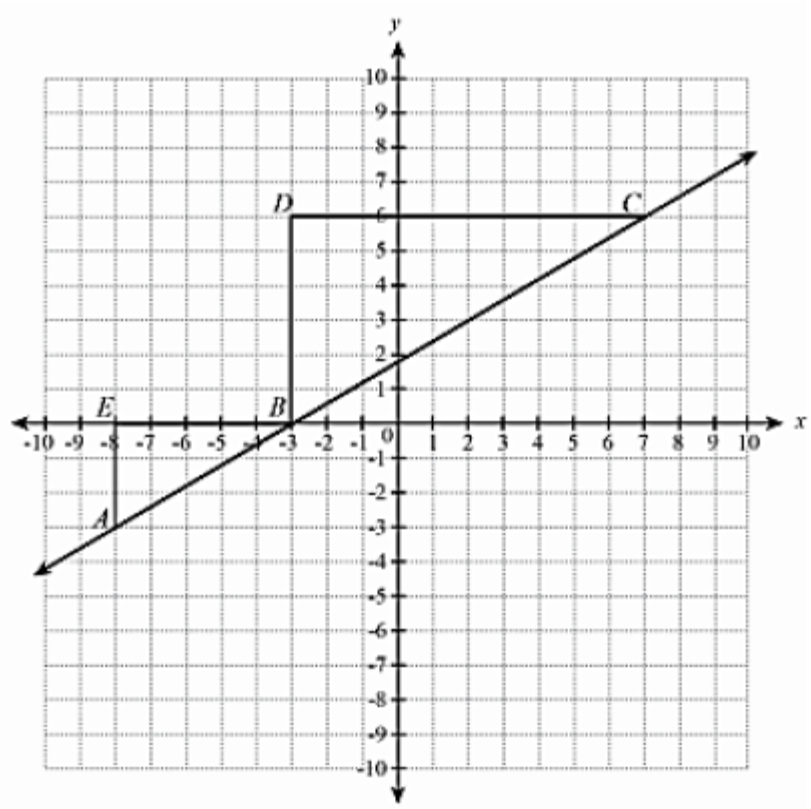
(A) Bill drove at a rate that was 10 miles per hour slower than the rate Kevin drove.

(B) Bill drove at a rate that was 10 miles per hour faster than the rate Kevin drove.

(C) Bill drove at a rate that was 20 miles per hour slower than the rate Kevin drove.

(D) Bill drove at a rate that was 20 miles per hour faster than the rate Kevin drove.

17 Use the graph shown below to answer the question.



Which statement is **not** true?

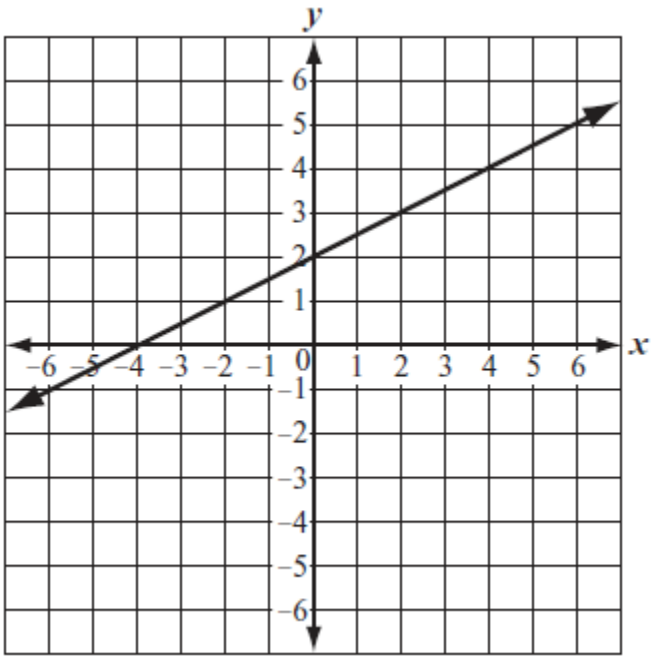
(A) The slope of the line is $\frac{3}{5}$.

(B) The slope of the line is $-\frac{3}{5}$.

(C) The smaller triangle and the larger triangle shown are similar.

(D) The simplified ratio of the vertical side length to the horizontal side length of each triangle is $\frac{3}{5}$.

18 The graph below shows a relationship between x and y.



Which of the following equations best represents this relationship?

