Practice Test 1
Mathematics

Section 1:
Percent/Part/Whole; Percent Change

Section 2:
Mean, Median, Mode

Section 3:
Exponents and Roots

Section 4:
Algebraic Equations

Section 5:
Inequalities, Literal Equations, Polynomials, Binomials

Section 6:
Slope and Distance to Midpoint

Section 7:
Absolute Value Equations

Section 8:
Geometry

Section 9:
Fundamental Counting Principle, Permutations, Combinations

Section 10:
Ratios, Proportions, Rate of Change
Percent/Part/Whole, Percent Change

1. In a class of 42 students, 18 are boys. Two girls get transferred to another school. What percent of students remaining are girls?
   a. 14%.
   b. 16%.
   c. 52.4%.
   d. 60%.
   e. None of the above.

2. A payroll check is issued for $500.00. If 20% goes to bills, 30% of the remainder goes to pay entertainment expenses, and 10% of what is left is placed in a retirement account, then approximately how much is remaining?
   a. $150.
   b. $250.
   c. $170.
   d. $350.
   e. $180.

3. A painting by Van Gogh increased in value by 80% from year 1995 to year 2000. If in year 2000, the painting is worth $7200, what was its value in 1995?
   a. $1500.
   b. $2500.
   c. $3000.
   d. $4000.
   e. $5000.

4. "Dresses and Ties" sells a particular dress for $60 dollars. But, they decide to discount the price of that dress by 25%. How much does the dress cost now?
   a. $55.
   b. $43.
   c. $45.
   d. $48.
   e. $65.

5. A sweater goes on sale for 30% off. If the original price was $70, what is the discounted price?
   a. $48.
   b. $49.
   c. $51.
   d. $65.
   e. $52.
Mean, Median, Mode

1. If test A is taken 5 times with an average result of 21, and test B is taken 13 times with an average result of 23, what is the combined average?
   a. 22.24.
   b. 22.22.
   c. 22.00.
   d. 22.44.
   e. 24.22.

2. A set of data has 12 entries. The average of the first 6 entries is 12, the average of the next two entries is 20, and the average of the remaining entries is 4. What is the average of the entire data set?
   a. 10.
   b. 10.67.
   c. 11.
   d. 12.67.
   e. 10.5.

3. What is the average score of 8 tests where the score for 3 tests is 55, the score for two tests is 35, and the remaining tests have scores of 70?
   a. 50.3.
   b. 52.5.
   c. 55.1.
   d. 56.0.
   e. 55.6.

4. The temperatures over a week are recorded as follows:

<table>
<thead>
<tr>
<th>Day</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>80</td>
<td>45</td>
</tr>
<tr>
<td>Tuesday</td>
<td>95</td>
<td>34</td>
</tr>
<tr>
<td>Wednesday</td>
<td>78</td>
<td>47</td>
</tr>
<tr>
<td>Thursday</td>
<td>79</td>
<td>55</td>
</tr>
<tr>
<td>Friday</td>
<td>94</td>
<td>35</td>
</tr>
<tr>
<td>Saturday</td>
<td>67</td>
<td>46</td>
</tr>
<tr>
<td>Sunday</td>
<td>76</td>
<td>54</td>
</tr>
</tbody>
</table>

What is the approximate average high temperature and average low temperature during the week?
   a. 90, 50.
   b. 80, 40.
   c. 81, 45.
   d. 82, 46.
   e. 81, 47.
Exponents and Roots

1. What is $x^2 y^3 z / y z^{9}$?
   a. $y^5 z^4$
   b. $y z^4$
   c. $x^2 y z^{14}$
   d. $x y z^4$
   e. $x y z$

2. What is $k$ if $(2m^3)^5 = 32m^{k+1}$?
   a. 11
   b. 12
   c. 13
   d. 14
   e. 15

3. What is $x^5 y^4 z^2 / x^3 y^2 z^4$?
   a. $x^2 y z^2$
   b. $y^2 z^2$
   c. $x^2 y z^2$
   d. $x y z^2$
   e. $x^2 y z^2$

Algebraic Equations

1. The number 568cd should be divisible by 2, 5, and 7. What are the values of the digits $c$ and $d$?
   a. 56835.
   b. 56830.
   c. 56860.
   d. 56840.
   e. 56800.

2. Carla is 3 times older than her sister Megan. Eight years ago, Carla was 18 years older than her sister. What is Megan's age?
   a. 10
   b. 8
   c. 9
   d. 6
   e. 5

3. What is the value of $f(x) = (x^2 - 25)/(x + 5)$ when $x = 0$?
   a. -1
   b. -2
   c. -3
   d. -4
   e. -5
Slope and Distance to Midpoint

1. What is the equation of the line that passes through (3, 5), with intercept y = 8?
   a. $y = x + 8$
   b. $y = x - 8$
   c. $y = -x - 8$
   d. $y = -x + 8$
   e. $y = -x$

2. What is the value of $y$ in the equation $(3x - 4)^2 = 4y - 15$, if $x = 3$?
   a. 10
   b. 2.5
   c. -10
   d. -2.5
   e. 5

3. If $y = 4x + 6y$, what is the range of $y$ if $-10 < x \leq 5$?
   a. $-4 < y \leq 8$
   b. $-4 < y < 8$
   c. $8 > y > -4$
   d. $-4 \leq y < 8$
   e. $-4 \leq y \leq 8$

4. If Jennifer gets three times as much allowance as Judy gets, and Judy gets $\$5/week, how much does Jennifer get every month?
   a. $\$15$
   b. $\$20$
   c. $\$30$
   d. $\$45$
   e. $\$60$

5. What is the value of $x$, if $y = 8$ in the equation $5x + 9y = 3x - 6y + 5$?
   a. 57.5
   b. 60
   c. -60
   d. -57.5
   e. None of the above.
6. What is the area outside the circle, but within the square whose two corners are A and B?
   a. $169(1-\pi)$.
   b. $169\pi$.
   c. $169\pi/4$.
   d. $169(1-\pi/4)$.
   e. 169.

7. A line with a slope of 2 passes through the point (2, 4). What is the set of coordinates where that line passes through the y intercept?
   a. (-2, 0).
   b. (0, 0).
   c. (2, 2).
   d. (4, 0).
   e. (1, 1).

8. $3x + 4y = 7$
   $9x + 12y = 21$

   Determine where the above two lines intersect:
   a. $x = 4$, $y = 3$.
   b. $x = 12$, $y = 9$.
   c. $x = 1/3$, $y = 1/3$.
   d. Not enough information provided.
   e. There is no solution; the lines do not intersect.

9. $3x + 4y = 7$
   $8x - 6y = 9$

   Are the above lines parallel or perpendicular?
   a. Parallel.
   b. Perpendicular.
   c. Neither parallel nor perpendicular.
   d. Cannot be determined.
   e. The angle at the point of intersection is 40.
Absolute Value Equations

1. Factor $x^2 + 2x - 15$.
   a. $(x - 3)(x + 5)$.
   b. $(x + 3)(x - 5)$.
   c. $(x + 3)(x + 5)$.
   d. $(x - 3)(x - 5)$.
   e. $(x - 1)(x + 15)$.

2. Car A starts at 3:15 PM and travels straight to its destination at a constant speed of 50 mph. If it arrives at 4:45 PM, how far did it travel?
   a. 70 miles.
   b. 75 miles.
   c. 65 miles.
   d. 40 miles.
   e. 105 miles.

3. What are the roots of the equation $2x^2 + 14x = 0$?
   a. 0 and 7.
   b. 0 and -7.
   c. 14 and 0.
   d. 2 and 14.
   e. Cannot be determined.

4. If $f(x) = 2x^2 + 3x$, and $g(x) = x + 4$, what is $f(g(x))$?
   a. $x^2 + 19x + 44$.
   b. $2x^2 + 19x + 44$.
   c. $4x^2 + 35x + 76$.
   d. $x^2 + 8x + 16$.
   e. None of the above.

