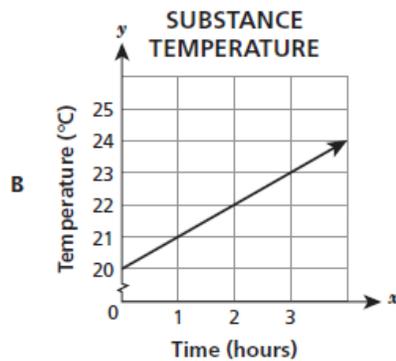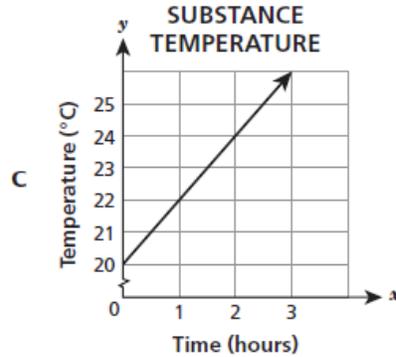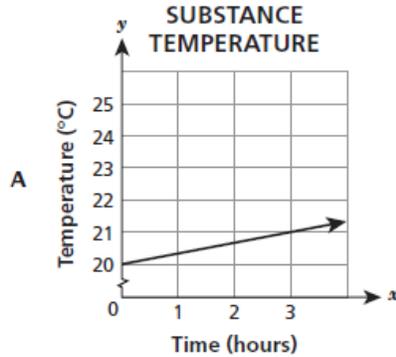8.EE.5

_____1. During an experiment, the temperature of a substance increased at a constant rate of three degrees Celsius (°C) per hour. Which graph represents this relationship?   (2015)

A

SUBSTANCE TEMPERATURE

Temperature (°C)
Time (hours)

C

SUBSTANCE TEMPERATURE

Temperature (°C)
Time (hours)

B

SUBSTANCE TEMPERATURE

Temperature (°C)
Time (hours)

D

SUBSTANCE TEMPERATURE

Temperature (°C)
Time (hours)
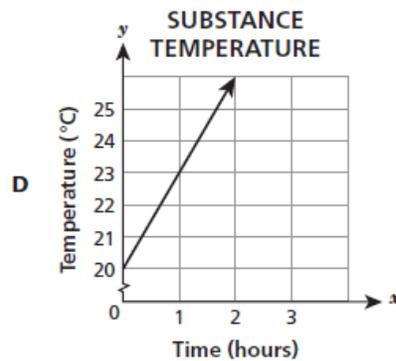
_____2. The graph below shows the relationship between the distances run and the time for three people in a 100-yard race.

RUNNERS IN 100-YARD RACE

Bella

Kofi

Elsie

Distance (yards)
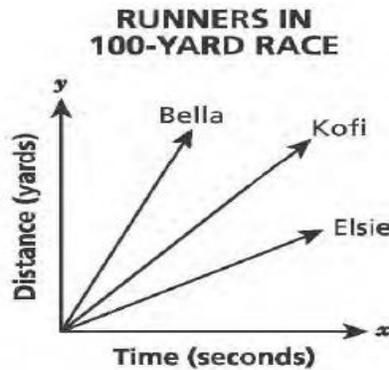
Time (seconds)

The relationship between the distance run and the time for Kofi can be represented by the equation **y = 15.55x**, where he ran y yards in x seconds. Which two equations could be used to represent this relationship for Bella and Elsie?   (2016) (no calculator)

A. Bella: $y = 15.15x$; Elsie: $y = 15.85x$ C. Bella: $y = 15.45x$; Elsie: $y = 15.15x$

B. Bella: $y = 15.85x$; Elsie: $y = 15.65x$ D. Bella: $y = 15.85x$; Elsie: $y = 15.15x$

_____3. Two friends work at different companies, P and S. Both companies use the number of hours that an employee works to calculate that employee's vacation hours. The relationship between the number of hours worked and the number of vacation hours for employees at each company is shown in the table and graph, respectively. (2016)