(A) $y + 2x$

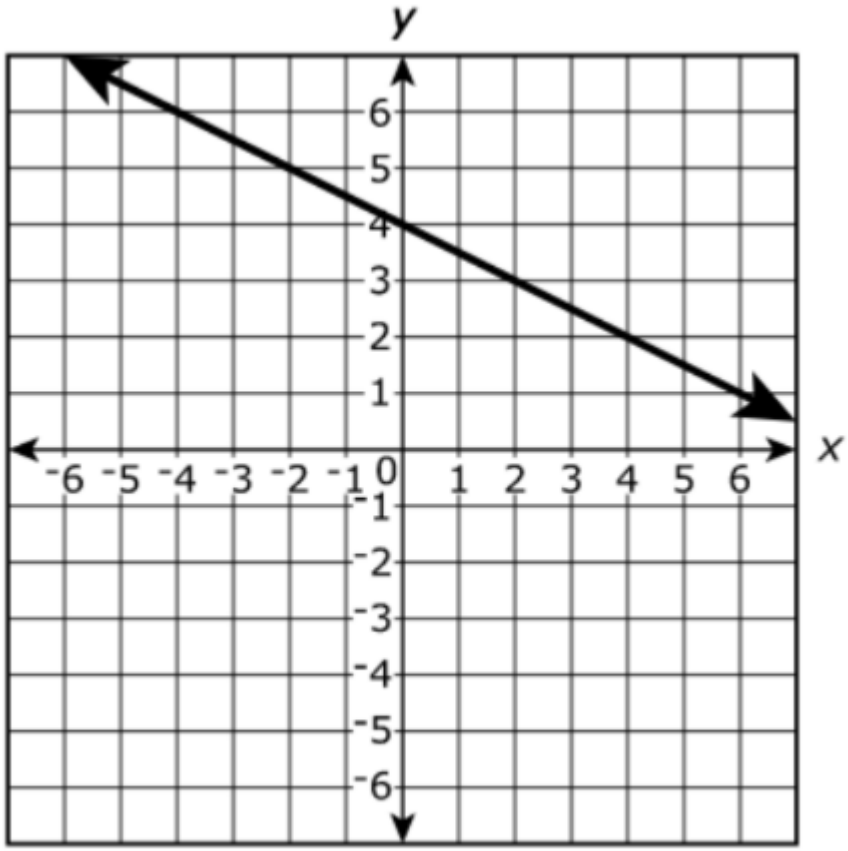
(B) $y = x + 2$

(C) $y = \frac{1}{2}x + 2$

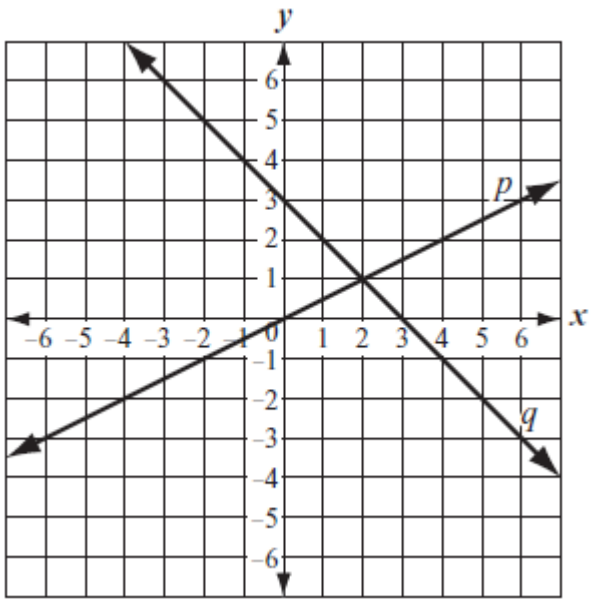
(D) $y = 2x + \frac{1}{2}$

19 A line is graphed on the coordinate plane.

Write the equation of the line in slope-intercept form. Explain how you found the slope and the y-intercept.



20 The system of equations represented by lines p and q is shown in the graph below.



Based on the graph, what is the solution of the system of equations?

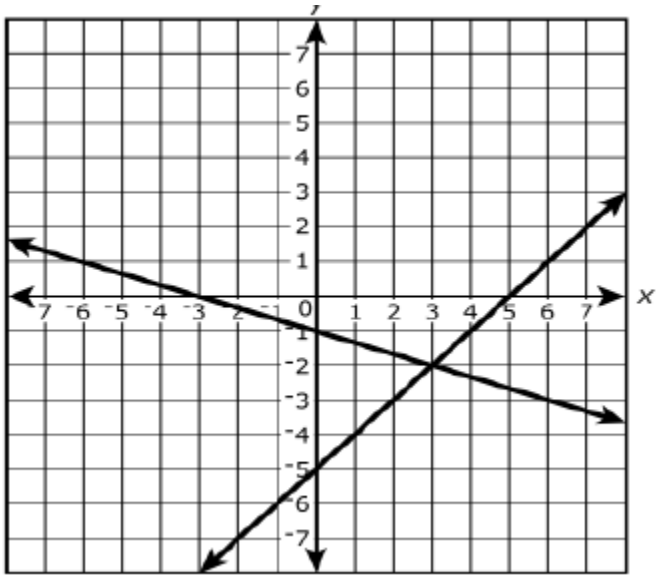
(A) (0, 0)

(B) (0, 3)

(C) (2, 1)

(D) (4, 2)

21 The graph of a system of equations is shown on the coordinate grid.



What is the value of y in the solution to this system of equations?