5. If $|x + 4| = 2$, what are the values of $x$?
   a. 2 and 6.
   b. -2 and -6.
   c. -2.
   d. -6.
   e. 0.

6. The sale of an item can be written as a function of price: $s = 3p + c$, where $s$ is the amount in sales, $p$ is the price per item, and $c$ is a constant value. If the sales generated are $20 at a price of $5 for the item, then what should the price be to generate $50 in sales?
   a. $10$.
   b. $15$.
   c. $20$.
   d. $16$.
   e. $14$. 
7. If \( f(n) = 2n + 3\sqrt{n} \), where \( n \) is a positive integer, what is \( f[g(5)] \) if \( g(n) = m - 4 \)?
   a. 1.
   b. 2.
   c. 3.
   d. 4.
   e. 5.

8. If \( f(x) = (x + 2)^2 \), and \( -4 \leq x \leq 4 \), what is the minimum value of \( f(x) \)?
   a. 0.
   b. 1.
   c. 2.
   d. 3.
   e. 4.

**Geometry**

1. What is the area, in square feet, of the triangle whose sides have lengths equal to 3, 4, and 5 feet?
   a. 6 square feet.
   b. 7 square feet.
   c. 4 square feet.
   d. 5 square feet.
   e. 8 square feet.

2. In the following figure, where AE bisects line BC, and angles AEC and AEB are both right angles, what is the length of AB?
   a. 1 cm.
   b. 2 cm.
   c. 3 cm.
   d. 4 cm.
   e. 5 cm.

![Diagram of triangle with labels and measurements: BC = 6 cm, AD = 3 cm, CD = 4 cm]

3. In the following triangle, if \( AB = 6 \) and \( BC = 8 \), what should the length of \( CA \) be to make triangle ABC a right triangle?
   a. 10.
   b. 9.
   c. 8.
   d. 4.
   e. 7.

![Diagram of triangle with labels: A, B, C]
4. In the following circle there is a square with an area of 36 cm². What is the area outside the square, but within the circle?
   a. $18\pi$ cm².
   b. $18\pi - 30$ cm².
   c. $18\pi - 36$ cm².
   d. 18 cm².
   e. $-18$ cm².

Fundamental Counting Principle, Permutations, Combinations

1. The wardrobe of a studio contains 4 hats, 3 suits, 5 shirts, 2 pants, and 3 pairs of shoes. How many different ways can these items be put together?
   a. 60.
   b. 300.
   c. 360.
   d. 420.
   e. 500.

2. For lunch, you have a choice between chicken fingers or cheese sticks for an appetizer; turkey, chicken, or veal for the main course; cake or pudding for dessert; and either Coke or Pepsi for a beverage. How many choices of possible meals do you have?
   a. 16.
   b. 24.
   c. 34.
   d. 36.
   e. 8.

3. For an office job, I need to pick 3 candidates out of a pool of 5. How many choices do I have?
   a. 60.
   b. 20.
   c. 10.
   d. 30.
   e. 50.

4. A contractor is supposed to choose 3 tiles out of a stack of 5 tiles to make as many patterns as possible. How many different patterns can he make?
   a. 10.
   b. 20.
   c. 30.
   d. 40.
   e. 60.
5. I have chores to do around the house on a weekend. There are 5 chores I must complete by the end of the day. I can choose to do them in any order, so long as they are all completed. How many choices do I have?
   a. 5.
   b. 25.
   c. 32.
   d. 3125.
   e. 120.

Ratios, Proportions, Rate of Change

1. A class has 50% more boys than girls. What is the ratio of boys to girls?
   a. 4:3.
   b. 3:2.
   c. 5:4.
   d. 10:7.
   e. 7:5.

2. A car can travel 30 miles on 4 gallons of gas. If the gas tank has a capacity of 16 gallons, how far can it travel if the tank is ¾ full?
   a. 120 miles.
   b. 90 miles.
   c. 60 miles.
   d. 55 miles.
   e. 65 miles.

3. The profits of a company increase by $5000 every year for five years and then decrease by $2000 for the next two years. What is the average rate of change in the company profit for that seven-year period?
   a. $1000/year.
   b. $2000/year.
   c. $3000/year.
   d. $4000/year.
   e. $5000/year.

4. A bag holds 250 marbles. Of those marbles, 40% are red, 30% are blue, 10% are green, and 20% are black. How many marbles of each color are present in the bag?
   a. Red = 90; Blue = 80; Green = 30; Black = 40.
   b. Red = 80; Blue = 60; Green = 30; Black = 80.
   c. Red = 100; Blue = 75; Green = 25; Black = 50.
   d. Red = 100; Blue = 70; Green = 30; Black = 50.
   e. Red = 120; Blue = 100; Green = 10; Black = 20.
5. Two students from a student body of 30 boys and 50 girls will be selected to serve on the school disciplinary committee. What is the probability that first a boy will be chosen, and then a girl?
   a. 1/1500.
   b. 1500/6400.
   c. 1500/6320.
   d. 1.
   e. 30/50.

Reading Comprehension

Many persons plead a love of truth as an apology for rough manners, as if truth was never gentle and kind, but always harsh, morose, and forbidding. Surely good manners and a good conscience are no more inconsistent with each other than beauty and innocence, which are strikingly akin, and always look the better for companionship. Roughness and honesty are indeed sometimes found together in the same person, but he is a poor judge of human nature who takes ill-manners to be a guarantee of probity of character. Some persons object to politeness, that its language is unmeaning and false. But this is easily answered. A lie is not locked up in a phrase, but must exist, if at all, in the mind of the speaker. In the ordinary compliments of civilized life, there is no intention to deceive, and consequently no falsehood. Polite language is pleasant to the ear, and soothing to the heart, while rough words are just the reverse; and if not the product of ill temper, are very apt to produce it. The plainest of truths, let it be remembered, can be conveyed in civil speech, while the most malignant lies may find utterance, and often do, in the language of the fish market.

1. What is the first sentence in the passage?
   a. Main idea
   b. Topic
   c. Theme
   d. Supporting detail

2. Which is a logical prediction?
   a. The next paragraph will discuss manners at the fish market.
   b. The next paragraph will discuss ways to speak politely.
   c. The next paragraph will discuss table manners.
   d. The next paragraph will discuss how to respond to an invitation.

3. What is the intent?
   a. Persuade
   b. Inform
   c. Entertain
   d. Express feeling

4. Which is an opinion?
   a. Polite language is pleasant to the ear.
   b. Many persons plead a love of truth.
   c. Roughness and honesty are indeed sometimes found together
   d. Some persons object to politeness

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I do not mean to prescribe rules to strong and valiant natures, who will mind their own affairs whether in heaven or hell, and perchance build more magnificently and spend more lavishly than the richest, without ever impoverishing themselves, not knowing how they live—if, indeed, there are any such, as has been dreamed; nor to those who find their encouragement and inspiration in precisely the present condition of things, and cherish it with the fondness and enthusiasm of lovers—and, to some extent, I reckon myself in this number; I do not speak to those who are well employed, in whatever circumstances, and they know whether they are well employed or not;—but mainly to the mass of men who are discontented, and idly complaining of the hardness of their lot or of the times, when they might improve them. There are some who complain most energetically and insconsolably of any, because they are, as they say, doing their duty. I also have in my mind that seemingly wealthy, but most terribly impoverished class of all, who have accumulated dross, but know not how to use it, or get rid of it, and thus have forged their own golden or silver fetters.

5. Which is a topic sentence?
   a. There are some who complain most energetically and insconsolably of any, because they are, as they say, doing their duty.
   b. I do not speak to those who are well employed, in whatever circumstances.
   c. I also have in my mind that seemingly wealthy, but most terribly impoverished class of all, who have accumulated dross, but know not how to use it, or get rid of it, and thus have forged their own golden or silver fetters.
   d. I do not mean to prescribe rules to strong and valiant natures, who will mind their own affairs whether in heaven or hell, and perchance build more magnificently and spend more lavishly than the richest, without ever impoverishing themselves, not knowing how they live—if, indeed, there are any such, as has been dreamed; nor to those who find their encouragement and inspiration in precisely the present condition of things, and cherish it with the fondness and enthusiasm of lovers—and, to some extent, I reckon myself in this number; I do not speak to those who are well employed, in whatever circumstances, and they know whether they are well employed or not;—but mainly to the mass of men who are discontented, and idly complaining of the hardness of their lot or of the times, when they might improve them.

