



# SAT

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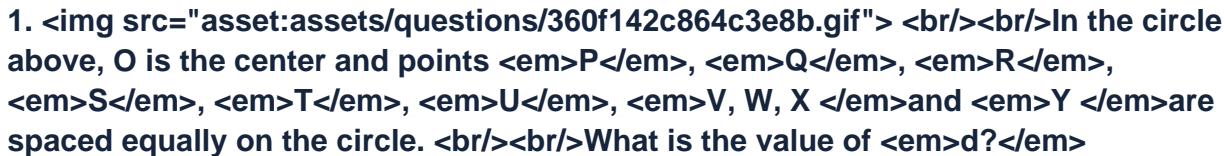
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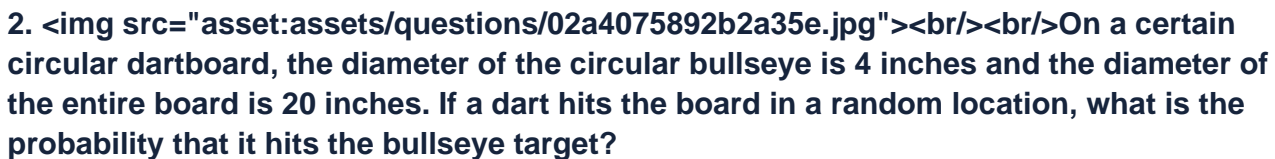
## Practice Questions

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1.  In the circle above, O is the center and points P, Q, R, S, T, U, V, W, X and Y are spaced equally on the circle. What is the value of  $d$ ?

- A. 108
- B. 90
- C. 120
- D. 144

2.  On a certain circular dartboard, the diameter of the circular bullseye is 4 inches and the diameter of the entire board is 20 inches. If a dart hits the board in a random location, what is the probability that it hits the bullseye target?

- A.  $\frac{1}{10}$
- B.  $\frac{1}{5}$
- C.  $\frac{1}{20}$
- D.  $\frac{1}{25}$

3. Choose the answer that best simplifies the following expression:

- A.  $r^2 + 2r + 3$
- B.  $r^2 + 2r - 3$
- C.  $r^2 - 2r - 3$
- D.  $r^2 - 2r + 3$

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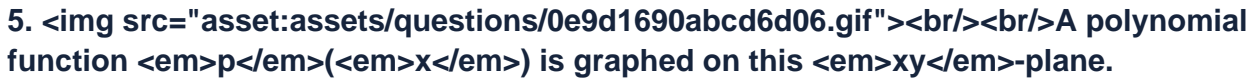
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4. If  $f(x) = \sqrt{x^2 - 2x + 1}$ , what is  $f(9)$ ?

- A. 8
- B. 5
- C. 9
- D. -6

5.   
A polynomial function  $p(x)$  is graphed on this  $xy$ -plane.  
Which binomial is a factor of  $p(x)$ ?

- A.  $x - 1$
- B.  $x - 2$
- C.  $x + 1$
- D.  $x + 2$

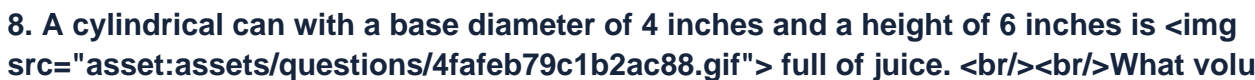
6. Eddie is 7 years older than Brian. If Brian is  $x$  years old, then how old was Eddie 11 years ago?

- A.  $x + 18$
- B.  $7x - 11$
- C.  $x - 18$
- D.  $x - 7$

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7.  $\left| 2x + 1 \right| > 5x - 4$   
Which of the following represents the complete solution set for the inequality above?

- A.  $\frac{3}{7} < x < \frac{5}{3}$
- B.  $3 < x < 7$
- C.  $x < \frac{5}{3}$
- D.  $\frac{5}{3} < x < 7$

8. A cylindrical can with a base diameter of 4 inches and a height of 6 inches is   
full of juice. What volume of juice is in the can in cubic inches?

- A.  $12\pi$
- B.  $36\pi$
- C.  $64\pi$
- D.  $16\pi$



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9. Which expression is equivalent to  $(2x - 3)(3x + 2)$ ?

- A.  $6x^2 - 5x - 6$
- B.  $6(x^2 - 1)$
- C.  $6(x - 1)$
- D.  $6x^2 - 9x - 6$

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10. In an examination of 4 subjects, John gets 100, 60 and 55 in three subjects. If his average (arithmetic mean) marks for all four subjects is 75, then the marks in the 4th subject must be

- A. 85
- B. 93
- C. 91
- D. 82

11. Which equation represents a translation of the function  $y = f(x)$  4 units to the right?

- A.  $y = f(x - 4)$
- B.  $y = f(x) + 4$
- C.  $y = f(x) - 4$
- D.  $y = f(x + 4)$

12. A trophy shop has been commissioned to create spherical trophies for a soccer tournament. Each spherical soccer trophy has a radius of 1 inch, while an actual regulation soccer ball has a radius of 4 inches. Which of the following expresses the ratio of the volume of the spherical trophy to the volume of the actual soccer ball?

