

3. Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?
- A. 25
  - B. 28
  - C. 44
  - D. 50
  - E. 72

**16.** A car accelerated from 88 feet per second (fps) to 220 fps in exactly 3 seconds. Assuming the acceleration was constant, what was the car's acceleration, in feet per second per second, from 88 fps to 220 fps ?

**F.**  $\frac{1}{44}$

**G.**  $29\frac{1}{3}$

**H.** 44

**J.**  $75\frac{1}{3}$

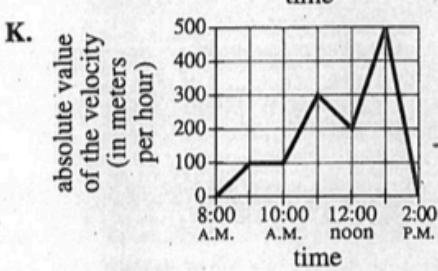
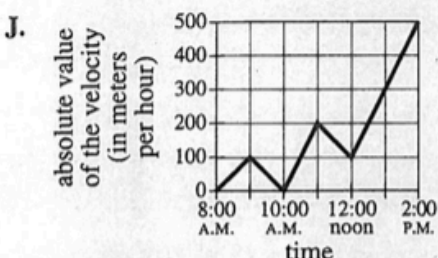
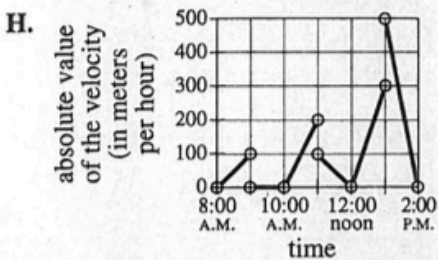
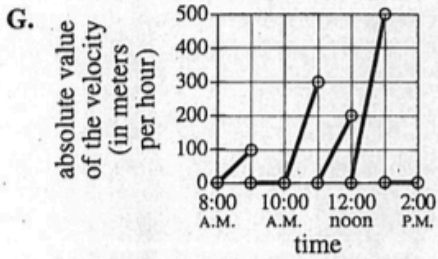
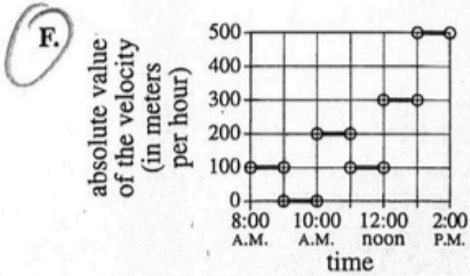
**K.**  $102\frac{2}{3}$

48. Which of the following graphs best represents the absolute value of the balloon's velocity, in meters per hour, between 8:00 A.M. and 2:00 P.M. ?

DO YOUR FIGURING HERE.

(Note: Ignore acceleration and deceleration.)

F



→ Same graph as Altitude graph

Velocity is speed or rate

$$\text{Velocity} = \frac{\text{Distance}}{\text{Time}}$$

"Which of the following"

Test and see what makes sense with original graph on previous page EVERYONE EXCEPT F

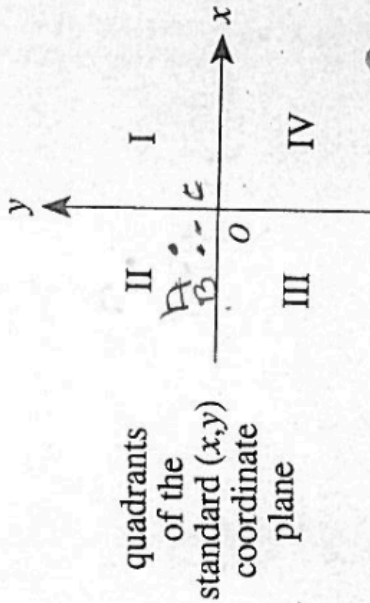
doesn't reflect the correct  $\frac{\text{Distance}}{\text{Time}}$  in the Altitude graph