6. What is the third sentence in the passage?
   a. Main idea
   b. Topic
   c. Theme
   d. Supporting detail

7. What can be inferred?
   a. The author believes that money is essential for happiness.
   b. The author wants people to find contentment.
   c. The author dislikes wealth.
   d. The author does not believe happiness is possible.
8. Which is a logical conclusion?
   a. The author is going to offer help finding new, meaningful employment.
   b. The author is going to recommend saving money, rather than spending.
   c. The author is going to suggest a path to contentment.
   d. The author is going to suggest that people give away their money.

9. What is the main purpose?
   a. To explain why wealth causes unhappiness
   b. To explain why wealth causes happiness
   c. To differentiate to whom the author is speaking
   d. To tell the reader the topic of the essay

10. Which type of passage is this?
    a. Narrative
    b. Expository
    c. Technical
    d. Persuasive

11. Which is a summary sentence?
    a. The wealthy spend lavishly.
    b. New money causes unhappiness.
    c. Hard work will bring happiness.
    d. Happiness and contentment is largely a matter of attitude and personality, rather than wealth.

I did not, when a slave, understand the deep meaning of those rude and apparently incoherent songs. I was myself within the circle; so that I neither saw nor heard as those without might see and hear. They told a tale of woe which was then altogether beyond my feeble comprehension; they were tones loud, long, and deep; they breathed the prayer and complaint of souls boiling over with the bitterest anguish. Every tone was a testimony against slavery, and a prayer to God for deliverance from chains. The hearing of those wild notes always depressed my spirit, and filled me with ineffable sadness. I have frequently found myself in tears while hearing them. The mere recurrence to those songs, even now, afflicts me; and while I am writing these lines, an expression of feeling has already found its way down my cheek. To those songs I trace my first glimmering conception of the dehumanizing character of slavery. I can never get rid of that conception. Those songs still follow me, to deepen my hatred of slavery, and quicken my sympathies for my brethren in bonds. If any one wishes to be impressed with the soul-killing effects of slavery, let him go to Colonel Lloyd’s plantation, and, on allowance-day, place himself in the deep pine woods, and there let him, in silence, analyze the sounds that shall pass through the chambers of his soul,—and if he is not thus impressed, it will only be because “there is no flesh in his obdurate heart.”

12. Which is a logical conclusion?
    a. The narrator was once a slave.
    b. The narrator is still a slave.
    c. This is a work of fiction.
    d. Colonel Lloyd is the narrator.
13. Which type of passage is this?
   a. Narrative
   b. Expository
   c. Technical
   d. Persuasive writing

14. What is the main purpose?
   a. To explain the history of slave music
   b. To convince the reader to abolish slavery
   c. To share a personal story
   d. To explain why Colonel Lloyd was unkind

Regardless of the time of the year or the time of the day there are pies. The Pennsylvania Dutch eat pies for breakfast. They eat pies for lunch. They eat pies for dinner and they eat pies for midnight snacks. Pies are made with a great variety of ingredients from the apple pie we all know to the rivel pie which is made from flour, sugar, and butter. The Dutch housewife is as generous with her pies as she is with all her cooking, baking six or eight at a time not one and two.

The apple is an important Pennsylvania Dutch food. Dried apples form the basis for many typical dishes. Each fall barrels of apples are converted into cider. Apple butter is one of the Pennsylvania Dutch foods which has found national acceptance. The making of apple butter is an all-day affair and has the air of a holiday to it. Early in the morning the neighbors gather and begin to peel huge piles of apples that will be needed. Soon the great copper apple butter kettle is brought out and set up over a wood fire. Apple butter requires constant stirring to prevent burning. However, stirring can be light work for a boy and a girl when they're young and the day is bright and the world is full of promise. By dusk the apple butter is made, neighborhood news is brought up to date and hunger has been driven that much further away for the coming winter.

Food is abundant and appetites are hearty in the Pennsylvania Dutch country. The traditional dishes are relatively simple and unlike most regional cookery the ingredients are readily available. Best of all, no matter who makes them the results are “wonderful good.”

15. Which is a logical conclusion?
   a. Pennsylvania Dutch housewives like to cook.
   b. Pie is the only food they eat.
   c. Food is an important part of Pennsylvania Dutch culture.
   d. Apple butter is used to make pies.

16. Which is a logical conclusion?
   a. Apples are a significant crop in Pennsylvania Dutch country.
   b. Pies require only butter, sugar and flour.
   c. Apple butter is made in the spring.
   d. Pennsylvania Dutch children all learn to cook.
17. Which is an opinion?
   a. Pennsylvania Dutch housewives frequently make pie.
   c. Pennsylvania Dutch food is “wonderful good”.
   d. Apple butter takes all day to make.

18. Which type of passage is this?
   a. Narrative
   b. Expository
   c. Technical
   d. Persuasive

19. What can be inferred?
   a. This is the introduction to a cookbook.
   b. This is the beginning of a history book.
   c. This is a book about Pennsylvania Dutch culture.
   d. This is a book about regional foods.

20. What is the first sentence in the passage?
   a. Main idea
   b. Topic
   c. Theme
   d. Supporting detail

I don't know whether you have ever seen a map of a person's mind. Doctors sometimes draw maps of other parts of you, and your own map can become intensely interesting, but catch them trying to draw a map of a child's mind, which is not only confused, but keeps going round all the time. There are zigzag lines on it, just like your temperature on a card, and these are probably roads in the island, for the Neverland is always more or less an island, with astonishing splashes of colour here and there, and coral reefs and rakish-looking craft in the offing, and savages and lonely lairs, and gnomes who are mostly tailors, and caves through which a river runs, and princes with six elder brothers, and a hut fast going to decay, and one very small old lady with a hooked nose. It would be an easy map if that were all, but there is also first day at school, religion, fathers, the round pond, needle-work, murders, hangings, verbs that take the dative, chocolate pudding day, getting into braces, say ninety-nine, three-pence for pulling out your tooth yourself, and so on, and either these are part of the island or they are another map showing through, and it is all rather confusing, especially as nothing will stand still.

21. What is the intent?
   a. Persuade
   b. Entertain
   c. Inform
   d. Express feeling
22. Which is a topic sentence?
   a. I don’t know whether you have ever seen a map of a person’s mind.
   b. Doctors sometimes draw maps of other parts of you, but catch them trying to draw a map of a child’s mind, which is not only confused but keeps going round all the time.
   c. There are zigzag lines on it, just like your temperature on a card, and these are probably roads in the island.
   d. It would be an easy map if that were all, but there is also first day at school, religion, fathers, the round pond.

23. What can be inferred?
   a. The child’s mind is being compared to Neverland.
   b. Neverland is an island.
   c. There are maps of Neverland.
   d. Neverland has chocolate pudding.

24. Which type of passage is this?
   a. Narrative
   b. Expository
   c. Persuasive
   d. Technical

Malvern Hill, a plateau a mile and a half long and half a mile wide, with its top bare of woods, commanded a view of the country over which the Confederates must approach. Around the summit of this hill McClellan had placed tier after tier of batteries, arranged like an amphitheater. On the top were placed several heavy siege guns, his left flank being protected by the gunboats in the river. The morning and early afternoon were occupied by several Confederate attacks, sometimes formidable in their nature, but Lee planned for no general move until he could bring up a force which he thought sufficient to attack the strong position of the Federals. The Confederates had orders to advance, when a signal shout was given by the men of Armistead’s brigade. The attack was made late in the afternoon by General D. H. Hill, and was gallantly done, but no army could have withstood the fire from the batteries of McClellan as they were massed upon Malvern Hill. All during the evening brigade after brigade tried to force the Union lines. They were forced to breast one of the most devastating storms of lead and canister to which an assaulting army has ever been subjected. The round shot and grape cut through the branches of the trees. Column after column of Southern soldiers rushed upon the death dealing cannon, only to be mowed down. Their thin lines rallied again and again to the charge, but to no avail. McClellan’s batteries still hurled their missiles of death. The field below was covered with the dead, as mute pleaders in the cause of peace. The heavy shells from the gunboats on the river shrieked through the timber and great limbs were torn from the trees as they hurled by. Darkness was falling over the combatants. It was nine o’clock before the guns ceased firing, and only an occasional shot rang out over the gory field of Malvern Hill.

25. What is the intent?
   a. Persuade
   b. Entertain
   c. Inform
   d. Express feeling
26. Which is a likely motive for the author?
   a. To provide historical information
   b. To share opinions about the war
   c. To explain why the war ended slavery
   d. To persuade the reader that war was wrong

27. Which is a summary sentence?
   a. The Battle of Malvern Hill was a decisive Confederate victory.
   b. The Battle of Malvern Hill was a decisive Union victory.
   c. The Battle of Malvern Hill was a part of the Revolutionary war.
   d. The hill offered the Confederates a better position in the battle.