- A. 1:64
- B. 4:1
- C. 1:4
- D. 64:1

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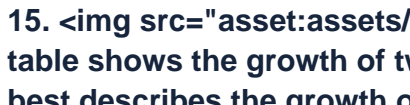


13. In the figure below,  $AD \parallel BC$ .  $m\angle AC = 13$ .  $m\angle BC = 5$ . If  $m\angle BD = 15$ , what is  $m\angle AD$ ?

- A. 12
- B. 8
- C. 11
- D. 9

14. Starting from her home, Mirinda rides her bike in a straight line due south for  $24$  kilometers, then turns and rides in a straight line due west for  $7$  kilometers, at which point she stops. Assuming that she can ride in any direction with no barriers, what is the distance of her shortest route back home?

- A. 25 kilometers
- B. 22 kilometers
- C. 20 kilometers
- D. 28 kilometers

15.  The above table shows the growth of two plants in cm. Which of the following statements best describes the growth of these two plants?

- A. Plant A shows exponential growth while Plant B is linear.
- B. Both Plant A and B show exponential growth
- C. Both Plant A and B show linear growth
- D. Plant A shows linear growth while Plant B is exponential.

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16. The writer is considering deleting the underlined sentence. Should the writer do this?

- A. Yes, because this information interrupts the flow of the paragraph.
- B. Yes, because it should be placed earlier in the paragraph.
- C. No, because this is useful and relevant contextual information.
- D. No, because it explains why family units are relatively small.



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17. Choose the answer which best rewords the italicized portion. If you think the original wording is best, choose option A.  
After agreeing to another *ceasefire*; they returned *to their former claimed areas*.

- A. Ceasefire they returned
- B. Ceasefire; they returned
- C. Ceasefire, they returned
- D. Ceasefire: they returned



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18. Haiti  
[1] Although my friends and family were skeptical of whether I would be safe, I boarded the plane in New York boldly and flew to Haiti. My college roommate had agreed to take medical supplies to a rural clinic where his brother was a physician, and I agreed to go and help.  
[2] When me and my roommate landed at the airport in the capital Port au Prince, the chaos inside the airport was frightening. Dozens of men approached us while gesturing to our luggage, and yelling at us in Creole. They wanted us to select their taxis. I was thrilled when my roommate smiled at someone who called our names through the crowd.  
[3] Papi, our designated transporter, was a Haitian man in his early twenties who works for the physician. He warmly welcomed us to his country, and seemed to have a great sense of humor.  
[4] He laughed nonstop during our ride through the capital city. Once we were on the open highway, Papi taught us basic Creole greetings to pass the time during our excessively long four-hour commute.  
[5] The mountainous town where we would spend the week was beautiful, and I immediately fell in love with the place and its people. The views rocked!  
[6] Even though I could not fluently speak Creole, I made the most of my time with the land and its inhabitants. Several daily tasks kept me busy that week. The medical clinic was a modest two-room building, and their staff needed help reorganizing the supply pantry. I removed, counted, sorted, and restocked supplies, before adding the additional resources we brought from the United States. After I cleaned and organized the supply pantry, I assisted a visiting nutritionist with distributing vitamins to the locals.  
[7] Each evening, two dozen young children would sit on the porch where my roommate and I stayed. They laughed constantly, they always found joy in the simplest of things. They did teach us to count in Creole and read children's stories to us in French. They invited us to kick balls with them and chase yard chickens. Even though they did not have many toys, the children entertained one another with conversation, laughter and storytelling.  
[8] When it was time to leave Haiti and return to New York, I was sad to say goodbye. Although my roommate and I delivered medical supplies to their community, the people gave us memories that will last the rest of our lives.

- A. NO CHANGE
- B. Ones
- C. Its
- D. It's

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19. Choose the answer which best rewords the italicized portion. If you think the original wording is best, choose option A.  
*It was discovered in 1803 by William Hyde Wollaston.*

- A. It was discovered, in 1803, by William Hyde Wollaston.
- B. William Hyde Wollaston discovered in 1803 it.
- C. William Hyde Wollaston discovered it in 1803.
- D. It was discovered in 1803 by William Hyde Wollaston.

20. Abraham Lincoln's Emancipation Proclamation.

- A. made slavery illegal
- B. freed slaves in all US territories
- C. caused soldiers to leave the army
- D. freed all slaves in the United States

21. What was the importance of Sherman's March to the Sea?

- A. It heavily damaged Northern industry during the Civil War.
- B. It severely weakened the South towards the end of the Civil War.
- C. It helped the Union gain control of the Mississippi during the Civil War.
- D. It reduced the ability of the British to utilize naval warfare in the Revolutionary War.

