Answers:

1) D	11) C	21) C
2) E	12) C	22) C
3) E	13) D	23) D
4) E	14) E	24) B
5) C	15) D	25) E
6) B	16) C	26) D
7) B	17) D	27) B
8) D	18) D	28) C
9) B	19) C	29) B
10) A	20) D	30) B

Solutions:

1) Answer: D
Strategy to Use: Determine What is Being Asked

First solve for x.

$$y = 5x$$

$$\frac{y}{5} = x \quad \text{or} \quad \frac{1}{5}y = x$$

To determine what $\frac{1}{2}x$ is, multiply both sides of the equation by $\frac{1}{2}$.

$$\frac{1}{2} \cdot \frac{1}{5} y = \frac{1}{2} x$$

$$\frac{1}{10} y = \frac{1}{2} x$$

The question asks, "How many tenths of y does $\frac{1}{2}x$ equal?

The correct answer is 1, not $\frac{1}{10}$. Choice D.

---

2) Answer: E

Strategy to Use: Determine What is Being Asked

Always read the questions carefully. Careless reading of this question might cause some students to solve for the percent of workers who did NOT sign up for the picnic. Get into the habit of circling or underlining important information and "what you are solving for". This will help prevent you from making careless mistakes. To solve this problem, first find the number of those who signed up for the picnic:

250 - 50 = 200.

Now, ask: 200 is what percentage of 250 employees?

$$200 = X\% \cdot 250$$

$$\frac{200}{250} = X\%$$

X = .80, or 80% , Choice E.

---

3) Answer: E
Strategy to Use: Determine What is Being Asked

Students who quickly read this problem without care will incorrectly choose choice C, 36, as the correct answer ($\frac{3}{4}$ of 48 of the Persian cats). However, this problem can not be solved with the information given. The problem only tells us that $\frac{1}{4}$ of the Persian cats are male; we are not told how many of the total cat population in the kennel are male. Therefore, we cannot determine how many of the cats in the kennel are female, Choice E.

---

4) Answer: E
Strategy to Use: Take Out the Garbage

In this problem, the garbage consists of the number of counties (14) and the population in 1879 (33,414). You do not need this information to solve the problem, so mark it out. To solve for the population of Delaware in 1874, you only need the population in 1884 (34,882) and the rate at which the population grew over the ten years since 1874 (at 18%). You then formulate the problem as follows:

1884's population (34,882) is 118% of what (x)?

$$34{,}882 = 1.18x$$

$$x = 29{,}561, \text{ Choice E}$$

Finding 18% of 34,882 and subtracting that number will not arrive at the correct answer. The correct beginning

population is 29,561. 18% of 29,561 and 18% of 34,882 are not the same number. Following the steps above is the only correct method to find the answer.

---

5) Answer: C

Strategy to Use: Take Out the Garbage

The garbage in this problem is Y° and T° . To solve, add up the degrees of the four corners (which must equal 360°) and solve for x:

$$100 + 70 + z + x + 40 = 360$$
$$z + x = 150$$
$$x = 150 - z, \text{ Choice C}$$

---

6) Answer: B

Strategy to Use: Take Out the Garbage

The garbage in this problem is "22% for cakes". This information is not needed to solve the problem. We know that the total spent on pies and tarts was $2639, which is 78% of his total baking budget:

$$42\% + 36\% = 78\% \text{ of budget} = \$2639$$

To solve for the amount spent on tarts, set up the following proportion and solve for X:

$$\frac{36\% \text{ for tarts only}}{78\% \text{ for pies and tarts}} = \frac{\$ X \text{ spent on tarts only}}{\$2639 \text{ spent on pies and tarts}}$$

Cross-multiply: $.78x = (.36)2639$

$$.78x = 950.04$$
$$x = \$1218, \text{ Choice B}$$

---

7) Answer: B
Strategy to Use: Working Backwards

To solve this problem, work backwards - working from the answer choices to find the correct answer. Remember, when working backwards, always start with choice C and then, based on the wording in the question, move to the smaller or larger numbers. Quickly set up the following chart:

First try answer choice C – which assigns 116 to Diane

Diane	Linda [$\frac{1}{4}$ Diane]	Amy [$\frac{1}{5}$ Diane]	Total
116	29	23.2	168.2

The total is 168.2. The total could get closer to 200, so try a higher number, Choice B. Eliminate choices D and E -- they are too small.

Diane	Linda [$\frac{1}{4}$ D]	Amy [$\frac{1}{5}$ D]	Total
120	30	24	174

The total is now 174, still less than 200. Looking at choice A, we see that if Diane had 144 bottles, the total would be larger than 200. So choice B, 120 must be the correct answer.