COMPANY P

Hours Worked	Vacation Hours
10	0.4
20	0.8
30	1.2
40	1.6
50	2.0
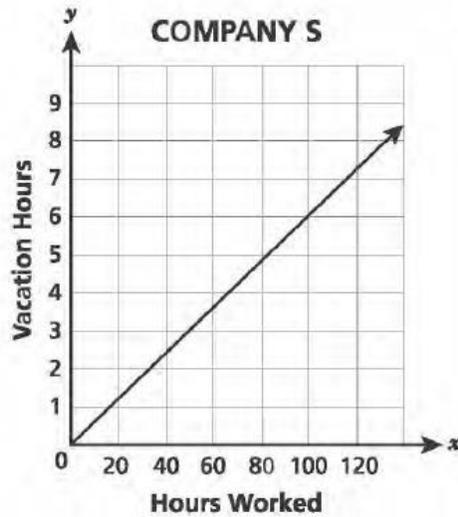
COMPANY S

Which statement describes the difference in each friend's vacation hours if both work 2,080 hours?

A. The friend at company S will have about 42 more vacation hours than the friend at company P.

B. The friend at company S will have about 46 more vacation hours than the friend at company P.

C. The friend at company P will have about eight more vacation hours than the friend at company S.

D. The friend at company P will have about nine more vacation hours than the friend at company S.

_____4. A cook uses 2.5 cups of flour for each ounce of butter in a recipe. Which graph represents the relationship between the amount of flour and the amount of butter in the recipe? (2017)

no calculator
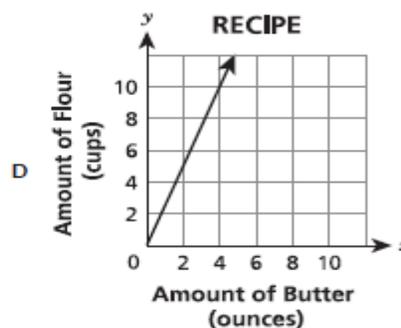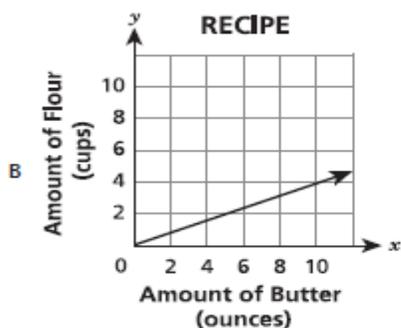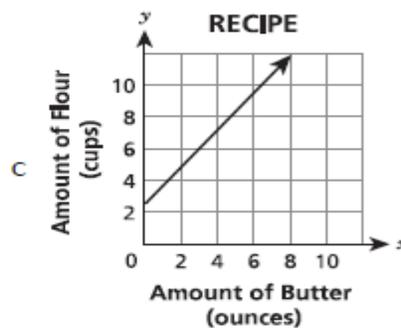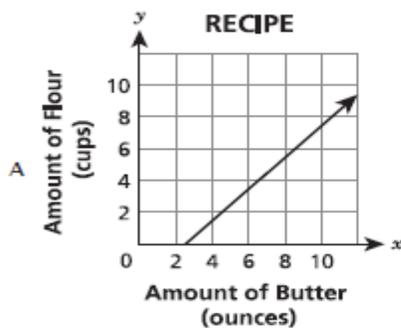
_____5. The graphs below show the relationship between elapsed time and distance traveled by airplane A and airplane B after each airplane reaches its cruising speed. (2017)