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22. Which choice best fits with the style and tone of the passage?

- A. NO CHANGE
- B. by refusing the role of wife or mother
- C. by postponing choosing to be a wife or mother
- D. by never being a wife or mother



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23. Comparing and Contrasting the Political and Social Features of China and Europe  
Medieval China and Europe were both impressive entities that provide elaborate model of the recovery process. Both of these civilizations had experienced expansive disparities from the plague, while only China suffered at the hands of the Mongols. Nonetheless, the fifteenth century was a time of reconstruction for both medieval China and Europe. These civilizations were parallel in their relentless efforts to recapture the spotlight; such efforts created two expansive domains that shared some political and social features, yet remained distinctly different in other areas.  
China definite has the upper hand over Europe. While Europe remained a compilation of many separate states that were highly competitive and territorial, China was united with a centralized government that emphasized the civil service exam. At the head of this government was none other than Emperor Yongle. This notable leader was able to create oversee two astounding constructions that remain well known today.  
Under the leadership of Emperor Yongle, the Forbidden City and the Temple of Heaven were created. Both of these led to the direct influence of Confucian philosophy. Other views of great influence throughout China during this time were Daoism and Buddhism. Meanwhile, in Europe, religious principles were centered on Christianity and the Renaissance.  
One notable similarity that was a main characteristic of both medieval China and Europe was the use of maritime expeditions. The Chinese did not desire to use their sea travel to try to overtake other areas, but instead, simply to trade. The Chinese believed immensely in their dominance; for them, anyone that desired to be a part of their political and religious entities were welcomed to come to them. It was not their intention to make converting others part of their naval operation.  
Comparatively, Europe was also engaged in vast sea trade. This was not solely about trading ideas though. Europeans wanted wealth. The Euro is a monetary system that is used throughout the European Union. Seeking items such as gold, spices, and silk, those that partook in these sea expeditions also desired to spread their culture, as well as their faith. These people, as a whole, still lacked unity, but as separate as they were, the common prize was profits and influence. Even with their desire for dominance, the overall size of the European fleet failed in comparison to the Chinese's plethora of ships and seamen.  
In continuing to compare Europe and the China, it must be noted that many European states adopted German principles. This included taxing citizens. The funds from this taxation allowed for the funding of armies and the design of organizational structures. Ultimately, Europe was successful in encapsulating a large quantity of the world's people under its dominance; comparatively, with the absence of Emperor Yongle, the Chinese abruptly ceased their maritime expeditions.  
Both of these expansive civilizations experienced increasing populations and the problem of inadequate land to accommodate growing populations. The presence of the "middle kingdom" or China became focused inland on rice crops. Europe continued to obtain foreign possessions. Europe also continued



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growing wheat and livestock. While obvious in their differences, the focus on agriculture did create similarities.<br/><br/>In conclusion, China and Europe were impressive civilizations. While diverse in their approach and design, both were able to overcome tragedy and transcend history. By surpassing such obstacles, both were culturally influential. Their presence in globally impacting the world remains unquestionable even seven centuries later.<br/><br/>Which of the following sentences could be added to the fourth paragraph?

- A. China remains a front runner in the development of technology still today.
- B. China refused to participate in sea trade, even with the emperor's request and demands for these maritime expeditions to occur.
- C. China was the best governed and most prosperous of any of the world's major civilizations.
- D. China and Europe are close enough together today that people living in these locations could trade with each other.



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24. Haiti  
Although my friends and family were skeptical of whether I would be safe, I boarded the plane in New York boldly and flew to Haiti. My college roommate had agreed to take medical supplies to a rural clinic where his brother was a physician, and I agreed to go and help.  
When me and my roommate landed at the airport in the capital Port au Prince, the chaos inside the airport was frightening. Dozens of men approached us while gesturing to our luggage, and yelling at us in Creole. They wanted us to select their taxis. I was thrilled when my roommate smiled at someone who called our names through the crowd.  
Papi, our designated transporter, was a Haitian man in his early twenties who works for the physician. He warmly welcomed us to his country, and seemed to have a great sense of humor. He laughed nonstop during our ride through the capital city. Once we were on the open highway, Papi taught us basic Creole greetings to pass the time during our excessively long four-hour commute.  
The mountainous town where we would spend the week was beautiful, and I immediately fell in love with the place and its people. The views rocked! Even though I could not fluently speak Creole, I made the most of my time with the land and its inhabitants. Several daily tasks kept me busy that week. The medical clinic was a modest two-room building, and their staff needed help reorganizing the supply pantry. I removed, counted, sorted, and restocked supplies, before adding the additional resources we brought from the United States. After I cleaned and organized the supply pantry, I assisted a visiting nutritionist with distributing vitamins to the locals.  
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When it was time to leave Haiti and return to New York, I was sad to say goodbye. Although my roommate and I delivered medical supplies to their community, the people gave us memories that will last the rest of our lives.

