Answers:

1) B	2) E	3) E	4) A	5) D
6) C	7) C	8) D	9) E	10) B

Subject Areas Tested:

1. Fundamental Operations
2. Using Algebra
3. Roots and Radicals
4. Inequalities
5. Fractions
6. Decimals
7. Percents
8. Averages
9. Motion Problems
10. Ratio and Proportions
11. Mixtures & Solutions
12. Work Problems
13. Coordinate Geometry
14. Geometry

Solutions:

1)   Answer: B   Subject Review Areas: 1, 9

To solve, use the formula, Rate = $\dfrac{Dis\,\tan\,ce}{Time}$.

Since we are asked to find the rate for the round trip, we need to first find the total distance and the total time of the round trip.

The total distance (D) is 1200 miles (600 miles each way).

To find the total time, use the formula Time = $\dfrac{Dis\,\tan\,ce}{Rate}$.

Time traveled from C to D is $\dfrac{600}{60}$, or 10 hours, and the time traveled from D to C is $\dfrac{600}{50}$, or 12 hours.

Now plug the total distance and total time into the Rate formulas
and get the correct answer:

Rate $= \dfrac{1200}{10 + 12} = \dfrac{1200}{22} =$ approximately <mark>54.5 mph, Choice</mark> <mark>(B)</mark>.

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2)   **Answer: E**   **Subject Review Areas: 1, 2, 3, 5, 13**

Quickly eliminate choice A, because it is closer to the origin than
choice B. Also eliminate choice C; it's obviously closer than
choices D and E. Now we are left with three choices. We
know choice B is $2\frac{1}{2}$ units from the origin, but what about
choices D and E?
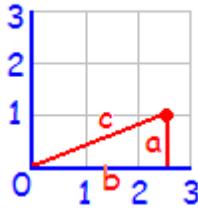
Since we suspect that choice D may be the furthest point form
the origin, let's look at this scenario more closely. If we
graph the point ($2\frac{1}{2}$, 1), we see that the distance between
the point and the origin would be the same distance as the
hypotenuse for the triangle drawn.

To find the length of this hypotenuse, we would use the
Pythagorean theorem

$$a^2 + b^2 = c^2$$

$$\text{So } 1^2 + (2\tfrac{1}{2})^2 = c^2$$

$$c = \sqrt{7.25}$$

Now we can see that all we would need to do is square each of the coordinates in each answer choice and see which one gives the largest number. Then we know that that choice would also be the greatest distance from the origin and the correct answer. Only choice B, D and E would need to be looked at since we already suspect these to be the correct answers.

B) $0^2 + (2\tfrac{1}{2})^2 = c^2$ $\qquad\qquad c = \sqrt{6.25}$

D) $1^2 + (2\tfrac{1}{2})^2 = c^2$ $\qquad\qquad c = \sqrt{7.25}$

E) $(-2)^2 + (2)^2 = c^2$ $\qquad\qquad c = \sqrt{8}$
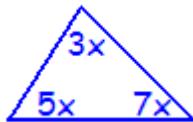
Now, since ==choice E== shows the largest value for the hypotenuse, this choice is the correct answer.

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3) **Answer: E**   **Subject Review Areas: 1, 2, 14**

Since the sum of the measures of the angles of a triangle is 180, we can find the value of the largest angle by using the given ratios, 3:5:7 (where x represents one unit):

$$3x + 5x + 7x = 180$$
$$15x = 180$$
$$x = 12$$

Thus, the largest angle is $7x = 7(12) =$ ==84°, choice E==.

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4)   Answer: A   **Subject Review Areas: 1, 7**

First, find the total number of games played in the season.

   18 won + 3 lost + 15 more = 36 total games

   Next, determine how many games make up 75% of the total
   36 games:
                .75 x 36 = 27 games.
   Since the team has already won 18 games, they must win 9
   more for a total of <mark>27 games, choice A</mark>.

5)   Answer: D   **Subject Review Areas: 1, 10**

There would be 18 groups of students since 9 vans transported
the students in two trips.   So if the number of trips was
increased to 6, only 3 vans would be needed to transport the 18
groups of students. <mark>Choice D, 3 vans</mark> is the correct answer.