AIRPLANE A

Distance (miles): 30, 24, 18, 12, 6
Time (minutes): 0 1 2 3 4 5

AIRPLANE B

Distance (miles): 20, 16, 12, 8, 4
Time (minutes): 0 1 2 3 4 5
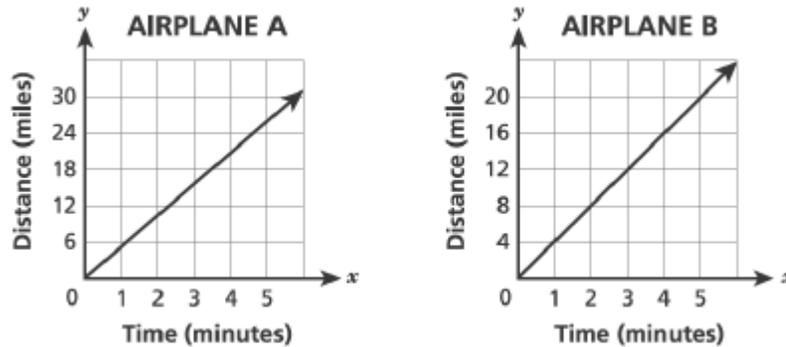
Airplane C is traveling at a different cruising speed. The equation $y = \frac{27}{6}x$ can be used to determine y, the number of miles traveled by airplane C in x minutes. Which statement accurately compares the cruising speed of airplane C to airplanes A and B?

A.   The cruising speed of airplane C is less than the cruising speeds of both airplanes A and B

B.   The cruising speed of airplane C is greater than the cruising speeds of both airplanes A and B

C.   The cruising speed of airplane C is greater than the cruising speed of airplane A and less than the cruising speed of airplane B

D.   The cruising speed of airplane C is less than the cruising speed of airplane A and greater than the cruising speed of airplane B

_____6. Kevin and Christy both saved money for their class trip. Kevin saved the same amount each week. The total amount that Kevin saved at the end of every two weeks is shown in the table below.

KEVIN'S SAVINGS

Time (weeks)	Total Amount Saved
2	$46
4	$92
6	$138

Christy's savings can be modeled by the equation $y = 26x$, where y is the total amount of money saved in x weeks. Which statement correctly compares the rates at which Kevin and Christy saved money? (2018)

A. Christy saved $3 per week more than Kevin.
B. Kevin saved $10 per week more than Christy.
C. Christy saved $18 per week more than Kevin.
D. Kevin saved $20 per week more than Christy.

_____7. A radar device has an antenna that revolves at a constant rate. The graph shows the number of revolutions the device will make over time. (2018)

RADAR DEVICE ANTENNA
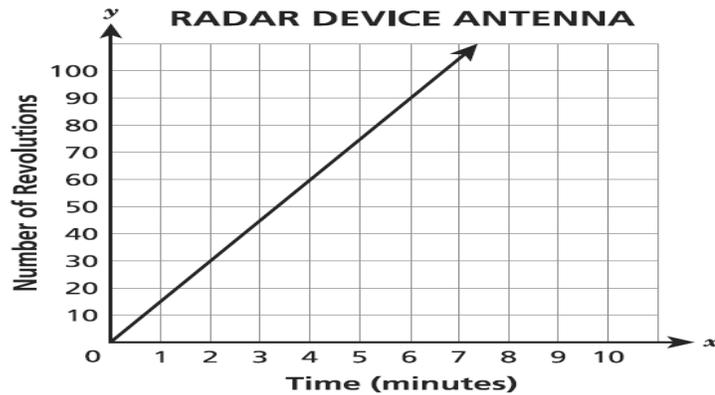
Which table shows the data for an antenna that revolves at exactly twice the rate of the antenna described in the graph?

A

ANTENNA #1

Time (minutes)	Number of Revolutions
15	315
30	660

C

ANTENNA #3

Time (minutes)	Number of Revolutions
20	40
25	50

B

ANTENNA #2

Time (minutes)	Number of Revolutions
18	450
36	900

D

ANTENNA #4

Time (minutes)	Number of Revolutions
22	660
24	720

_____8. Chris and Sam earn money shoveling snow, as described below.

- The amount of money Chris earns can be modeled by the equation $y = 8.25x$, where y is the total amount of money, in dollars, earned in x hours.

- The table below shows the relationship between the total amount of money earned, y, in dollars, and the total amount of time worked, x, in hours for Sam. (2021)

SAM'S EARNINGS

x	4	6	8
y	30	45	60

Which statement correctly compares the rates at which Chris and Sam earn money shoveling snow?