---

8) Answer: D
Strategy to Use: Working Backwards

First, we must determine the total number of dogs owned by Bob, Frank, and Steve. Since the average is about 12, the total number of dogs must be very close to 36 (Since 36 ÷ 3 = 12).

Working backwards, we start with choice C which assigns 11 dogs to Bob:

Bob	Frank [2B]	Steve [$\frac{1}{2}$ B]	Total
11	22	5.5	38.5

Since the number of dogs must be a whole number, Steve cannot have 5.5 dogs. Bob must have an even number of dogs since dividing an even number by 2 will always produce a whole number (as long as the even number is larger than 2). This way, the number of Steve's dogs (which is $\frac{1}{2}$ of the number of Bob's dogs) will always be a whole number.

So choices C, A, and E are automatically excluded since they are odd numbers. Since we are looking for a total close to 36 and with choice C the total was 38.5, we need to try a choice that starts with a smaller number. So choice D must be the correct answer.

Bob	Frank [2B]	Steve [$\frac{1}{2}$ B]	Total
10	20	5	35

9) Answer: B

Strategy to Use: Working Backwards

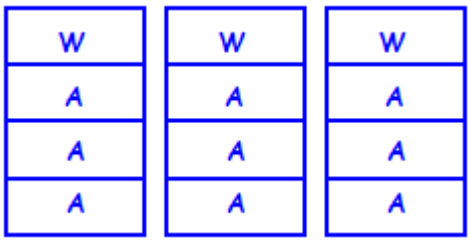
Since x and y must be two REAL and DIFFERENT numbers and the answer choices contain variables, it is not necessary to start with choice C. To solve, look through the answer choices and find the choice to make rx = ry a true statement. We see that choice B, r = 0 will be the only value of r that will work. If r = 0, then x and y can be two real and different numbers, and the equation will still be true.

---

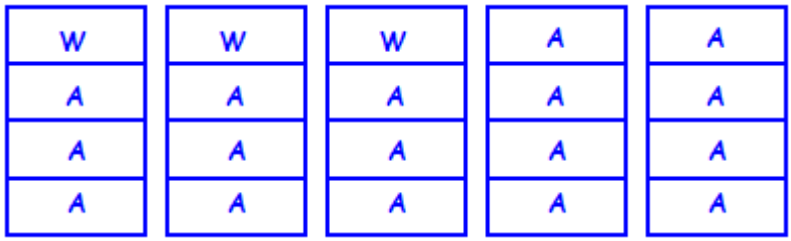
10) Answer: A

Strategy to Use: Draw Pictures

First, draw a picture of three one-gallon containers, dividing each container into fourths. Label three-fourths with A for alcohol and the other one-fourth with W for water.



Now add two more containers to your drawing. Divide them into fourths and label each fourth with A for alcohol.



To find the % of the total mixture (all five gallons) which is water, simply add up the sections labeled W (3) and divide it by the total number of sections (20).

The correct answer is $\frac{3}{20}$, or 15%, Choice A.

---

11) Answer: C

Strategy to Use: Draw Pictures

A quick way to solve this problem is to draw two squares of the same size, leaving one whole and dividing one into four equal squares by halving its sides. Next, compare the area of the first square with the area of one of the smaller squares.

As you can see, the area of the smaller square is one-fourth the area of the whole square. The correct answer is choice C, divided by 4.

---

12) Answer: *C*

Strategy to Use: Draw Pictures

To solve, draw a picture. First draw a rectangle. Next draw another rectangle with each side twice as long as the first rectangle (increase by 100%).

By increasing each side of the original rectangle by 100%, you get three additional rectangles the same size as the original. Therefore, you increase it by 300%, Choice *C*.

Note: Some students will select 400% since the second rectangle contains four of the original rectangles. If you double the size of the rectangle (producing two of the originals), you have increased it by 100%. If you triple the size of the rectangle (producing three originals), you have increased it by 200%. If you quadruple the size of the rectangle (producing four originals), you have increased it by 300%.

13) Answer: D

Strategy to Use: Substitute Numbers for Letters

To solve, first substitute simple numbers for the letters in the problem. Let's assign the following values for the variables: Let g = 4 gumballs, d = 1 dollar, and c = 25 cents. So, we have 4 gumballs for 1 dollar. The question now reads: How many gumballs can be purchased for 25 cents? That is an easy question -- one gumball for 25 cents. Our next job is to find the answer choice which produces ONE as a solution when we substitute our numbers for the letters. Always start with (C):

Choice (C)	$\frac{(25)(1)}{4}$	=	$\frac{25}{4}$	=	6.25	*WRONG*
Choice (B)	$\frac{(10)(25)}{(4)(1)}$	=	$\frac{250}{4}$	=	62.5	*WRONG*
Choice (D)	$\frac{(4)(25)}{(100)(1)}$	=	$\frac{100}{100}$	=	1	*CORRECT*

---

14)Answer: E

Strategy to Use: Substitute Numbers for Letters

Remind the students that $\frac{3t}{4}$ is the same as $\frac{3}{4}t$. To solve, substitute simple numbers for r, rate, and t, time.