28. Which type of passage is this?
   a. Narrative
   b. Expository
   c. Technical
   d. Persuasive

29. Which accurately represents the historical context of the information in the passage?
   a. World War I
   b. The Civil War
   c. World War II
   d. The Revolutionary War

30. What can be inferred?
   a. This is part of a book about the Civil War
   b. This is a memoir of a Confederate soldier
   c. This is a memoir of a Union soldier
   d. This is a biography of a Confederate general

Many persons plead a love of truth as an apology for rough manners, as if truth was never gentle and kind, but always harsh, morose, and forbidding. Surely good manners and a good conscience are no more inconsistent with each other than beauty and innocence, which are strikingly akin, and always look the better for companionship. Roughness and honesty are indeed sometimes found together in the same person, but he is a poor judge of human nature who takes ill-manners to be a guarantee of probity of character. Some persons object to politeness, that its language is unmeaning and false. But this is easily answered. A lie is not locked up in a phrase, but must exist, if at all, in the mind of the speaker. In the ordinary compliments of civilized life, there is no intention to deceive, and consequently no falsehood. Polite language is pleasant to the ear, and soothing to the heart, while rough words are just the reverse; and if not the product of ill temper, are very apt to produce it. The plainest of truths, let it be remembered, can be conveyed in civil speech, while the most malignant lies may find utterance, and often do, in the language of the fish market.

31. What is the main idea of the passage?
   a. Fishmongers have bad manners.
   b. Good manners and honesty can go together.
   c. A little white lie is necessary for politeness.
   d. Poor manners are not a sign of honesty.
32. Which statement is not a detail from the passage?
   a. Truth can be gentle and kind.
   b. Honesty is often an excuse for bad manners.
   c. Lies can be conveyed with rough manners.
   d. People with good manners intend to deceive.

33. What is the meaning of deceive near the end of the paragraph?
   a. Make someone believe something that is not true
   b. Convince someone to give you something
   c. Spread an unkind story about someone else
   d. Share truths or speak honestly

34. What is the author’s primary purpose in writing this passage?
   a. To emphasize the importance of honesty
   b. To share information about fish markets
   c. To talk about the differences in manners among the social classes
   d. To explain that manners and honesty can coexist

35. Which is the best summary of this passage?
   a. Civil speech helps people to get along.
   b. Honesty is always the best policy.
   c. Good manners help you to lie.
   d. Rough manners cause fights.

"However, let us go to dinner, and I will soon tell you whether you are a well-bred man or not; and here let me premise that what is good manners for a small dinner is good manners for a large one, and vice versa. Now, the first thing you do is to sit down. Stop, sir! Pray do not cram yourself into the table in that way; no, nor sit a yard from it, like that. How graceless, inconvenient, and in the way of conversation! Why, dear me! You are positively putting your elbows on the table, and now you have got your hands fumbling about with the spoons and forks, and now you are nearly knocking my new hock glasses over. Can’t you take your hands down, sir? Didn’t you learn that in the nursery? Didn’t your mamma say to you, ‘Never put your hands above the table except to carve or eat?’ Oh! But come, no nonsense, sit up, if you please. I can’t have your fine head of hair forming a side dish on my table; you must not bury your face in the plate, you came to show it, and it ought to be alive. Well, but there is no occasion to throw your head back like that, you look like an alderman, sir, after dinner. Pray, don’t lounge in that sleepy way. You are here to eat, drink, and be merry. You can sleep when you get home.

36. What is the main idea of the passage?
   a. Aldermen drink too much.
   b. Well-bred individuals have good manners.
   c. You should not nap at the dinner table.
   d. Don’t put your hands above the table.

37. Which statement is not a detail from the passage?
   a. Don’t put your hands above the table.
   b. Don’t sit a yard from the table.
   c. Don’t lean over your plate.
   d. Don’t put your elbows on the table.
38. What is the meaning of lounge near the end of the paragraph?
   a. Couch or sofa
   b. Lay down
   c. Sleep
   d. Relax

39. What is the author’s primary purpose in writing this passage?
   a. To teach manners.
   b. To amuse the reader.
   c. To explain why you should not go to dinner parties.
   d. To illustrate how to properly eat fish.

40. Which is the best summary of this passage?
   a. Good manners are common sense.
   b. Use good manners at meals.
   c. No one has good manners.
   d. Good manners are unimportant

Writing

Questions 1 – 5 are based on the following original passage. Sentences are numbered at the end for easy reference within the questions.

Examining the impact my lifestyle has on the earth’s resources is, I believe, a fascinating and valuable thing to do (1). According to the Earth Day Network ecological footprint calculator, it would take four planet earths to sustain the human population if everyone used as many resources as I do (2). My “ecological footprint,” or the amount of productive area of the earth that is required to produce the resources I consume, is therefore larger than the footprints of most of the population (3). It is hard to balance the luxuries and opportunities I have available to me with doing what I know to be better from an ecological standpoint (4).

It is fairly easy for me to recycle, so I do it, but it would be much harder to forgo the opportunity to travel by plane or eat my favorite fruits that have been flown to the supermarket from a different country (5). Although I get ecological points for my recycling habits, my use of public transportation, and living in an apartment complex rather than a free-standing residence, my footprint expands when it is taken into account my not-entirely-local diet, my occasional use of a car, my three magazine subscriptions, and my history of flying more than ten hours a year (6). I feel that realizing just how unfair my share of the earth’s resources have been should help me to change at least some of my bad habits (7).

1. Which of the following is the best version of sentence 1?
   a. It is fascinating and valuable to examine the impact that my lifestyle has on the earth’s resources.
   b. Examining the impact my lifestyle has on the earth’s resources is a fascinating and valuable thing to do.
   c. To examine the impact my lifestyle has on the earth’s resources is fascinating and is also valuable.
   d. The impact of my lifestyle on the earth’s resources is fascinating and valuable to examine.
   e. Examining the impact my lifestyle has on the earth’s resources is, I believe, a fascinating and valuable thing to do.
2. How could sentences 2 and 3 best be combined?
   a. According to the Earth Day Network ecological footprint calculator, it would take four planet earths to sustain the human population if everyone used as many resources as I do because I have a very large “ecological footprint,” which is the amount of productive area of the earth that is required to produce the resources I consume.
   b. According to the Earth Day Network ecological footprint calculator, which calculates the amount of productive area of the earth that is required to produce the resources one consumes, it would take four planet earths to sustain the human population if everyone had a footprint as large as mine.
   c. According to the Earth Day Network ecological footprint calculator, it would take four planet earths to sustain the human population if everyone used as many resources as I do; my “ecological footprint,” or the amount of productive area of the earth that is required to produce the resources I consume, is therefore larger than the footprints of most of the population.
   d. According to the Earth Day Network ecological footprint calculator, which measures the amount of productive area of the earth that is required to produce the resources a person consumes, my footprint is larger than that of most; it would take four planet earths to sustain the human population if everyone consumed as much as I do.
   e. According to the Earth Day Network ecological footprint calculator, my “ecological footprint,” or the amount of productive area of the earth that is required to produce the resources I consume, would require four planet earths if it were to be the footprint of the human population; it is therefore larger than the footprints of most of the population.

3. Sentence 4 would best fit if it were moved where in this composition?
   a. At the beginning of paragraph 2.
   b. After sentence 5.
   c. After sentence 6.
   d. At the end of paragraph 2.
   e. Sentence 4 is best left where it is.

4. Which two sentences would be improved by switching positions?
   a. 1 and 2.
   b. 3 and 4.
   c. 5 and 6.
   d. 6 and 7.
   e. 2 and 7.

5. Which of the following should replace the underlined portion of sentence 6?
   a. “my footprint expands when taken into account my not-entirely-local diet”
   b. “my footprint expands when taken into account are my not-entirely-local diet”
   c. “my footprint expands when we take into account my not-entirely-local diet”
   d. “my footprint expands when one takes into account my not-entirely-local diet”
   e. “my footprint expands when it is taken into account my not-entirely-local diet”
6. Which revision would most improve sentence 7?
   a. Eliminate the phrase “I feel that.”
   b. Change “should help me” to “will help me.”
   c. Add the phrase “In conclusion,” to the beginning.
   d. Change “have been” to “has been.”
   e. Eliminate the phrase “at least some of.”

