Practice Test

Word Problems and Applications

Questions 1 - 3 refer to the following information.

The manager of an apartment building needs an electrician to repair the power generator for the building. The table below shows the fixed amount for a time service call and hourly charges for two different companies.

Company	Fixed amount for a service call	Hourly Rate
A	\$40	\$55
B	\$75	\$48

1

Which of the following equations gives the total cost, y, of repairing the power generator in terms of the total number of hours, x, from company A?

A) $y = 48x + 75$

B) $y = 75x + 48$

C) $y = 40x + 55$

D) $y = 55x + 40$

2

For what number of hours, x, will the total cost of repairing the generator for company B be less than or equal to the total cost of repairing the generator for company A?

A) $x \geq \frac{5}{2}$

B) $x \leq \frac{5}{2}$

C) $x \geq 5$

D) $x \leq 5$

3

Company B's total cost, y, is the fixed amount for a service call plus the hourly rates. If the relationship between Company B's total cost, y, and the number of hours, x, is graphed in the xy- plane, what does the slope of the line represent?

A) Fixed amount for a service call

B) Hourly Rate

C) Total amount for one day

D) Total amount for repairing the power generator

4

Apex Car Rental company charges a flat fee of \$40.00 per day plus \$0.75 per mile to rent a car. Jason Car Rental company charges a flat fee of \$64.00 per day plus \$0.60 per mile to rent a car. If a car is rented for three days, at how many miles would the rental charges of the two companies be the same?

A) 480

B) 450

C) 420

D) 380

5

It took Sara a total of 42 minutes to jog from home to the park and back again, by the same path. If she averaged 8 miles per hour going to the park and 6 miles per hour coming back, what is the distance from her home to the park?

A) 2.4 miles

B) 2.8 miles

C) 3.2 miles

D) 3.6 miles

6

Carl drove from his home to the beach at an average speed of 50 mph and returned home along the same route at an average speed of 30 mph. His total driving time for the trip was 2 hours. Solving which of the following systems of equations yields, x, the time it took for Carl to drive to the beach and, y, the time spent for the return trip?

A) $x = y + 2$
$50x = 30y$

B) $x + y = 2$
$30x = 50y$

C) $x + y = 2$
$50x = 30y$

D) $y = x + 2$
$30x = 50y$

7

To join Ace Gym, one must pay a $180 membership fee plus dues of $35 per month. To join Best Gym, one must pay a $300 membership fee plus dues of $23 per month. At how many months would the total cost of either gym be the same?

A) 7

B) 8

C) 9

D) 10

8

At a county fair the admission is $8.00 and each ride costs $1.25. If you go to the fair with $20.00, what is the maximum number of rides you can go on?

A) 8

B) 9

C) 10

D) 11

9

A car averages 18 miles per gallon of gas for city driving and 27 miles per gallon of gas for highway driving. What is the total number of gallons of gas needed to drive $6x$ miles in the city and $18x$ miles on the highway?

A) x

B) $2x$

C) $3.5x$

D) $4.5x$

10

One section of a grocery store display only water bottles. The water bottles are in either 6-bottle packages or 8-bottle packages. Let x represent the number of 6-bottle packages and y represent the number of 8-bottle packages. The total number of packages displayed are 270 and the total number of bottles are 1,860. To find the values of variables x and y, which of the following systems of equations can be used?

A) $\begin{cases} x + y = 1,860 \\ 6x + 8y = 270 \end{cases}$

B) $\begin{cases} 6x + 8y = 1,860 \\ x + y = 270 \end{cases}$

C) $\begin{cases} 8x + 6y = 1,860 \\ x + y = 270 \end{cases}$

D) $\begin{cases} x + y = 1,860 \\ 8x + 6y = 270 \end{cases}$

Answers
Word Problems and Applications

Chapter 5 Practice Test

1. D

   If the apartment manager hires an electrician from company A, he needs to pay 55 dollars per hour. So for x hours, he has to pay $55x$ dollars plus 40 dollars for a service call. Therefore, the total cost, y, of repairing the power generator will be $y = 55x + 40$.

2. C

   The total cost, y, of repairing the generator for company B will be $y = 48x + 75$. If the cost of repairing the generator for company B is less than or equal to the total cost of repairing the generator for company A, then $48x + 75 \le 55x + 40$.

   $48x + 75 \le 55x + 40$
   $\Rightarrow \ 48x + 75 - 48x \le 55x + 40 - 48x$
   $\Rightarrow \ 75 \le 7x + 40 \ \Rightarrow \ 75 - 40 \le 7x + 40 - 40$
   $\Rightarrow \ 35 \le 7x \ \Rightarrow \ 5 \le x$

   Choice C is correct.