49. Which of the following phrases best describes the balloon's motion between 10:30 A.M. and 12:00 noon?

- A. Descended, and then ascended more quickly
- B. Descended, and then ascended more slowly
- C. Stayed at the same altitude
- D. Ascended, and then descended more quickly
- E. Ascended, and then descended more slowly

"Which of the following" Review each one and determine which one makes the MOST SENSE

50. In the standard  $(x,y)$  coordinate plane shown below,  $\triangle ABC$  has vertices at  $A(-2,3)$ ,  $B(-2,1)$ , and  $C(-1,1)$ . A translation is performed on  $\triangle ABC$ , and the image of each point  $P$  with coordinates  $(x,y)$  is the point  $P'$  with coordinates  $(x',y')$  where  $x' = x + 3$  and  $y' = y - 2$ . The vertices of  $\triangle A'B'C'$  are in which quadrant(s)?



- F. Quadrant I only  
 G. Quadrant II only  
 H. Quadrant III only  
 J. Quadrants I and IV only  
 K. Quadrants II and III only

DO YOUR FIGURING HERE.

Translations in  $xy$   
 Coordinate Plane

If the  $x$ 's slide to  
 the right  $(+3)$ , then  
 the figure would be in  
 quad I. If they move  
 down  $(-2)$ , they would move  
 to quad II.

J

→

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**38.** Greene ran the 100-meter dash in 9.79 seconds. What was his speed in kilometers per hour (round to the nearest kilometer)?

f. 31 km/h

g. 37 km/h

h. 1 km/h

i. 10 km/h

j. 25 km/h

8. In the formula  $d = rt$ ,  $d$  represents distance in miles,  $r$  represents average speed in miles per hour, and  $t$  represents time in hours. What is an automobile's average speed, in miles per hour, if it travels 60 miles in  $1\frac{1}{2}$  hours?

- F. 30  
 G. 40  
 H. 60  
 J. 90  
 K. 120

G

→

$$20 \cdot 60 = 3\frac{1}{2} r \cdot 2\frac{1}{2}$$

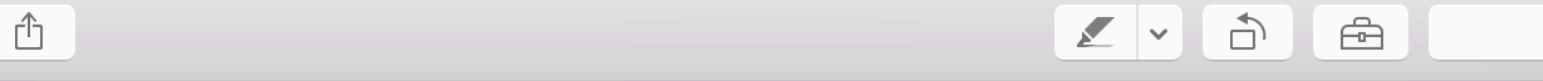
$$2 \cdot 20 = 40 = r$$

Plug and chug

$$D = R \cdot T$$

$$60 = R \cdot 1\frac{1}{2} \text{ or } 60 = \frac{3}{2} r$$

$$\text{calculator} \Rightarrow 60 \div 1.5 = 40$$



11

Paul travels from Rye to Eston at an average speed of 90 km/h  
He travels for  $T$  hours.

Mary makes the same journey at an average speed of 70 km/h  
She travels for 1 hour longer than Paul.