A. Sam earns $0.75 more per hour than Chris.   C. Sam earns $0.25 more per hour than Chris.

B. Chris earns $0.75 more per hour than Sam.   D. Chris earns $0.25 more per hour than Sam.

_____9. Which proportional relationship has the greatest rate of change?   (2019 and 2021)
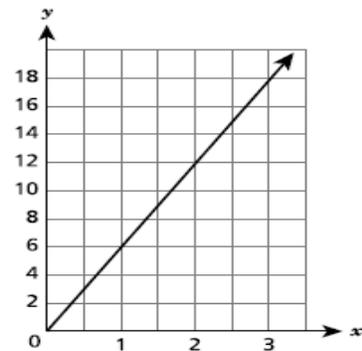
A. $y = 7x$

C.

| x	y
0	0
2	8
4	16
6	24

B. The value of increases by 12 for every increase of in the value of .

D

_____10. There are two mechanics who work on cars. For each mechanic, the relationship between x, the number of hours worked, and y, the total cost, in dollars, is described below.
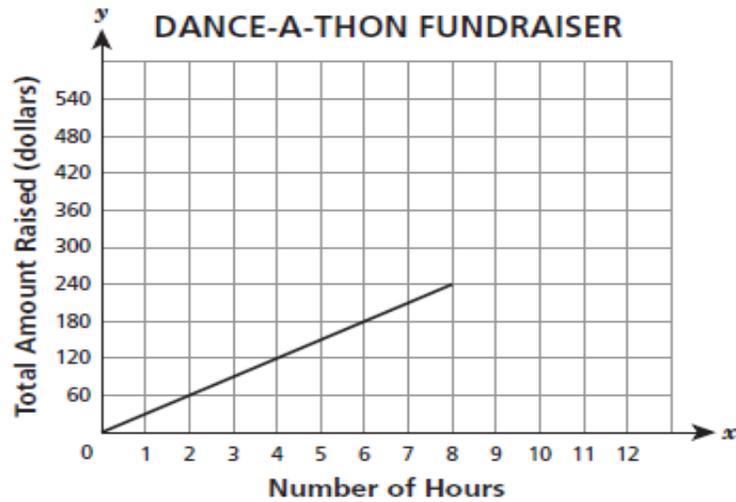
- The equation $y = 36x$ represents the total cost charged by Mechanic A for the number of hours worked.

- The graph shown below represents the total cost charged by Mechanic B for the number of hours worked.

(2, 88)

Number of Hours
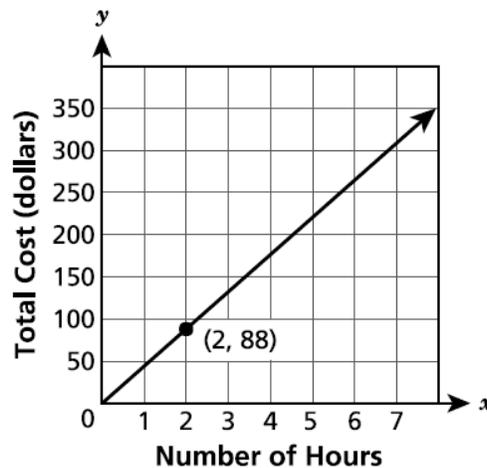
Based on the information, which statement is true?   (2022)

A. Mechanic A charges $8.00 more per hour than Mechanic B.
B. Mechanic B charges $8.00 more per hour than Mechanic A.
C. Mechanic A charges $52.00 more per hour than Mechanic B.
D. Mechanic B charges $52.00 more per hour than Mechanic A.

11. Students organized a 12-hour "dance-a-thon" as a fundraiser for their summer camp. The graph below represents the amount of money they raised during the first 8 hours. (2013)

DANCE-A-THON FUNDRAISER

Total Amount Raised (dollars)

540
480
420
360
300
240
180
120
60
0   1   2   3   4   5   6   7   8   9   10   11   12

Number of Hours

What was the amount of money raised per hour during the first 8 hours?
Show your work or explain how you determined your answer.

Answer $_____ per hour

During the next 4 hours of the dance-a-thon, the students raised money at twice the hourly rate of the first 8 hours.

On the coordinate plane on the previous page, complete the graph for the next 4 hours to represent the total amount of money raised at the dance-a-thon. Use words and numbers on the following lines to explain how you knew where to draw the graph.