- A. Pass the time during our excessive four-hour commute
- B. Pass the time during our excessively long commute
- C. NO CHANGE
- D. Pass the time during our commute

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**25. To improve the flow of this paragraph, sentence 4 should be placed**

- A. before sentence 1.
- B. after sentence 6.
- C. after sentence 5.
- D. where it is now.

**26. Select one of the following:**

- A. they're
- B. there
- C. they are
- D. NO CHANGE



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27. Adapted from "Why a Classic is a Classic" in *Literary Taste: How to Form It* by Arnold Bennet (1909)  
The large majority of our fellow-citizens care as much about literature as they care about airplanes or the policies of the Legislature. They do not ignore it; they are not quite indifferent to it. But their interest in it is faint and perfunctory; or, if their interest happens to be violent, it is spasmodic. Ask the two hundred thousand persons whose enthusiasm made the vogue of a popular novel ten years ago what they think of that novel now, and you will gather that they have utterly forgotten it, and that they would no more dream of reading it again than of reading Bishop Stubbs's *Select Charters*. Probably if they did read it again they would not enjoy it—not because the said novel is worse now than it was ten years ago; not because their taste has improved—but because they have not had sufficient practice to be able to rely on their taste as a means of permanent pleasure. They simply don't know from one day to the next what will please them.  
In the face of this one may ask: Why does the great and universal fame of classical authors continue? The answer is that the fame of classical authors is entirely independent of the majority. Do you suppose that if the fame of Shakespeare depended on the man in the street it would survive a fortnight? The fame of classical authors is originally made, and it is maintained, by a passionate few. Even when a first-class author has enjoyed immense success during his lifetime, the majority have never appreciated him as sincerely as they have appreciated second-rate men. He has always been reinforced by the ardor of the passionate few. And in the case of an author who has emerged into glory after his death the happy sequel has been due solely to the obstinate perseverance of the few. They could not leave him alone; they would not. They kept on savoring him, and talking about him, and buying him, and they generally behaved with such eager zeal, and they were so authoritative and sure of themselves, that at last the majority grew accustomed to the sound of his name and placidly agreed to the proposition that he was a genius; the majority really did not care very much either way.  
And it is by the passionate few that the renown of genius is kept alive from one generation to another. These few are always at work. They are always rediscovering genius. Their curiosity and enthusiasm are exhaustless, so that there is little chance of genius being ignored. And, moreover, they are always working either for or against the verdicts of the majority. The majority can make a reputation, but it is too careless to maintain it. If, by accident, the passionate few agree with the majority in a particular instance, they will frequently remind the majority that such and such a reputation has been made, and the majority will idly concur: "Ah, yes. By the way, we must not forget that such and such a reputation exists." Without that persistent memory-jogging the reputation would quickly fall into the oblivion which is death. The passionate few only have their way by reason of the fact that they are genuinely interested in literature, that literature matters to them. They conquer by their obstinacy alone, by their eternal repetition of the same statements. Do you suppose they could prove to the man in the street that Shakespeare was a great



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artist? The said man would not even understand the terms they employed. But when he is told ten thousand times, and generation after generation, that Shakespeare was a great artist, the said man believes--not by reason, but by faith. And he too repeats that Shakespeare was a great artist, and he buys the complete works of Shakespeare and puts them on his shelves, and he goes to see the marvelous stage-effects which accompany *King Lear* or *Hamlet*, and comes back religiously convinced that Shakespeare was a great artist. All because the passionate few could not keep their admiration of Shakespeare to themselves. This is not cynicism; but truth. And it is important that those who wish to form their literary taste should grasp it.

When the author states that the minority conquers by “obstinacy alone” (line 31), to what attribute is he crediting the minority?

- A. thoughtfulness
- B. courage
- C. stubbornness
- D. deception

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28. Choose the word or set of words that best completes the following sentence.  
The elderly woman’s \_\_\_\_\_ tone about modern dating habits made the young men hesitant to tell her about their personal lives.