Let r = 10 mph, and t = 4 hours.

Now, substitute: $\frac{3t}{4} = \frac{3 \cdot 4}{4}$ = 3 hours ago

The question now reads: How many miles from the garage had the car traveled 3 hours ago, or after 1 hour of travel? Using (D = Rate • Time), we can solve for D:

D =R • T → 10 mph • 1 hour = 10 miles

Now, substitute our numbers for the letters in each of the answer choices and see which choice produces a distance of 10 miles.

(A) r t = (10)(4) = 40 WRONG
(B) 4rt ÷ 3 = (4)(10)(4) ÷ 3 = 53.33 WRONG
(C) rt ÷ 12 = (10)(4) ÷ 12 = 3.33 WRONG
(D) 3rt ÷ 4 = (3)(10)(4) ÷ 4 = 30 WRONG
(E) rt ÷ 4 = (10)(4) ÷ 4 = 10 CORRECT!

---

15) Answer: D

Strategy to Use: Substitute Numbers for Letters

Substitute simple numbers for the letters C and D.

Let C = 100¢ and D = $2.

Since 5 apples cost C (100¢), each apple must cost 20¢. Therefore, D ($2) will buy 10 apples (200 ÷ 20 = 10).

Substitute these numbers for the letters in each of the answer choices and select the choice which produces the number 10.

(A) 20CD ÷ D = (20)(100)(2) ÷ 2 = 2000 WRONG
(B) 20CD = (20)(100)(2) = 4000 WRONG
(C) 500C ÷ D = 500(100) ÷ 2 = 25000 WRONG
(D) 500D ÷ C = 500(2) ÷ 100 = 10 CORRECT

---

16) Answer: C
Strategy to Use: Look for Shortcuts

This problem asks for the answer in units of "dollars per hour". The shortcut here is to realize that the answer must be in "dollars per hour" or some value over h (hours). The problem tells us that dollars, which must be the numerator in the answer, is represented by d and g. Therefore, the numerator must also contain some combination of d and g.

Now, scan the answer choices. Eliminate any choice which does not have a value in the form of dollars (d and g) per hour h. Choices A, B, and E do not have this requirement. If you cannot solve it the problem from here, you at least now have a 50% chance of choosing correctly between choices C and D. The correct answer is choice C, (d + g) ÷ h. The man earns (g dollars + d dollars) divided by h hours.

---

17) Answer: D
Strategy to Use: Look for Shortcuts

The shortcut in solving this problem is realizing that the answer must be evenly divisible by 7, the denominator of $\frac{3}{7}$ and by 5 the denominator of $\frac{1}{5}$. We know this since the number of fish must be a whole number. The only answer choice which is divisible by both 7 and 5 is 35, choice D.

---

18) Answer: D
Strategy to Use: Look for Shortcuts

If you know the following rules regarding the divisibility of numbers, you can solve this problem quickly. A number is

divisible by 5 if the units digit is a 5 or 0. In this problem, every number in the answer choices ends with a 5 or 0, so this rule does not help us much this time.

Next, we check to see which is also divisible by 9. A shortcut for determining if a number is divisible by 9 is first to add all of the digits of the number. If the sum is divisible by 9, then the original number is divisible by 9. Try this on each choice and select the choice which works.

(A) 4 + 2 + 2 + 4 + 0 = 12 NO, not divisible by 9
(B) 3 + 4 + 3 + 1 + 5 = 16 NO, not divisible by 9
(C) 4 + 6 + 5 + 2 + 5 = 22 NO, not divisible by 9
(D) 3 + 7 + 8 + 4 + 5 = 27 YES, it is divisible by 9

The correct answer is D, 37,845.

---

19) Answer: *C*
Strategy to Use: Look for Shortcuts

A shortcut to use in this problem is to realize that the answer must be divisible by the denominators of the two fractions ($\frac{3}{7}$ and $\frac{1}{3}$) used in the problem. We know this since the number of birds must be a whole number. The only answer choice which is divisible by both 7 and 3 is 21, choice C.