Alternately, this can be solved by using an inverse proportion.
You know that the *more* vans used, *less* trips are needed. Keep in
mind that the answer must be less than 9 because more trips are
being made.

First step: Set up as a direct proportion: $\dfrac{9 \text{ vans}}{X \text{ vans}}$ = $\dfrac{2 \text{ trips}}{6 \text{ trips}}$

   Now, invert the second ratio since it's an inverse proportion

                                   $\dfrac{9 \text{ vans}}{X \text{ vans}}$ = $\dfrac{6 \text{ trips}}{2 \text{ trips}}$

And cross-multiply and solve for x: 18 = $6x$; x = <mark>3 vans,
choice D</mark>.

6)   **Answer: C**   **Subject Review Areas: 1, 10**

The recipe consists of a total of 5 + 4 + 4 + 2 + 1 = 16 parts.

Since 10 ounces of milk will be used, think of this as 10 parts. Since the base recipe includes 5 parts of milk, the recipe has been doubled, or <mark>32 parts, choice C</mark> for the doubled recipe.

Or the following ratio can be set up:

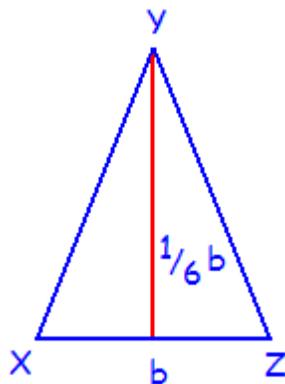|		
5 parts milk	=	10 ounces milk
16 total parts		x ounces of cookie mixture

$5x = 160$

$x = 32$ ounces of cookie mixture; choice C.
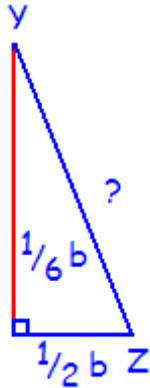
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7)   **Answer: C**   **Subject Review Areas: 1, 2, 3, 5, 14**

Since XY = YZ, the triangle is isosceles, and the median from Y to XZ bisects the base, b.

Two right angles are formed with legs $\frac{1}{6}b$ (the median) and $\frac{1}{2}b$ (half the base).

Y

?

$\frac{1}{6}b$

$\frac{1}{2}b$ Z

We can now use the Pythagorean Theorem to express YZ, the hypotenuse, in terms of b.

$$a^2 + b^2 = c^2$$

$$(\frac{1}{6}b)^2 + (\frac{1}{2}b)^2 = c^2$$

$$\frac{1}{36}b^2 + \frac{1}{4}b^2 = c^2$$

Find the LCD (36) then add.

$$\frac{1}{36}b^2 + \frac{9}{36}b^2 = c^2$$

$$\frac{10}{36}b^2 = c^2$$

$$\frac{\sqrt{10}}{6}b = c = \text{side XY}$$

The correct answer is $b\frac{\sqrt{10}}{6}$, choice C.

8)   Answer: D   **Subject Review Areas: 1**

Simply add the change for C to the 1985 customer base for C and
   get 5,851 (5,539 + 312)
   Do the same for D: 1,123 + (-256) = 867

The difference is 5,851 – 867 = 4,984.   Now multiply by 1,000
   since the chart is in thousands.
   The correct answer is 4,984,000 choice D.

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9)   Answer: E   **Subject Review Areas: 1, 2, 5, 7**

If a discount of 40% is given, then buyer pays 60% of the list price.

If another discount of 25% is given, then buyer pays 75% of new price.

Let the original price equal x. Multiply by 60% and then 75%.
      The reduced price will be $180.

$$(.60)(.75)x = 180$$

$$.45x = 180$$

$$x = 400$$

The original price was $400, choice E.

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10) Answer: B   **Subject Review Areas: 1, 2**

The video store charges S cents for the first day, so subtract 1
   day from D days to determine the number of days past the
   first day (D - 1). Multiply by T cents (the extra-day charge)
   and then add S cents (the first day charge). This gives: R =
   T (D - 1) + S, choice B.