Questions 7 – 12 are based on the short passage below, which is excerpted from Thomas Huxley’s preface to his Collected Essays: Volume V (public domain) and modified slightly. Sentences are numbered at the end for easy reference within the questions.

I had set out on a journey, with no other purpose than that of exploring a certain province of natural knowledge, I strayed no hair’s breadth from the course which it was my right and my duty to pursue; and yet I found that, whatever route I took, before long, I came to a tall and formidable-looking fence (1). Confident I might be in the existence of an ancient and indefeasible right of way, before me stood the thorny barrier with its comminatory notice-board—“No Thoroughfare. By order” (2). There seemed no way over; nor did the prospect of creeping round, as I saw some do, attracts me (3). True there was no longer any cause to fear the spring guns and man-traps set by former lords of the manor; but one is apt to get very dirty going on all-fours (4). The only alternatives were either to give up my journey—which I was not minded to do—or to break the fence down and go through it (5). I swiftly ruled out crawling under as an option (6). I also ruled out turning back (7).

7. How could sentence 1 best be changed?
   a. The comma after journey should be removed.
   b. The comma after knowledge should be changed to a semicolon.
   c. “and yet” should be eliminated.
   d. Change “I had set out” to “I set out.”
   e. No change.

8. Sentence 6 should be placed where in the passage?
   a. After sentence 1.
   b. After sentence 2.
   c. After sentence 3.
   d. After sentence 4.
   e. Left after sentence 5.

9. Which edit should be made in sentence 3?
   a. “nor” should be changed to “or.”
   b. “seemed” should be changed to “seems.”
   c. “me” should be changed to “I.”
   d. “attracts” should be changed to “attract.”
   e. No edit should be made.

10. How could sentences 6 and 7 best be combined?
    a. Swiftly, I ruled out crawling under as an option and also turning back.
    b. Ruling out two options swiftly: crawling under and turning back.
    c. I swiftly ruled out the options of crawling under or turning back.
    d. I ruled out crawling under as an option and I swiftly also ruled out turning back.
    e. I swiftly ruled out crawling under as an option and also turning back.
11. Which word could be inserted at the beginning of sentence 2 before “confident” to best clarify the meaning?
   a. Even.
   b. However.
   c. Hardly.
   d. Finally.
   e. Especially.

12. Which of the following is the best way to split sentence 1 into two separate sentences?
   a. I had set out on a journey, with no other purpose than that of exploring a certain province of natural knowledge. I strayed no hair’s breadth from the course which it was my right and my duty to pursue; and yet I found that, whatever route I took, before long, I came to a tall and formidable-looking fence.
   b. I had set out on a journey, with no other purpose than that of exploring a certain province of natural knowledge, I strayed no hair’s breadth from the course which it was my right and my duty to pursue. Yet I found that, whatever route I took, before long, I came to a tall and formidable-looking fence.
   c. I had set out on a journey, with no other purpose than that of exploring a certain province of natural knowledge, I strayed no hair’s breadth from the course which it was my right and my duty to pursue; and yet I found that, whatever route I took, before long, I came to a tall and formidable-looking fence.
   d. I had set out on a journey. With no other purpose than that of exploring a certain province of natural knowledge, I strayed no hair’s breadth from the course which it was my right and my duty to pursue; and yet I found that, whatever route I took, before long, I came to a tall and formidable-looking fence.
   e. I had set out on a journey, with no other purpose than that of exploring a certain province of natural knowledge, I strayed no hair’s breadth from the course which it was my right and my duty to pursue; and yet. I found that, whatever route I took, before long, I came to a tall and formidable-looking fence.

Questions 13 – 27 are based on the short passage below:

1Sandra Cisneros, perhaps the best known Latina author in the United States, writes poems and stories whose titles alone – “Barbie-Q,” “My Lucy Friend Who Smells Like Corn,” “Woman Hollering Creek” – engage potential readers’ curiosity. 2Ironically, this renowned writer, whose books are printed on recycled paper, did not do well in school. 3When she lectures at schools and public libraries, Cisneros presents the evidence. 4An elementary school report card containing Cs, Ds and a solitary B (for conduct). 5Cisneros has a theory to explain her low grades: teachers had low expectations for Latina and Latino students from Chicago’s South Side. 6Despite the obstacles that she faced in school, Cisneros completed not only high school but also college. 7Her persistence paid off in her twenties, when Cisneros was admitted prestigious to the Writers’ Workshop at the University of Iowa.
8Cisneros soon observed that most of her classmates at the university seemed to have a common set of memories, based on middle-class childhoods, from which to draw in their writing. 9Cisneros felt decided out of place. (“9A”) 10She decided to speak from her own experience. 11Her voice, which by being one of a Latina living outside of the mainstream, found a large and attentive audience in 1984 with the publication of her first short story collection, The House on Mango Street. 12Today the book is read by middle school, high school, and college students across the United States. 13Cisneros uses her influence as a successful writer to help other Latina and Latino writers get their works published. 14But having made the argument that, in order for large numbers of young Latinos to achieve literary success, the educational system itself must change. 15Cisneros hints that she succeeded in spite of the educational system. "I'm the exception," she insists, "not the rule."

13. What change should be made to sentence 1?
   a. No Change.
   b. “author and writer.”
   c. “author and novelist.”
   d. “wordsmith and author.”

14. What change should be made towards the end of sentence 1?
   a. No Change.
   b. “potential, reader's.”
   c. “potential, readers.”
   d. “potential readers.”

15. What change should be made to sentence 2?
   a. No Change.
   b. “writer, who is recognized by her orange and black eyeglasses”
   c. “writer, who likes to write at night,”
   d. “writer”

16. What change should be made to sentence 3?
   a. No Change.
   b. “evidence: an”
   c. “evidence; an”
   d. “evidence an”

17. The best placement for the underlined portion in sentence 7 would be:
   a. Where it is now.
   b. Before the word admitted.
   c. Before the word “Writers,'”
   d. Before the word “Workshop.”

18. Which word would best replace the underlined portion in sentence 8?
   a. No Change.
   b. “furthermore”
   c. “nevertheless”
   d. “therefore”
19. Which of the following is the best beginning of sentence 9?
   a. No Change.
   b. "Cisneros herself,"
   c. "Cisneros, herself"
   d. "Cisneros,"

20. Which of the following should replace the underlined word in sentence 9?
   a. No Change.
   b. "deciding"
   c. "decidedly"
   d. "decidedly and"

21. Which of the following true statements, if added at _____("9A")_____, would best serve as a transition between the challenges Cisneros faced as an aspiring writer and her success in meeting those challenges?
   a. "She did not know what to do."
   b. "Then she had a break through."
   c. "At that point she almost went home to Chicago."
   d. "She wondered whether she was in the right field."

22. Which of the following changes should be made to sentence 11?
   a. No Change.
   b. "voice – that of a Latina living outside the mainstream –"
   c. "voice, being one of a Latina living outside the mainstream, it”
   d. "voice – in which it was a Latina living outside the mainstream –"

23. Which of the following changes should be made to sentence 11?
   a. No Change.
   b. "1984, With"
   c. "1984; with"
   d. "1984, with,"

24. Which of the following is the best change to the underlined word at the beginning of sentence 12?
   a. No Change.
   b. "In the future,"
   c. "Meanwhile,"
   d. "At the same time,"

25. Which of the following is the best replacement for the underlined portion in sentence 14?
   a. No Change.
   b. "she argues that,"
   c. "arguing that,"
   d. "she argues that, when"
26. Which choice best shows that Cisneros is emphatic about expressing the belief stated in the underlined portion of sentence 15?
   a. No Change.
   b. "Says."
   c. "Supposes."
   d. "Asserts."

27. The writer is considering deleting the last sentence. If the writer decided to delete this sentence, the paragraph would primarily lose a statement that:
   a. Enhances the subject and setting.
   b. Provides support for a point previously made.
   c. Humorously digresses from the main topic of the paragraph.
   d. Contradicts Cisneros's claim made earlier in the essay.