_____

_____

_____

12. The table shown below was posted on the wall at Andy's Hardware to show the price of varying lengths of chain-link fencing. (2014)

PRICE OF FENCING

| Length (feet)	Price
75	$168.75
125	$281.25
175	$393.75
225	$506.25

The price of the same fencing at Bargain Hardware can be determined by the equation $y = 2.50x$, where y is the price, in dollars, for x feet of fencing.

Determine the unit price for fencing, in dollars per foot, for each store.

Show your work.

Answers   Andy's Hardware $_____ per foot
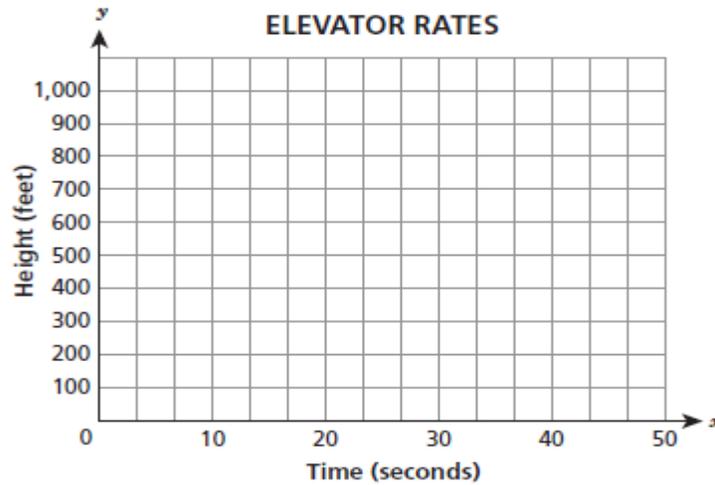
Bargain Hardware $_____ per foot

On the grid below, graph for each store the relationship between the length of the fencing and the price to verify your answers. Be sure to label each line.

Price of Fencing
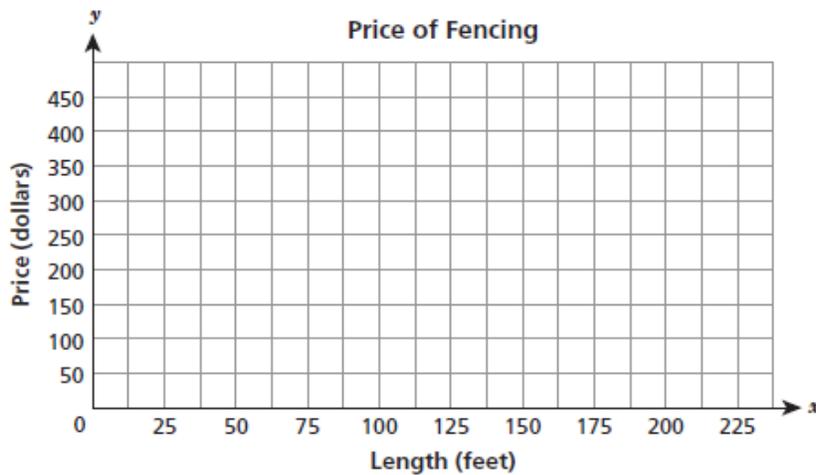
13. The express elevator in the Empire State Building in New York City travels nonstop from the ground floor to the top floor at a rate of 1,400 feet per minute. (2015)

The express elevator in the John Hancock Center in Chicago travels nonstop from the ground floor to the observatory on the top floor at a rate represented by the equation $y = 30x$, where y is the height, in feet, and x is the number of seconds.

Graph the two relationships on the grid below to compare the rates of the two elevators.