- A. approving
- B. curious
- C. inquisitive
- D. censorious



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29. Adapted from “The Rise of Pancho Villa” in *Insurgent Mexico* by John Reed (1913)  
The roar began at the back of the crowd and swept like fire in heavy growing crescendo until it seemed to toss thousands of hats above their heads. The band in the courtyard struck up the Mexican national air, and Villa came walking down the street.  
He was dressed in an old plain khaki uniform, with several buttons lacking. He hadn't recently shaved, wore no hat, and his hair had not been brushed. He walked a little pigeon-toed, humped over, with his hands in his trousers pockets. As he entered the aisle between the rigid lines of soldiers he seemed slightly embarrassed, and grinned and nodded to a friend here and there in the ranks. At the foot of the grand staircase, Governor Chao and Secretary of State Terrazzas joined him in full-dress uniform. The band threw off all restraint, and, as Villa entered the audience chamber, at a signal from someone in the balcony of the palace, the great throng in the *Plaza de Armas* uncovered, and all the brilliant crowd of officers in the room saluted stiffly. It was Napoleonic!  
Villa hesitated for a minute, pulling his mustache and looking very uncomfortable, finally gravitated toward the throne, which he tested by shaking the arms, and then sat down, with the Governor on his right and the Secretary of State on his left.  
Señor Bauche Alcalde stepped forward and pronounced a short discourse, indicting Villa for personal bravery on the field on six counts, which he mentioned in florid detail. He was followed by the Chief of Artillery, who said: "The army adores you. We will follow you wherever you lead. You can be what you desire in Mexico." Then three other officers spoke in the high-flung, extravagant periods necessary to Mexican oratory. They called him "The Friend of the Poor," "The Invincible General," "The Inspirer of Courage and Patriotism," "The Hope of the Indian Republic." And through it all Villa slouched on the throne, his mouth hanging open, his little shrewd eyes playing around the room. Once or twice he yawned, but for the most part he seemed to be speculating, with some intense interior amusement, like a small boy in church, what it was all about. He knew, of course, that it was the proper thing, and perhaps felt a slight vanity that all this conventional ceremonial was addressed to him. But it bored him just the same.  
Finally, with an impressive gesture, Colonel Servin stepped forward with the small pasteboard box which held the medal. General Chao nudged Villa, who stood up. The officers applauded violently; the crowd outside cheered; the band in the court burst into a triumphant march.  
Villa put out both hands eagerly, like a child for a new toy. He could hardly wait to open the box and see what was inside. An expectant hush fell upon everyone, even the crowd in the square. Villa looked at the medal, scratching his head, and, in a reverent silence, said clearly: "This is a hell of a little thing to give a man for all that heroism you are talking about!" And the bubble of Empire was pricked then and there with a great shout of laughter.  
The passage as a whole suggests that Pancho Vila was \_\_\_\_\_ by the Mexican people.

A. disgusted



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- B. impressed
- C. intrigued
- D. beloved

30. "The Place of Lesion Studies in Neuroscience" by Samantha Winter

(2013)  
It's easy to forget that the study of neuroscience originated from non-normalized, non-statistically appraised methods like lesion studies. It's equally easy, with the advent of sophisticated technology, to render such a method obsolete. A small group of neuroscientists today make a case for the reinstatement of lesion studies—the study of abnormal brains with damaged regions in order to better understand the brain—into the twenty-first-century cognitive neuroscience realm. Their suggestion is bold, but their argument is justified.  
Cognitive neuroscientists advocate for the use of convergent methods. Many of them argue that with the limitations of our existing techniques, convergent evidence is imperative for sound research. If this is the case, why ignore a method that has potential for implying causality in a domain dominated by correlational research? Rather than advocating for a single method, neuroscientists should take their own advice and use convergent techniques. Sound research should combine a variety of techniques to examine both causal relationships and overcome the individual shortcomings of each method through the use of many.  
Lesion studies are also significantly more beneficial now than they were in earlier times. Neuroimaging methods have enhanced our understanding of what contributes to the brain problems most often encountered, and more refined experiments have been developed to confirm the findings from the more unreliable lesion studies. This transformation allows lesion studies to be included alongside the other systems as a mechanism for understanding the human brain.  
In the last sentence of the first paragraph, "bold" most closely means \_\_\_\_\_.

- A. emphasized
- B. impertinent
- C. cunning
- D. extruding



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## Answer Key & Explanations

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### 1. D — 144

You can eliminate choice A as a Clunker right away. 90 degrees would represent a perfect quarter of the circle. The angle labeled  $d^\circ$  is between 90 and 180 degrees. (Remember, on geometry diagrams where you are not specifically told that the figure is not drawn to scale, you can assume that it is. When a figure is drawn to scale, you can make judgments about its measurements based upon the way things look.) Since a circle contains 360 degrees, the regions between each of the ten equally spaced points each contain  $36^\circ$ :  $360^\circ \div 10 = 36^\circ$ . Since the angle labeled  $d^\circ$  is composed of four of these regions, it measures  $144^\circ$ :  $36^\circ \times 4 = 144^\circ$ .

### 2. D — $\frac{1}{25}$

While this problem asks about probability, it's essentially an area of a circle problem. The probability of hitting the bullseye is just the area of the bullseye divided by the area of the dartboard in total.  
  
Since  $\text{Area} = \pi r^2$  your job becomes to find the radius of each circle. You're quoted the diameters, so to find the radius just divide the diameter by 2.  
  
Bullseye: Diameter = 4 so Radius = 2. Area =  $\pi (2^2) = 4\pi$   
  
Dartboard: Diameter = 20 so Radius = 10. Area =  $\pi (10^2) = 100\pi$   
  
So the probability of hitting the bullseye is  $\frac{4\pi}{100\pi}$  which reduces to  $\frac{1}{25}$ .