Questions 28-40 are based on the short passage below:

1. Traveling on commercial airlines has changed substantially over years. When commercial air travel first became available, it was so expensive that usually only businessmen could afford to do so.
2. Airplane efficiency, the relative cost of fossil fuels, and using economics of scale have all contributed to make travel by air more affordable and common. These days, there are nearly 30,000 commercial air flights in the world each day!

5. Depending on the size of the airport you are departing from, you should arrive 90 minutes to two and a half hours before your plane leaves. Things like checking your luggage and flying internationally can make the process of getting to your gate take longer. If you fly out of a very busy airport, like LaGuardia, in New York City, on a very busy travel day, like the day before Thanksgiving, you can easily miss your flight if you don’t arrive early enough.

8. Security processes for passengers have also changed. In the 1960s, there was hardly any security: you could just buy your ticket and walk on to the plane the day of the flight without even needing to show identification. In the 1970s, American commercial airlines started installing sky marshals on many flights, an undercover law enforcement officers who would protect the passengers from a potential hijacking.

10. Also in the early 1970s, the federal government began to require that airlines screen passengers and their luggage for things like weapons and bombs. After the 2001 terrorist attacks in the United States, these requirements were stringently enforced. Family members can no longer meet someone at the gate; only ticketed passengers are allowed into the gate area. The definition of weapons are not allowed is expanded every time there is a new incident for example liquids are now restricted on planes after an attempted planned attack using gel explosives in 2006.

14. Despite the hassles of traveling by air, it is still a boon to modern life. Still, some businesses are moving away from sending employees on airplane trips, as face-to-face video conferencing technologies improve. A trip which might take ten hours by car can take only two hours by plane. However, the ability to travel quickly by air will always be valued, by citizens of our modern society.
28. Which of the following is the best change to the underlined portion of sentence 1?
   a. No Change.
   b. "over the years"
   c. "over time"
   d. Delete.

29. Which of the following is the best change to the underlined portion of sentence 2?
   a. No Change.
   b. "to do it"
   c. "to fly"
   d. "do so"

30. Which of the following is the best change to the underlined portion of sentence 3?
   a. No Change.
   b. "using economies"
   c. "and the use of economies"
   d. "and economies"

31. Which of the following is the best change to the underlined portion of sentence 7?
   a. No Change.
   b. "La Guardia in"
   c. "La Guardia; in"
   d. "La Guardia,"

32. Which of the following is the best change to the underlined portion of sentence 7?
   a. No Change.
   b. "hardly"
   c. "no"
   d. "barely"

33. Which of the following is the best change to the underlined portion of sentence 9?
   a. No Change.
   b. "flights; an"
   c. "flights. Marshals are"
   d. "flights, marshals are"

34. Which of the following is the best change to the underlined portion of sentence 11?
   a. No Change.
   b. "stiffly upheld"
   c. "enforced with more stringency"
   d. "more stringently enforced"

35. If the underlined portion in sentence 12 were deleted, the passage would lose:
   a. No Change.
   b. An explanation of the screening process.
   c. Ambiguity over why family members are no longer allowed at the gate.
   d. A further specific example of how regulations have changed over time.
36. Which of the following is the best change to the underlined portion in sentence 13?
   a. No Change.
   b. “weapon is”
   c. “weapons”
   d. “weapons which are”

37. Which of the following is the proper transition between sentences 13 & 14?
   a. No Change.
   b. “life. Some”
   c. “life even though some”
   d. “life, still some”

38. Which of the following is the best replacement for the underlined word in sentence 14?
   a. No Change.
   b. “because”
   c. “while”
   d. “since”

39. Which of the following is the best change to the underlined portion in sentence 15?
   a. No Change.
   b. “may only take”
   c. “takes only”
   d. “will only take”

40. Which of the following is the best change to the underlined portion in sentence 16?
   a. No Change.
   b. “citizens will always value”
   c. “will always, be valued by citizens”
   d. “will always be valued by citizens”

**Use the prompt below to answer Question 41.**

41. Write an essay in 25 minutes by answering the question from your perspective. Be sure to provide evidence.

- General George S. Patton Jr. is quoted as having said, “No good decision was ever made in a swivel chair.”

Is it necessary to be directly in a situation in order to best understand what must be done?
Practice Test 1—Answers

Mathematics

Percent/Part/Whole, Percent

1. e.
The entire class has 42 students, 18 of which are boys, meaning 42 - 18 = 24 is the number of girls. Out of these 24 girls, 2 leave; so 22 girls are left. The total number of students is now 42 - 2 = 40.

\[ \frac{22}{40} \times 100 = 55\% . \]

Reminder: If you forget to subtract 2 from the total number of students, you will end up with 60% as the answer. Sometimes you may calculate an answer that has been given as a choice; it can still be incorrect. Always check your answer.

2. b.
If out of the entire paycheck, 20% is first taken out, then the remainder is 80%. Of this remainder, if 30% is used for entertainment, then \((.8 - .80 \times .30) = .560 \) is left. If 10% is put into a retirement account, then \((.56 - .56 \times .1) = .504 \) is remaining. So out of $500, the part that remains is 50%, which is $252.

3. d.
In 2005, the value was 1.8 times its value in 1995. So \( 1.8x = 7200 \rightarrow x = 4000. \)

4. e.
\[ 60 \times (100 - 25)/100 \rightarrow 60 \times .75 = 45. \]

5. b.
New price = original price * (1 - discount) \rightarrow new price = 70(1-.3 ) = 49.

Mean, Median, Mode

1. d.
If test A avg = 21 for 5 tests, then sum of test A results = 21 * 5 = 105.
If test B avg = 23 for 13 tests, then sum of test B results = 23 * 13 = 299.
So total result = 299 + 105 = 404.
Average of all tests = 404/(5 + 13) = 404/18 = 22.44.

2. b.
The average of the first 6 points is 12 \( \rightarrow s_1/6 = 12 \rightarrow s_1 = 72; s_1 \) is the sum of the first 6 points.

The average of the next 2 points is 20 \( \rightarrow s_2/2 = 20 \rightarrow s_2 = 40; s_2 \) is the sum of the next 2 points.

The average of the remaining 4 points is 4 \( \rightarrow s_3/4 = 4 \rightarrow s_3 = 16; s_3 \) is the sum of the last 4 points.

The sum of all the data points = 72 + 40 + 16 = 128.
The average = $\frac{128}{12} = 10.67$.

3. e.
   \[ \text{Average} = \frac{(3 \times 55 + 2 \times 35 + 3 \times 70)}{8} \rightarrow \text{Average} = 55.625. \]

4. c.
   \[ \text{Average of high } s = \frac{(80 + 95 + 78 + 79 + 94 + 67 + 76)}{7} = 81.29. \]
   \[ \text{Average of low } s = \frac{(45 + 34 + 47 + 55 + 35 + 46 + 54)}{7} = 45.14. \]

**Exponents and Roots**

1. e.
   \[ x^2 y^3 z^5 \div y^2 z^9 = x^2 y^3 z^5 \div y^2 z^9 \text{ which gives the answer } x^2 y^{(3-2)} z^{(5+9)} \rightarrow x^2 y^2 z^{14}. \]

2. d.
   Expand \((2m^3)^5\) to give \(32m^{15}\).
   \[ \text{So } 32m^{15} = 32m^{k+1} \rightarrow k + 1 = 15 \rightarrow k = 14. \]

3. d.
   \[ x^5 y^4 z^3 \div x^3 y^2 z^4 = x^5 y^4 z^3 \div x^3 y^2 z^4 = x^2 y^2 z^4. \]

**Algebraic Equations**

1. d.
   If the number is divisible by 2, \(d\) should be even. If the number is divisible by 5, then \(b\) has to equal 0.

   Start by making both variables 0 and dividing by the largest factor, 7.

   \[ 56800 \div 7 = 8114. \]
   2 from 56800 is 56798, a number divisible by 2 and 7.

   Next add a multiple of 7 that turns the last number to a 0. \(6 \times 7 = 42. 56798 + 42 = 56840\), which is divisible by 2, 5, and 7.