---

20) Answer: *C*
Strategy to Use: Estimate

Instead of multiplying and dividing all of these numbers to determine which answer choice is closest to 280, ESTIMATE each choice's value by substituting easier numbers (which are

close in value to the actual numbers). By estimating in this manner, the answer choices become the following terms:

(A) 1 x 20 ÷ 5 = approximately 4, too small

(B) 70 x 20 ÷ 50 = approximately 28, too small

(C) 70 x 2 ÷ 5 = approximately 28, too small

(D) 70 x 2 ÷ 0.5 = approximately 280, correct choice

(Remembering that dividing by 0.5 is the same as multiplying by 2 will make choice D easy to calculate without using a calculator.)

Choice D, 71.4 x 2.12 ÷ 49 is the correct answer.

---

21) Answer: *C*
Strategy to Use: Estimate

To solve this problem quickly, you should round off the numbers 484, 1888, and 112 to numbers which are easier to work with, such as 500, 2000, and 100. Now solve and select the answer choice which is closest in value to your solution:

484 + 1888 ÷ 112 → 500 + 2000 ÷ 100 = 25

The closest choice is 20, choice *C*.

---

22) Answer: C
Strategy to Use: Estimate

This problem can be quickly and easily solved by rounding-off the difficult numbers, solving, and then choosing the answer choice which is closest in value to the rounded-off solution. Round-off 785 to 800, 494 to 500, 1530 to 1500, and 888 to 900. Now solve:

$(785 + 494) \div (1530 - 888) \rightarrow (800 + 500) \div (1500 - 900) = 2.17$

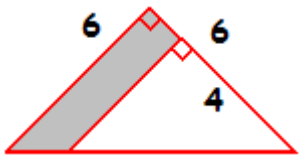
The only answer choice which is close in value to 2.17 is choice C, 2.

---

23) Answer: D
Strategy to Use: Take the Difference Between Ordinaries to Find Unusual

The shaded area in the picture is a trapezoid, an unusual shape. The area of this trapezoid can be found by taking the difference between the area of the large triangle (side 6) and the small triangle (side 4).

Since the large triangle has a right angle and two equal sides (both 6), it is an isosceles right triangle. The small triangle shares an angle (lower right in diagram) and is also a right triangle, so it is similar to the large triangle by AAA. The small triangle is also isosceles, so each leg has length 4. The trapezoid's area (that of the unusual shaped figure) can be determined as follows:



Large Δ's Area - Small Δ's Area = Trapezoid's Area

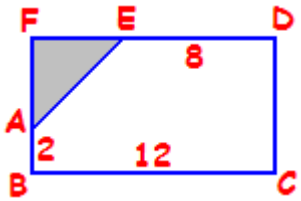
$\frac{1}{2}(6)(6) - \frac{1}{2}(4)(4) = 18 - 8 =$ 10, choice D.

---

24) Answer: B

Strategy to Use: Take the Difference Between Ordinaries to Find Unusual

To find the area of the remaining polygon ABCDE after the corner AFE has been removed, we simply find the difference between the area of the rectangle BCDF and the area of the triangle AFE.



Rectangle's Area - Δ's Area =Remaining Polygon's Area

(length) (width) $- \frac{1}{2}$(base) (height) =

$(12)(6) - (\frac{1}{2})(4)(4) = 72 - 8 =$ 64, Choice B

---

25) Answer: E

Strategy to Use: Take the Difference Between Ordinaries to Find Unusual

It is important not to make assumptions about the lengths of sides or proportions. For instance, you can not assume that GC = AH = EJ = FJ or that FBEJ is a bigger area than the shaded area. If that were true, then the area of FBEJ would

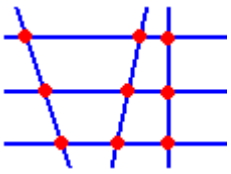
be a number larger than 70, which is not a choice. All we know is that AE = 4, GC = 6, and the area of the shaded region is 70. To solve, use the information provided to find the area of ABCD and subtract 70, the area of the shaded region, from it.

Square ABCD's Area - Shaded Region's Area = FBEJ's Area
(side) (side) - 70 =
(10) (10) - 70 →100 - 70 = 30, Choice E.