3. B

   The total cost, y, for a service call and hourly charge from company B is given by the equation $y = 48x + 75$. If the relationship is graphed on the xy-plane, the slope of the graph is 48, which is the hourly rate for company B.

   Choice B is correct.

4. A

   If a car is rented for three days and driven for x miles, the rental charges of Apex Car Rental will be $3 \times 40 + 0.75x$ and the rental charges of Jason Car Rental will be $3 \times 64 + 0.6x$.
   The two company's charges will be the same if

   $3 \times 40 + 0.75x = 3 \times 64 + 0.6x$.
   $120 + 0.75x = 192 + 0.6x$
   $120 + 0.75x - 0.6x = 192 + 0.6x - 0.6x$
   $120 + 0.15x = 192$
   $120 + 0.15x - 120 = 192 - 120$
   $0.15x = 72$
   $x = 480$

5. A

   Let d = the distance in miles from Sara's home to the park. Since average time $= \dfrac{\text{total distance}}{\text{average speed}}$, the time it took to jog from home to the park $= \dfrac{d}{8}$ and the time it took to jog from the park to her home $= \dfrac{d}{6}$. Since the total time for the round trip was 42 minute, or $\dfrac{42}{60}$ hours, $\dfrac{d}{8} + \dfrac{d}{6} = \dfrac{42}{60}$.

   By multiplying each side of the equation by 120, we have $120(\dfrac{d}{8} + \dfrac{d}{6}) = 120(\dfrac{42}{60})$.
   $\Rightarrow \ 15d + 20d = 84 \ \Rightarrow \ 35d = 84$
   $\Rightarrow \ d = \dfrac{84}{35} = 2.4$

6. C

   The time it took for Carl to drive to the beach plus the time spent for the return trip equals 2 hours. Therefore $x + y = 2$.
   Also the distance of going to the beach equals the returning distance. Use the formula $d = rt$.

Answers
Word Problems and Applications

1. D

If the apartment manager hires an electrician from company A, he needs to pay 55 dollars per hour. So for x hours, he has to pay $55x$ dollars plus 40 dollars for a service call. Therefore, the total cost, y, of repairing the power generator will be $y = 55x + 40$.

2. C

The total cost, y, of repairing the generator for company B will be $y = 48x + 75$. If the cost of repairing the generator for company B is less than or equal to the total cost of repairing the generator for company A, then $48x + 75 \le 55x + 40$.

$48x + 75 \le 55x + 40$
$\Rightarrow \quad 48x + 75 - 48x \le 55x + 40 - 48x$
$\Rightarrow \quad 75 \le 7x + 40 \quad \Rightarrow \quad 75 - 40 \le 7x + 40 - 40$
$\Rightarrow \quad 35 \le 7x \quad \Rightarrow \quad 5 \le x$

Choice C is correct.

3. B

The total cost, y, for a service call and hourly charge from company B is given by the equation $y = 48x + 75$. If the relationship is graphed on the xy-plane, the slope of the graph is 48, which is the hourly rate for company B.

Choice B is correct.

4. A

If a car is rented for three days and driven for x miles, the rental charges of Apex Car Rental will be $3 \times 40 + 0.75x$ and the rental charges of Jason Car Rental will be $3 \times 64 + 0.6x$.
The two company's charges will be the same if

$3 \times 40 + 0.75x = 3 \times 64 + 0.6x$.
$120 + 0.75x = 192 + 0.6x$
$120 + 0.75x - 0.6x = 192 + 0.6x - 0.6x$
$120 + 0.15x = 192$
$120 + 0.15x - 120 = 192 - 120$
$0.15x = 72$
$x = 480$

5. A

Let d = the distance in miles from Sara's home to the park. Since average time $= \dfrac{\text{total distance}}{\text{average speed}}$, the time it took to jog from home to the park $= \dfrac{d}{8}$ and the time it took to jog from the park to her home $= \dfrac{d}{6}$. Since the total time for the round trip was 42 minute, or $\dfrac{42}{60}$ hours, $\dfrac{d}{8} + \dfrac{d}{6} = \dfrac{42}{60}$.

By multiplying each side of the equation by 120, we have $120(\dfrac{d}{8} + \dfrac{d}{6}) = 120(\dfrac{42}{60})$.

$\Rightarrow \quad 15d + 20d = 84 \quad \Rightarrow \quad 35d = 84$

$\Rightarrow \quad d = \dfrac{84}{35} = 2.4$

6. C

The time it took for Carl to drive to the beach plus the time spent for the return trip equals 2 hours. Therefore $x + y = 2$.

Also the distance of going to the beach equals the returning distance. Use the formula $d = rt$.

The distance to the beach equals to $50x$ and the returning distance equals $30y$. Thus $50x = 30y$.

Choice C is correct.