2. c.
   Carla’s age is \(c\); Megan’s age is \(m. c = 3m; c - 8 = m - 8 + 18. \)

   Substitute 3\(m\) for \(c\) in equation 2 \(\rightarrow 3m - 8 = m + 10 \rightarrow m = 9. \)

3. e.
   We know \((x^2 - 25) = (x + 5)(x - 5). \)

   So \((x^2 - 25)/(x + 5) = x - 5. \text{ At } x = 0, f(0) = -5. \)
4. b.
Let $j$ be John’s age and $s$ be Sally’s age.

$$j + 4 = 2(s + 4).$$

$$s - 8 = 10 \Rightarrow s = 18.$$ 

So $j + 4 = 2(18 + 4) \Rightarrow j = 40.$

5. a.
If $x$ is the number of marbles initially, then $.25x$ goes to Vic, $.2x$ goes to Robbie, and $.1x$ goes to Jules.

The number left, $x$, is $(1 - .25 - .2 - .1) = .45x$.

Of that I give $6/20$ to my brother, so $6/20 \times .45x$.

I am left with $.45x(1 - (6/20)) = .315x$.

We are also told $.315x = 315 \Rightarrow x = 1000$.

6. e.
Always read the question carefully! Questions 5 and 6 are similar, but they are not the same.

Let $x$ be the original number of marbles. After Vic’s share is given $.75x$ remains. After Robbie’s share $.75x \times .80$ remains. After Jules’ share, $.75x \times .8 \times .9$ remains.

After I give my brother his share, $.75x \times .8 \times .9 \times (1 - 6/20)$ remains. The remaining number $=.378x$.

We are told $.378x = 315 \Rightarrow x = 833.33$. We need to increase this to the next highest number, 834, because we have part of a marble and to include it we need to have a whole marble.

7. e.
Replace the value of $x$ with its value and solve the equation.

$$29 = 5y + 4.$$ 

Solving:

$$29 - 4 = 5y + 4 - 4.$$ 

$$25 = 5y$$ or $$5y = 25.$$ 

$$5y/5 = 25/5.$$ 

$$y = 5.$$
8. b. 
2(8) + x > 45 means x > 29, so we need more than 29 marbles. A bag has 8 marbles, so the number of bags needed is 29/8, or 3.625. Since we need 3 bags plus part of another bag, we need 4 additional bags to give at least 45 marbles.

9. b. 
n is the number of widgets. The cost the factory incurs for making n widgets is 10000 + 50n. The amount the factory makes by selling n widgets is 550n.

At the break-even point, the cost incurred is equal to the amount of sales.

10000 + 50n = 550n → n = 20.

Inequalities, Literal Equations, Polynomials, and Binomials

1. a. 
Choice a) will always be true, while the other choices can never be true.

2. b. 
25x^2 - 40x + 32 < 22 → 25x^2 - 40x + 16 < 6 → (5x - 4)^2 < 6 → 5x - 4 < 6.

x = 2, so x has to be all numbers less than 2 for this inequality to work.

3. c. 
Rearrange equation x > 6 + 2y, so 2 > 6 + 2y. Solve for y.

2 ≥ 6 + 2y.

-4 ≥ 2y, so -2 ≤ y or y ≥ -2.

(When working with inequalities, remember to reverse the sign when dividing by a negative number.)

4. b. 
Find the slopes first. If they are not equal, then the lines intersect. The slopes are -1/2 and 3.

Next, solve by substitution or addition. From the first equation, x = 4 - 2y. Plugging this into equation 2, we get 3(4 - 2y) - y = 26 → 7y = 12 - 26 → y = -2. Plug this value into either equation to find x.

With equation 1, we get x - 4 = 4 → x = 8.

5. c. 
Add the equations to eliminate b. 2a = 6 → a = 3.

6. a. 
Square both equations.

Equation 1 becomes a + 2\sqrt{ab} + b = 4; and equation 2 becomes a - 2\sqrt{ab} + b = 9.
Add the equations.
\[2(a + b) = 13 \Rightarrow a + b = 13/2. \quad 13/2 = 6.5.\]

**Slope and Distance to Midpoint**

1. **d.**
   The standard form of the line equation is \(y = mx + b\). We need to find slope \(m\).
   \[m = (y_2 - y_1)/(x_2 - x_1) \Rightarrow m = (5 - 8)/(3 - 0) \Rightarrow m = -1.\]
   Therefore the equation is \(y = -x + 8\).

2. **a.**
   At \(x = 3\), \(((3 * 3) - 4)^2 = 4y - 15.\)
   \[(9 - 4)^2 = 4y - 15.\]
   \[25 = 4y - 15.\]
   \[40 = 4y.\]
   \[y = 10.\]

3. **d.**
   Rearrange the equation and combine like terms. \(-5y = 4x.\)
   At \(x = -10, y = 8.\) At \(x = 5, y = -4.\) The range of \(y\) is therefore \(-4 \leq y < 8\).

4. **e.**
   If Judy gets \(x\) dollars, then Jennifer gets \(3x\) in a week. In a month, Jennifer will then get \(4 \times 3x.\)
   If Judy gets \$5\) per week, then Jennifer gets \$60\) in a month.

5. **d.**
   Combine like terms.
   \[5x + 9y = 3x - 6y + 5 \Rightarrow 2x = -15y + 5 \Rightarrow x = -57.5\) when \(y = 8.\)

6. **d.**
   First we need to find the length of side \(AB.\)
   \[AB = \sqrt{(17 - 5)^2 + (8 - 3)^2} = 13.\]
   If \(AB = 13\), then \(A_{\text{square}} = 13^2 = 169.\)
   \(AB\) is also the diameter of the circle. \(A_{\text{circle}} = \pi (d^2/4) = 169 \pi /4.\)
   The area outside the circle and within the square is: \(A_{\text{square}} - A_{\text{circle}} = 169(1 - \pi /4).\)
7. b. 
The slope of the line is given as \( m = (y_2 - y_1)/(x_2 - x_1) \), where \((x_1, y_1)\) and \((x_2, y_2)\) are two points which the line passes through. 
The \( y \) intercept is the point where the graph intersects the \( y \) axis, so \( x = 0 \) at this point. 

Plug in the values of \( m \), etc.; we get \( 2 = (4 - y)/(2 - 0) \) \( \rightarrow y = 0 \).

8. e. 
While it is tempting to solve this system of simultaneous equations to find the values of \( x \) and \( y \), the first thing to do is to see whether the lines intersect. To do this, compare the slopes of the two lines by putting the lines into the standard form, \( y = mx + b \), where \( m \) is the slope.

By rearranging, equation 1 becomes \( y = 7/4 - 3x/4 \); and equation 2 becomes \( y = 21/12 - 9x/12 \).

The slope of line 1 is \(-3/4\), and the slope of line 2 is \(-9/12\), which reduces to \(-3/4\). Since the slopes are equal, the lines are parallel and do not intersect.

9. b. 
Find the slopes by rearranging the two equations into the form \( y = mx + b \).

Equation 1 becomes \( y = -3x/4 + 7/4 \) and equation 2 becomes \( y = 8x/6 - 9/6 \).

So \( m_1 = -3/4 \) and \( m_2 = 8/6 = 4/3 \). We see that \( m_1 \) is the negative inverse of \( m_2 \), so line 1 is perpendicular to line 2.

**Absolute Value Equations**

1. a. 
The constant term is -15. The factors should multiply to give -15 and add to give 2. The numbers -3 and 5 satisfy both, \((x - 3)(x + 5)\).

2. b. 
The time between 3:15 PM and 4:45 PM = 1.5 hours. \( 1.5 \times 50 = 75 \).

Reminder: half an hour is written as .5 of an hour, not .3 of an hour, even though on a clock a half hour is 30 minutes.

3. b. 
Rearrange, reduce, and factor.

\[ 2x^2 + 14x + 0 = 0. \]

\[ 2(x^2 + 7x + 0) = 0. \]

\[ (x + 7)(x + 0). \]

\[ x = 0, \text{ or } -7. \]
4. b.
Substitute \( g(x) \) for every \( x \) in \( f(x) \).

\[
f[g((x + 4))] = 2(x + 4)^2 + 3(x + 4) = 2x^2 + 16x + 32 + 3x + 12 = 2x^2 + 19x + 44.
\]

5. b.
Two solutions: \( (x + 4) = 2 \) and \( -(x + 4) = 2 \).

Or \( x + 4 = 2, x = -2 \).

And \( x + 4 = -2, x = -6 \).

6. b.
Find the value of the constant by plugging in the given information.

\[
20 = 3 \times 5 + c \Rightarrow c = 5.
\]

Now use the value of \( c \) and the new value of \( s \) to find \( p, 50 = 3p + 5 \Rightarrow p = 15 \).