### 3. D — $r^2 - 2r + 3$

To simplify, remove parentheses and combine like terms, remembering the ever-important step of applying the negative sign to each term within the second set of parentheses:  
  
 $5r^2 + 3r - 5 - 4r^2 - 5r + 8$   
  
 $5r^2 - 4r^2 + 3r - 5r - 5 + 8$   
  
 $r^2 - 2r + 3$

### 4. A — 8

Function questions tend to derive most of their difficulty from the abstract function notation itself. So being comfortable with approaching function notation is most of the battle. When you see function notation such as  $f(x)$ , keep in mind that  $x$  is the "input" (whatever they tell you  $x$  is, put that into the equation), and that  $f(x)$  is the "output" (once you've put your input through the equation, the result is the value of  $f(x)$ ).  
  
So when you're given  $f(x) = \sqrt{x^2 - 2x + 1}$ , what the problem is really saying is that "whatever we put in the parentheses of  $f()$ , plug that value in wherever you see an  $x$  in  $f(x) = \sqrt{x^2 - 2x + 1}$ .  
  
Which means you'll take the input value, square it, subtract the product of the input value and two, add one to that, and then take the square root of the whole thing. With 9, that looks like:  
  
 $f(9) = \sqrt{9^2 - 2(9) + 1}$   
  
You can then simplify the math underneath the radical to get:  
  
 $\sqrt{81 - 18 + 1} = \sqrt{64}$   
  
And since you know that  $\sqrt{64} = 8$  you have your answer.

### 5. D — $x + 2$

The curve representing  $p(x)$  crosses the  $x$ -axis at  $x = -2$ , so  $x - (-2) = x + 2$  must be a factor of  $p(x)$ .



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**6. A —  $x + 18$** 

We can model this by getting Eddie's age now and then figuring out how old he was 11 years ago. Right now, he is  $x+7$ . Eleven years ago, Eddie was  $x + 7 - 11 = x - 4$  years old. This is answer B.  
 a. The correct calculation should be  $x+7$  (to get Eddie's age now) - 11, which is  $x - 4$ .  
 b. Correct.  
 c. This is an incorrect calculation of Eddie's present age.  
 d. This response does not relate their ages properly.  
 e. This also does not express their age relationship properly.

**7. C —  $x < \frac{5}{3}$** 

Whenever you're dealing with absolute values and inequalities, you need to consider two possibilities. In case one, the expression within the absolute value directly satisfies the inequality. In case two, the expression within the absolute value will satisfy the opposite, taken by flipping the inequality sign and negating the entire other side of the inequality (think "a is greater than 1 or less than negative-one" --> case two is that "less than negative..." case). Let's examine both here.  
 Case 1  
 $2x+1 > 5x-4$   
 Here you can subtract  $2x$  from both sides and add  $4$  to both sides to isolate the variable:  
 $5 > 3x$   
 Then divide both sides by  $3$  and you have:  
 $x < \frac{5}{3}$   
 It's a good idea to try a number that just barely satisfies your new inequality to ensure that it fits with the given inequality. If you try  $x=1$  here, you'll see that you have a fit:  $|2(1)+1| > |5(1)-4|$  simplifies to  $3 > 1$ , proving that you have a fit.  
 Case 2  
 $2x+1 < -5x+4$  (notice that the sign is flipped, and all terms on the right are negated)  
 Here you can add  $5x$  to both sides and subtract  $1$  from both sides to get:  
 $7x < 3$   
 So  $x < \frac{3}{7}$   
 Notice here that this does not add new information. Any number less than  $\frac{3}{7}$  is already less than  $\frac{5}{3}$  and you've already tried a number between them (1) to ensure that it works. So the full solution set here is just any number less than  $\frac{5}{3}$ , making the correct answer  $x < \frac{5}{3}$ .

**8. D —  $16\pi$** 

The area of a circle is  $A = \pi r^2$ .  
 Since the diameter is 4 inches, then the radius is 2 inches, and the area of the can's base is  $A = \pi(2)^2 = 4\pi$ .  
 The volume of the can is  $V = h \times A$ . Since the can is only  full, the volume of the juice is 

**9. A —  $6x^2 - 5x - 6$** 

Use FOIL to multiply: 

**10. A — 85**

The average marks for all four subjects is 75 and so total marks are  $4 \times 75 = 300$ .  
 The marks for three subjects are given and their total is  $100 + 60 + 55 = 215$ . Hence the marks for the fourth subject =  $300 - 215 = 85$ .  
**Key takeaway:** GMAT always refers to an average as average (arithmetic mean)  
 The average ( arithmetic mean ) of a set of numbers is their sum divided by the number of numbers in the set.  
 For average problems, think Total divided by number of items.

**11. A —  $f(x-4)$** 

Horizontal translations are caused by addition or subtraction done inside of the function notation. Since this is



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a subtraction, the translation is to the right.