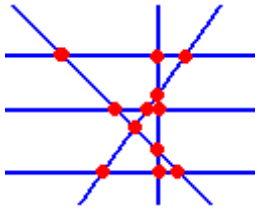
---

26) Answer: D
Strategy to Use: Avoid Obvious Answer Choices

The problem asks you for the maximum or greatest number of intersections. In most problems in the Difficult Third's section of the SAT which ask for the largest/greatest possible value, the correct answer will not be the largest answer choice. In this problem, choice E, 13, is the largest number and should therefore be eliminated. You should also eliminate any answer choices which seem too obvious or too easy to derive. In this problem, the most obvious solution is the following drawing, which produces 9 intersections:



This solution is too easy for a problem in the Difficult Third's section. Eliminate choice A, 9. Now we are left with choices B, C, and D. Try to quickly sketch some alternative answers then pick the one which produces the most intersections. The correct answer is D, 12, as shown in the following sketch:



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27) Answer: B
Strategy to Use: Avoid Obvious Answers

Since this is a problem in the Difficult Third's section, we should avoid any easy solutions. The most obvious, tempting answer choice in this problem is choice D, 35, because it is simply the average of 30 mph (the first part) and 40 mph (the second part). This choice is WRONG. Eliminate this choice; that answer is simply too easy to derive. Another answer choice which is too easily derived is choice E, 70. Why is it too easy? 70 is derived by adding 30 mph and 40 mph. So, eliminate choice E. We are now left with choices A, B, and C - leaving much better chances at guessing. The correct answer is choice B, $34\frac{2}{7}$.

To solve, use D = RT and T = D/R and R = D/T

Time for the First Part = $\frac{50}{30}$ = $\frac{5}{3}$ of an hour

Time for the Second Part = $\frac{50}{40}$ = $\frac{5}{4}$ of an hour

Average Total Speed (rate) = Total Distance ÷ Total Time

$$\text{Average Speed (rate)} = \frac{100}{\frac{5}{3} + \frac{5}{4}} = 34\frac{2}{7}$$

The correct answer is choice B.

---

28) Answer: C
Strategy to Use: Avoid Obvious Answers

Careless test-takers will quickly select choice D, 45, as the correct answer for this difficult question. They will assume that to solve the problem, all one needs to do is to average 40 and 50 mph to get 45 mph, and then multiply by 1 hour. This solution is too simple for a question in the Difficult Third's section of the SAT. Other test-takers may be tempted by choices A, 40, and E, 50, because they are values which appeared in the question. We call these distractors. When answering questions in the Difficult Third's section, always eliminate any answer choices with easy solutions and any distractors. In this problem, we should eliminate choices A, D, and E. We now have choices B and C left - a 50% chance of answering correctly.

To solve, use D = RT and T = D/R and R = D/T

First, notice that the distance there and back is equal. Since D = RT, multiply rate x time for each direction. The total time is 1 hour. Let the time there equal x and the return time would then be 1 – x.

$$40x = 50(1 - x)$$

$$40x = 50 - 50x$$

$$90x = 50$$

$$x = \frac{5}{9}$$

So, time there is 5/9 of an hour and the time back is $1 - \frac{5}{9} = \frac{4}{9}$ of an hour.

To find the total distance we simply use D = RT by substituting the known times.

Distance there = $40(\frac{5}{9}) = \frac{200}{9}$ miles = $22\frac{2}{9}$ miles

Distance back = $50(\frac{4}{9}) = \frac{200}{9}$ miles = $22\frac{2}{9}$ miles

The total distance $22\frac{2}{9} + 22\frac{2}{9} = 44\frac{4}{9}$, choice C.

---

29)Answer: B
Strategy to Use: Educated Guessing

When faced with a fraction or percentage that you are not able to convert quickly into another form, work with what your know. The key is to work with what you know to make an educated guess. In this problem, we are asked:

How many eights are equal to $37\frac{1}{2}\%$

We KNOW:

$$\frac{4}{8} = \frac{1}{2} = 50\ \%$$

In other words, there are 4 eights in 50%. If we think about this, then we rea

with choice A and B -- a 50% chance of guessing correctly. The correct answer is choice B, 3.

To solve, set up the following proportion, cross-multiply, then solve for X:

$$\frac{x}{8} = \frac{37.5\ \%}{100\ \%}$$

$100x = (8)(37.5)$
$100x = 300$
$x = 3$, choice B.

---

30) Answer: B
Strategy to Use: Educated Guessing

First, take inventory of what we know. We are told that the sum of the areas of the sides of a cube equals 300 square inches. We know that a cube has 6 side (which are squares); therefore, each side has an area of 50 (300 ÷ 6). We also know that the area of a square (a side) can be determined by using the formula: Area = side^2. So, 50 = side^2. By taking the square root of each side, we can determine that each side has an area of $\sqrt{50} = 5\sqrt{2}$. We also know that the volume of a cube equals side^3.

The volume is $(5\sqrt{2})^3 = 125(2)\sqrt{2} = 250\sqrt{2}$, choice B.
Alternately, $(5\sqrt{2})^3$ can be approximated by punched it into the calculator and compared with the answer choices also approximated on the calculator.