(A) −5

(B) −2

(C) 3

(D) 5

22 Let (x, y) be the solution of the system of equations below.

$4x + 3y = 17$
$3x + 2y = 12$

What is the value of $\boldsymbol{x - y}$?

(A) -11

(B) -1

(C) 5

(D) 9

23 Solve the system of equations below.

$$y = 2x - 3$$
$$8x - 5y = 1$$

(A) (7, 11)

(B) (-2, -7)

(C) $(-\frac{1}{3}, -3\frac{2}{3})$

(D) $(2\frac{3}{11}, 1\frac{6}{11})$

24 The total cost in dollars, y, of a membership at each of four health clubs is represented below in terms of x, the number of months of the membership.

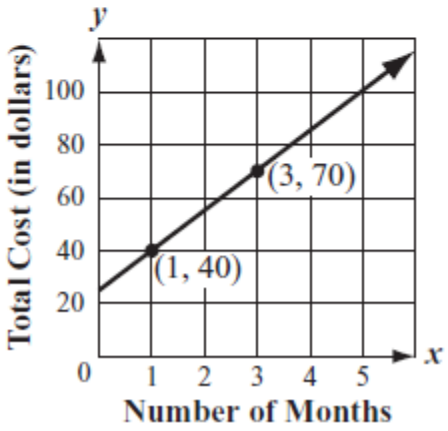
Health Club A:

$$y = 12x + 60$$

Health Club B:

x	y
0	\$ 0
1	\$21
2	\$42
3	\$63
4	\$84

Health Club C:



Health Club D:

A customer pays a one-time fee of \$20 plus \$20 each month for x months.

Which representation has the greatest rate of change?

(A) Health Club A

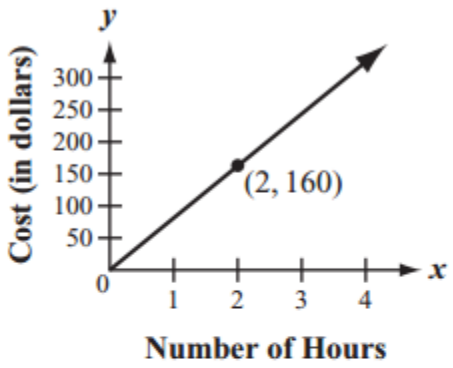
(B) Health Club B

(C) Health Club C

(D) Health Club D

25 The students at a middle school want to hire a DJ for an end-of-the-year dance. The information below can be used to find the total cost of hiring a DJ at each of four different companies.

Awesome Entertainers



Turntable Tunes

Number of Hours	Cost (in dollars)
1	200
2	240
3	280
4	320

Cool Beats

$300 plus an additional $35 per hour

Rock-N-Sounds

The cost of hiring a DJ is represented by the equation

$c = 45h + 250$,

where c is the total cost, in dollars, and h is the number of hours the DJ works.

Which company's cost has the greatest rate of change?

(A) Awesome Entertainers

(B) Cool Beats

(C) Turntable Tunes

(D) Rock-N-Sounds

26 Which is a linear function?

(A) $y = x^2 + 4$

(B) $y = \frac{3}{5x}$

(C) $y = 4x^3$

(D) $y = \frac{1}{2}x$

27 Which equation represents a nonlinear function?

(A) $y = x$

(B) $y = 2x$

(C) $y = x^2$

(D) $y = x + 2$

28 Classify each equation as defining y as a linear or non-linear function of x. Check one cell per column.

function	$y = 7 \times 4x$	$y = (2x + 5)^2$	$y = 10x^2$	$y = 5x - 3$	$y = \frac{x}{2}$	$y = 2x^3 + 1$
linear	○	○	○	○	○	○
on-linear	○	○	○	○	○	○

29 Some of the students from Eastwood School are taking a trip to a museum. In all, fewer than 60 students will go on the trip. The cost for food and admission to the museum is $18 per student.

(a) What is the total cost for food and admission to the museum for 15 students? Show or explain how you got your answer.

The students will travel on one bus to the museum. The cost of the bus is $800.