### 12. A — 1:64

When looking to find the relationship between the volumes of the two spherical figures in the question stem, we'll want to keep in mind the formula for the volume of a sphere:  $\frac{4}{3}\pi r^3$ . So, if we plug each radius into this formula, we'll arrive at:  $\frac{4}{3}\pi (1)^3 = \frac{4}{3}\pi$  and  $\frac{4}{3}\pi (4)^3 = \frac{4}{3}\pi(64)$ . Thus, the ratio between the two volumes is  $\frac{\frac{4}{3}\pi}{\frac{4}{3}\pi(64)}$ . Since the  $\frac{4}{3}\pi$  component cancels in both the numerator and the denominator, the ratio of the volumes is **1:64**. Be sure to arrange the ratio in the order asked for in the question stem! Additionally, you'll want to keep in mind that when a change in scale is applied to multiple dimensions, the scale changes exponentially! We can actually save some time on questions like this if we recognize this relationship. For instance, here, the "scale factor," or change in scale from the smaller radius to the larger radius is 4, but since the relationship we're looking for compares volume to volume, we need to account for the fact that the scale factor has been taken to the third power for the three dimensional measurement at hand. Thus, the ratio of the volumes will be 1 to  $4^3$ , or 1 to 64.

### 13. D — 9

Correct answer: B. To find AD, we first need to know AB. Since AB belongs to both triangles, we'll use what we know about triangle ABC to find AB, using the Pythagorean Theorem. AB is a short side, so we'll call it a. The Pythagorean Theorem is  $a^2 + b^2 = c^2$  (a and b are the shorter sides, c is the hypotenuse) Plugging in gives  $a^2 + 5^2 = 13^2$ . Squaring gives  $a^2 + 25 = 169$ . Subtracting 25 on each side gives  $a^2 = 144$ . Taking the square roots gives  $a=12$ . This means AB = 12. To find AD, we'll use the Pythagorean Theorem again, with a representing AD this time. Plugging in gives  $a^2 + 12^2 = 15^2$ . Squaring gives  $a^2 + 144 = 225$ . Subtracting 144 from each side gives  $a^2 = 81$ . Taking the square root gives  $a = 9$ , which is length of AD.

### 14. A — 25 kilometers

This problem forces you to visualize a right triangle from the information provided in the story. When Mirinda makes a turn from heading directly south to heading directly west, that is a 90-degree right angle. And the shortest distance to get from her endpoint ( 24 km south and 7 km west) back home is a diagonal line that connects the triangle:  So that shortest distance home is the hypotenuse of a right triangle with shorter sides 7 and 24. To solve, you can use the Pythagorean Theorem:  $a^2 + b^2 = c^2$ , where a and b are lengths of the shorter sides and c is the length of the hypotenuse. This then means that:  $7^2 + 24^2 = c^2$ . This simplifies to:  $49 + 576 = c^2$ . So  $c^2 = 625$  and  $c = 25$ . Note that 7:24:25 is a relatively-common Pythagorean triplet and is one you should consider memorizing. You should absolutely memorize 3:4:5 and 5:12:13 as side ratios, with 7:24:25 and 8:15:17 as much lower priority (as they are tested much less frequently, and you can always use Pythagorean Theorem if you do not know them offhand).



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**15. A — Plant A shows exponential growth while Plant B is linear.**

Each hour doubles the height of Plant A. Doubling is a characteristic of exponential growth  $\langle \text{tex} \rangle \displaystyle (2t) \langle / \text{tex} \rangle$ . Each hour adds  $\langle \text{tex} \rangle \displaystyle 5 \langle / \text{tex} \rangle$  cm to the height of Plant B. Additive and subtractive trends are characteristic of linear growth  $\langle \text{tex} \rangle \displaystyle (5t) \langle / \text{tex} \rangle$ .

**16. C — No, because this is useful and relevant contextual information.**

The writer should not delete the underlined sentence. This information supports the main idea of the paragraph, and the sentence appears in the correct place in the logical organization of the paragraph.  
Choice B is incorrect because this sentence does not explain the previous sentence; rather, it adds a detail that is further explained in the next sentence.  
Choice C is incorrect because moving the sentence would interrupt the organizational flow of the paragraph.  
Choice D is incorrect because this information does not interrupt the flow of ideas in the paragraph.

**17. C — Ceasefire, they returned**

A semicolon can join to independent clauses - clauses that can stand alone as sentences. "After agreeing to another ceasefire" is an introductory phrase; therefore, the comma is necessary to separate it from the independent clause.