Work out the value of  $T$

**[4 marks]**

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Answer ..... hours

**Turn over for the next question**

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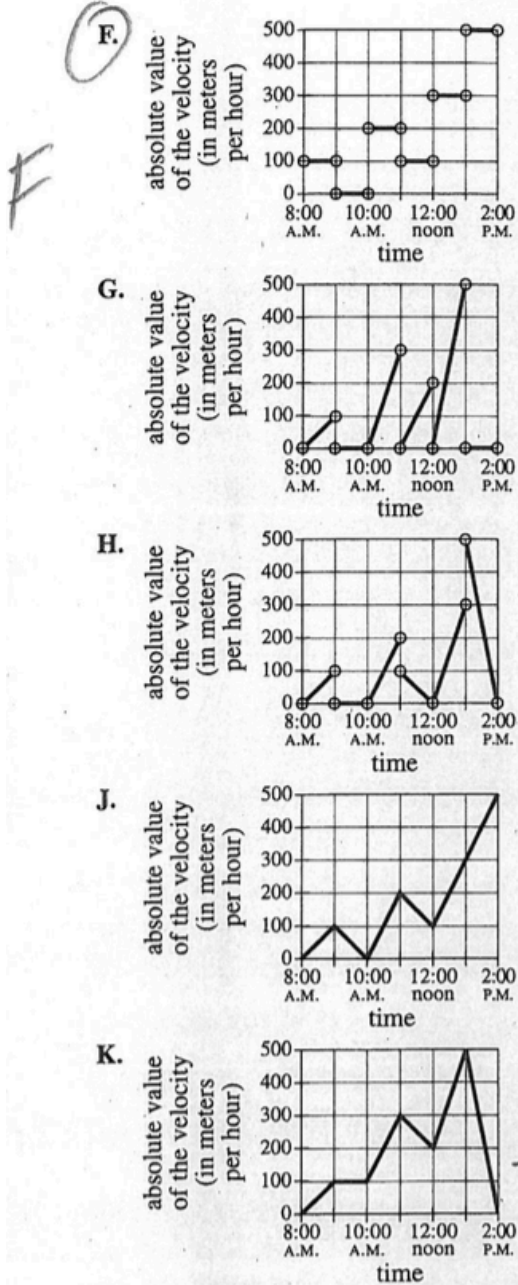
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doesn't reflect the correct  $\frac{\text{Distance}}{\text{Time}}$  in the altitude graph

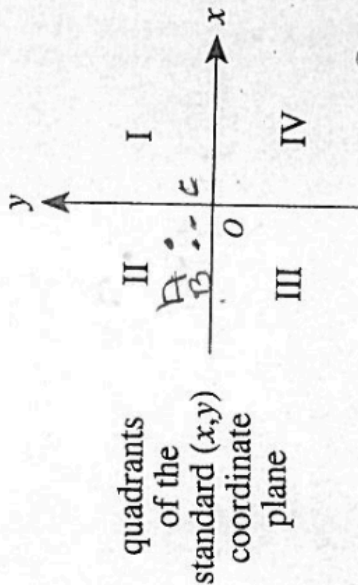
→ same graph as altitude graph

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G

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$$20 \quad 2 \cdot 60 = \frac{3}{2} r \cdot \frac{2}{2}$$

$$2 \cdot 20 = 40 = r$$

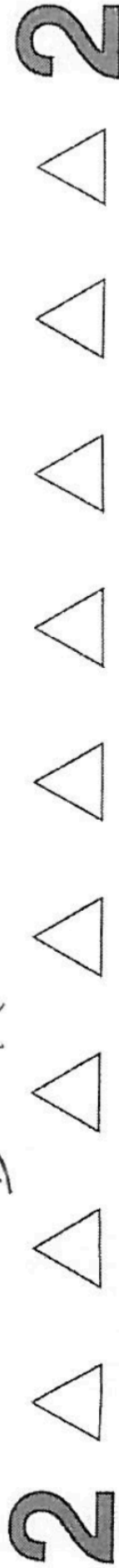
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$$D = Rt$$



46. During their morning jog in the park, Jean stops at a drinking fountain. Sula continues to jog and gets 10 meters ahead of Jean. Sula is jogging at a constant rate of 2 meters per second, and Jean starts jogging at a constant rate of 2.4 meters per second to catch up to Sula. Which of the following equations, when solved for  $t$ , gives the number of seconds Jean will take to catch up to Sula?

DO YOUR FIGURING HERE.

Word problems and Rates

Distance equals rate times Time

When they meet up again, the time will be equal for both of them.

Set the two formulas for the same distance equal to one another

→ F.  $2t + 10 = 2.4t$

G.  $2t - 10 = 2.4t$

H.  $\frac{10 + 2.4t}{2.4} = 2t$

J.  $2t = 10$

K.  $2.4t = 10$

27. A hot-air balloon 70 meters above the ground is falling at a constant rate of 6 meters per second while another hot-air balloon 10 meters above the ground is rising at a constant rate of 15 meters per second. To the nearest tenth of a second, after how many seconds will the 2 balloons be the same height above the ground?

- A. 8.9
- B. 6.7
- C. 2.9
- D. 0.4
- E. 0.2