(b) Complete the table below to show the total cost for food, admission, and the bus for different numbers of students to go to the museum. Show or explain how you got your answers.

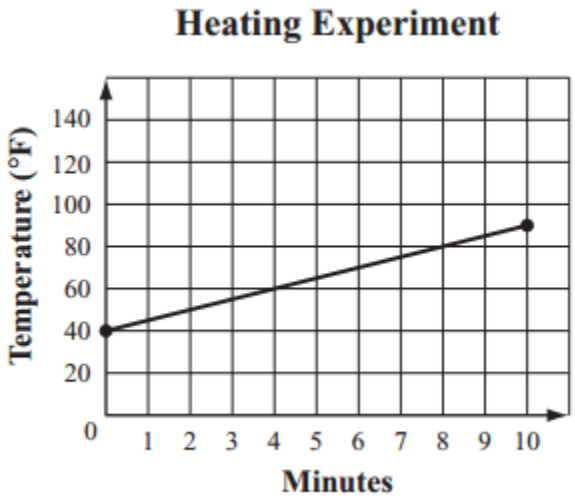
Student Trip to the Museum

Number of Students	Total Cost for Food, Admission, and the Bus
0	$ 800
20	$1160
30	
40	
50	

(c) Write an expression that can be used to find the total cost for food, admission, and the bus for *n* students from Eastwood School to go to the museum.

(d) A total of 44 students go to the museum. What is the total cost, for food, admission, and the bus, **per student** to go to the museum? Show or explain how you got your answer.

30 The graph below shows the temperature, in degrees Fahrenheit, of a liquid for the first ten minutes of a heating experiment.



Based on the graph, which expression could be used to calculate the temperature of the liquid after m minutes?

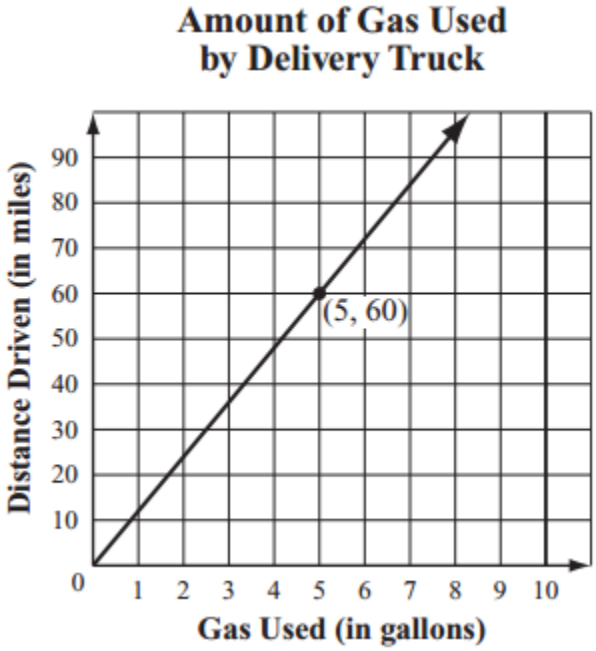
(A) $5m + 40$

(B) $-5m - 40$

(C) $10m + 40$

(D) $-10m - 40$

31 The graph below shows the relationship between the distance a delivery truck is driven and the amount of gas the truck uses.



Based on the graph, what is the average distance, in miles, the truck can be driven using 1 gallon of gas?

(A) 10

(B) 12

(C) 14

(D) 16

32 The average distance from Earth to the Moon is approximately 384,400,000 meters. What is the average distance, in kilometers, from Earth to the Moon written in scientific notation?

(A) 3.844×10^4 kilometers

(B) 3.844×10^5 kilometers

(C) 3.844×10^7 kilometers

(D) 3.844×10^8 kilometers

33 The distance from Mars to the Sun is 1.416×10^8 miles. The distance from Earth to the Sun is 9.296×10^7 miles.

How many more miles is the distance from Mars to the Sun than the distance from Earth to the Sun?

(A) 4.864×10^1 miles

(B) 7.880×10^1 miles

(C) 4.864×10^7 miles

(D) 7.880×10^7 miles

34 A carpenter bought 750 nails. Each nail has a mass of 5.2×10^{-3} kilogram. What is the total mass, in kilograms, of the nails the carpenter bought? Give your answer as a decimal.

35 During the first year of operation, a company produced 8.4×10^9 reams of paper. During the second year, the company produced 5.6 times the number of reams of paper that it produced during the first year.

Which expression represents the number of reams of paper the company produced during the second year?

(A) 1.5×10^9

(B) 1.5×10^{10}

(C) 4.704×10^9

(D) 4.704×10^{10}