ELEVATOR RATES
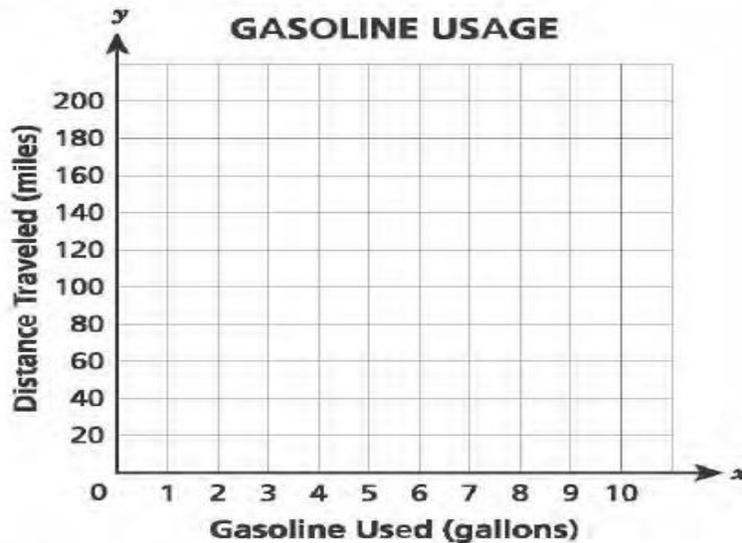
Height (feet)

1,000
900
800
700
600
500
400
300
200
100

0   10   20   30   40   50

Time (seconds)

Which elevator travels at a faster rate?

Using the information from the graph, explain how you got your answer.

_____

_____

_____

14. Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x, and the distance traveled, y, during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.   (2016)

GASOLINE USAGE

Distance Traveled (miles)

200
180
160
140
120
100
80
60
40
20

0   1   2   3   4   5   6   7   8   9   10

Gasoline Used (gallons)

How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

_____

_____

15. The table and the graph below show Josie's and Salvador's wages, respectively, based on the number of hours worked.

JOSIE'S WAGES

| Hours Worked	Wages (dollars)
3	26.25
5	43.75
7	61.25

SALVADOR'S WAGES
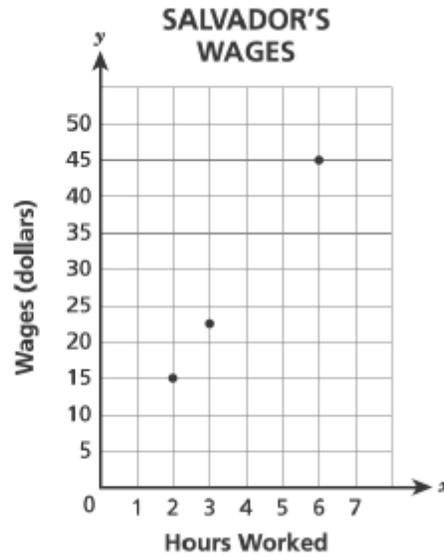
In 2010, Josie and Salvador each worked an eight-hour day for five days each week. How many weeks did it take Josie to earn $1000 more than Salvador?   (2017)

Show your work

Answer _____ weeks

16. Charles needs to fill a large fish tank with water using a hose. He has two hoses from which to choose. Water flows through each hose as a constant rate. The graph below shows the amount of water, in gallons, that flows through Hose A based on the number of minutes used.   (2018)
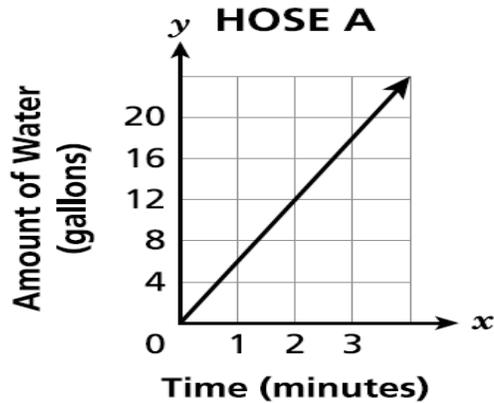
HOSE A

A total of 110 gallons of water can flow through Hose B in 10 minutes. Which hose has a faster flow rate, in gallons per minute, and what is that rate?

Show your work.

Answer Hose _____ and _____ gallons per minute

17. Billy is comparing gasoline prices at two different gas stations.

- At the first gas station, the equation c = 2.80g gives the relationship between g, the number of gallons of gasoline, and c, the total cost, in dollars.

- At the second gas station, the cost of 2.5 gallons of gasoline is $8.30, and the cost of 5 gallons of gasoline is $16.60.

How much money, per gallon, would Billy save by going to the less expensive gas station?   (2019)
Show your work.

Answer $_____ gallon