7. e.
\( g(5) = 5 - 4 = 1, f[g(5)] = 2 \times 1 + 3\sqrt{1} = 5 \).

8. a.
From the domain of \( x \), the lowest value of \( x \) is -4, and the highest value is 4. We are tempted to think that \( f(x) \) will have the least value at \( x = -4 \); \( f(-4) = 4 \). However, \( f(x) \) is equal to a squared value, so the lowest value of \( f(x) \) is 0. This happens at \( x = -2 \).

Geometry

1. a.
The Pythagorean triple (special right triangle property) means the two shorter sides form a right triangle.

\[
\frac{1}{2}bh = A. \text{ So, } (1/2)(3)(4) = 6.
\]

2. e.
\[
AB^2 = AC^2 = AD^2 + CD^2 \Rightarrow AB^2 = 3^2 + 4^2 \Rightarrow AB = 5.
\]

3. a.
In a right triangle, the square of the hypotenuse = the sum of the squares of the other two sides.

\[
AB^2 + BC^2 = AC^2 \Rightarrow AC^2 = 36 + 64 \Rightarrow AC = 10.
\]

4. c.
If the area of the square is 36 cm², then each side is 6 cm. If we look at the triangle made by half the square, that diagonal would be the hypotenuse of the triangle, and its length = \( \sqrt{6^2 + 6^2} = 6\sqrt{2} \).

This hypotenuse is also the diameter of the circle, so the radius of the circle is \( 3\sqrt{2} \).
The area of the circle \( A = \pi r^2 \approx 18\pi \). The area outside the square, but within the circle is \( 18\pi - 36 \).

**Fundamental Counting Principle, Permutations, Combinations**

1. c.
The number of ways \( = 4 \times 3 \times 5 \times 2 \times 3 = 360 \).

2. b.
Multiply the possible number of choices for each item from which you can choose.

\[ 2 \times 3 \times 2 \times 2 = 24. \]

3. c.
This is a combination problem. The order of the candidates does not matter.

The number of combinations \( = \frac{5!}{3!(5 - 3)!} = \frac{5 \times 4 \times 3}{2 \times 1} = 10 \).

4. e.
This is a permutation problem. The order in which the tiles are arranged is counted.

The number of patterns \( = \frac{5!}{(5 - 3)!} = 5 \times 4 \times 3 = 60 \).

5. e.
This is a permutation problem. The order in which the chores are completed matters.

\[ ^5P_5 = \frac{5!}{(5 - 5)!} = 5! = 5 \times 4 \times 3 \times 2 \times 1 = 120. \]

**Ratios, Proportions, Rate of Change**

1. b.
The ratio of boys to girls is 150:100, or 3:2.

2. b.
A full tank has 16 gallons \( \rightarrow 3/4 \) of the tank = 12 gallons. The car can travel 30 miles on 4 gallons, so 12 gallons would take the car \( 12 \times \frac{30}{4} = 90 \) miles.

3. c.
Average Rate of Change = the change in value/change in time = (total profit -- initial profit)/change in time. Initial profit = 0; change in time = 7 years.

Increase \( = 5000 \times 5 = 25000 \); decrease = 2000 \( \times 2 = 4000 \); total profit = 25000 - 4000 = 21000.

\( 21000 - 0)/7 \text{ years} = \$3000/\text{year} \).

4. e.
Total number of marbles = 250.
#red marbles = 250 * 40/100 = 250 * .4 = 100.
#blue marbles = 250 * .3 = 75.
#green marbles = 250 * .1 = 25.
#black marbles = 250 * .2 = 50.

5. c.
The probability of selecting a boy from the entire group = 30:80.
The probability of selecting a girl from the remaining group = 50:79.
The probability of selecting a boy and a girl is (30:80) * (50:79) = 1500:6320.

**Reading Comprehension**

1. a.
2. b.
3. a.
4. a.
5. d.
6. d.
7. b.
8. c.
9. c.
10. d.
11. d.
12. a.
13. a.
14. c.
15. c.
16. a.
17. c.
18. a.
19. a.
20. b.
21. b.
22. b.
23. a.
24. a.
25. c.
26. a.
27. b.
28. b.
29. b.
30. a.
31. b.
32. d.
33. a.
34. d.
35. a.
36. b.
37. d.
38. d.
39. a.
40. b.

Writing

1. a.
2. d.
3. c.
4. c.
5. d.
6. d.
7. b.
8. d.
9. d.
10. c.
11. b.
12. a.
13. a.
14. a.
15. d.
16. b.
17. c.
18. a.
19. a.
20. c.
21. b.
22. b.
23. a.
24. a.
25. b.
26. d.
27. b.
28. b.
29. c.
30. c.
31. b.
32. a.
33. c.
34. d.
35. d.

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41. **Score of 5+**

General George Patton was speaking of war when he noted that “no good decision was ever made in a swivel chair;” however, that observation applies to situations beyond battle. While a big-picture perspective is useful in analyzing situations and deciding how to act, an on-the-ground outlook is essential. In matters of politics, and technology, to name two, the best-laid plans usually have to be changed to respond to changing circumstances.

One example which illustrates the necessity of on-the-ground action is the famous space flight of Apollo 13. Before launch, all plans were worked out to get the manned mission to the moon and back. However, due to a fluke set of circumstances – an oxygen tank explosion and the resulting technical problems – the plans had to change. The successful return of Apollo 13 and the survival of its crew would not have been possible without the quick thinking of the men on board. They first noticed the incident, well before the technical crew in Houston would have detected it from Earth. While the work of the technical crew was of course key as well, without the astronauts on board the ship to implement an emergency plan, the mission would surely have been lost.

Just as there are often unforeseen circumstances when implementing technology, politics can also be unpredictable. For example, the Cuban Missile Crisis in 1962 required immediate, on-the-ground decision making by the leaders of the United States. Prior to the Cold War standoff, President Kennedy and his advisors had already decided their hardline position against Soviet weapons expansion in the Western hemisphere. The Monroe Doctrine, status quo since the 1920s, held that European countries should not practice their influence in the Americas. The Soviet Union tested this line by establishing intermediate-range missiles on the island of Cuba. President Kennedy could not simply hold to the established wisdom, because the true limits had never been tested. Instead, to stave off the threat of attack, he was forced to act immediately as events unfolded to preserve the safety of American lives. The crisis unfolded minute-by-minute, with formerly confident advisors unsure of the smartest step. Eventually, after thirteen tense days, the leaders were able to reach a peaceful conclusion.

What these events of the 1960s illustrate is that the best laid plans are often rendered useless by an unfolding situation. For crises to be resolved, whether they be in war, technology, or politics; leaders must have level heads in the moment with up-to-date information. Therefore, plans established in advance by those in swivel chairs with level heads are not always the best plans to follow. History has shown us that we must be able to think on our feet as unforeseen situations unfold.

**Score of 3-4:**

It is often necessary to be directly on the ground as a situation unfolds to know what is best to do. This is because situations can be unpredictable and what you previously thought was the best course of action, is not always so. This can be seen in the unfolding events of the 1962 Cuban Missile Crisis.
The Cuban Missile Crisis happened in 1962, during the presidency of John F. Kennedy, when Nikita Khrushchev, president of the Soviet Union, developed an intermediate-range missile base on the island of Cuba, within range of the United States. Since the Monroe Doctrine in the 1920s, the United States leaders have declared that they would not tolerate this kind of aggression. However, the decisions that had been made by leaders in the past, removed from the situation, were no longer relevant. It was necessary for President Kennedy to make decisions as events unfolded.

As the Cuban Missile Crisis shows us, at turning points in history decisions have to be made as events unfold by those who are in the middle of a situation. Otherwise, we would all be acting according to what those in the past and those removed from the challenge thought was best. Following the Monroe Doctrine could have resulted in unnecessary violence.

**Score of 2 or Less:**

It is necessary to make decisions while in the middle of a situation, not above the situation, because there is always information that is only known to people in the middle of the situation. For example, in a war, the strategists in Washington might have an overall aim in the war, but they would be unable to know what it best to do on the ground. Situations like running out of ammunition or the enemy having an unexpected backup could change the decisions that need to be made. This was especially true before cell phones and other digital technologies made communication easier.