**18. C — Its**

The mountainous town where we would spend the week was beautiful, and I immediately fell in love with the place and its people. The views rocked! Even though I could not fluently speak Creole, I made the most of my time with the land and its inhabitants. Several daily tasks kept me busy that week. The medical clinic was a modest two-room building, and their staff needed help reorganizing the supply pantry. I removed, counted, sorted, and restocked supplies, before adding the additional resources we brought from the United States. After I cleaned and organized the supply pantry, I assisted a visiting nutritionist with distributing vitamins to the locals. A. NO CHANGE  
B. it's  
C. its  
D. ones  
The correct answer is C because of case and number and personal pronouns. Collective nouns, such as medical clinic, are institutions, not people.

**19. C — William Hyde Wollaston discovered it in 1803.**

The original sentence uses the passive voice. To emphasize who discovered palladium, use the active voice, represented by the sentence "William Hyde Wollaston discovered it in 1803." Here, the sentence states the subject, Wollaston, before the noun (discovered).

**20. A — made slavery illegal**

The Emancipation Proclamation freed slaves in the Confederate held states that were rebelling. The border states of Missouri, Kentucky, Delaware, and Maryland were not affected. All Union states had either already freed their slaves, or would do so in separate state and federal actions. Slavery was not actually illegal until the Thirteenth Amendment in 1865, however.

**21. B — It severely weakened the South towards the end of the Civil War.**

Sherman's March to the Sea is the name given to the campaign waged by Union General William Tecumseh Sherman in Georgia towards the end of the Civil War. Sherman marched his troops from Atlanta to Savannah over a one-month period. Sherman and his army destroyed Southern industry, agriculture and civilian property in a campaign historians refer to as total war. It is believed that Sherman's March to the Sea



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contributed to a decline in Southern morale and strength.

**22. B — by refusing the role of wife or mother**

The passage is written in a formal style and has a literary tone. Instead of saying Emily did not accept the role of women, the author writes she "eschewed" "the trappings of being a woman." Only choice D matches this style and tone, so it is the correct answer. Choices A, B, and C are incorrect because while each conveys this same thought, the uninspired word choice in each answer does not match the style or tone of the passage. Choice C is also unnecessarily wordy.

**23. C — China was the best governed and most prosperous of any of the world's major civilizations.**

This sentence is an appropriate supporting detail to build upon the main idea of this paragraph. Given the discussion of "maritime expeditions", it is sensible to include how such led to the result of a major illustration of success within China.

**24. D — Pass the time during our commute**

Papi, our designated transporter, was a Haitian man in his early twenties who works for the physician. He warmly welcomed us to his country, and seemed to have a great sense of humor. He laughed nonstop during our ride through the capital city. Once we were on the open highway, Papi taught us basic Creole greetings to pass the time during our excessively long four-hour commute. A. NO CHANGE B. pass the time during our excessively long commute C. pass the time during our excessive four-hour commute D. pass the time during our commute D is the correct answer because of wordiness and redundancy. A, B, and C are incorrect because "excessively," "long," and "four-hour" are redundant when combined. In addition, the lengthy description is wordy. Although longer sentences may be grammatically correct, short sentences are the best choice to minimize wordiness.

**25. A — before sentence 1.**

This sentence would best serve as a transition between the previous and current paragraphs. The previous paragraph refers to the city planners' strategic plan, and the current paragraph begins with an example of one of the plan's boldest suggestions. A sentence that mentions that the plan contained bold suggestions (choice B) would work well here. The other choices would place this notion after providing examples of the plan's bold suggestions, rendering it ineffective and unnecessary.

**26. B — there**

Because it is being used as a pronoun to point to the clause "have been challenges". Choice A is incorrect because it is possessive. Choices B and D are incorrect because the verb clause doesn't make sense in the sentence.

**27. C — stubbornness**

The word obstinacy means stubbornness. If you were not aware of that it would become necessary to try to solve the problem through understanding the context in which the word is used. The author states: "They conquer by their obstinacy alone, by their eternal repetition of the same statements." The constant repetition of the same idea is an example of stubbornness. By matching the meaning of the second part of the sentence with the meaning of the word obstinacy you would be able to solve the problem without knowing the exact definition of obstinacy, although it always helps to know.



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**28. D — censorious**

As the young men avoid her, the elderly woman obviously dislikes modern dating habits, which rules out “approving” and “laudatory” as possible correct answers. Similarly, the young men’s unwillingness to talk indicates she was not “inquisitive,” or “curious.” “Censorious,” meaning stern and critical, is the only possible correct answer.

**29. D — beloved**

The passage as a whole emphasizes how much the Mexican people loved Pancho Villa. Everyone who speaks in the passage refers to Villa in beloved or respectful language, as an example, the general says that “The army adores you. We will follow you wherever you lead. You can be what you desire in Mexico.”  
  
You might have thought that embarrassed was the correct answer because the author references on a couple of occasions that Villa is embarrassed by the occasion. But, it is important to understand that Pancho Villa feels embarrassment at the formality of the ceremony not about the Mexican people themselves.  
  
There is no implicit or explicit reference to suggest that Villa was disgusted, intrigued or impressed by the Mexican people.

**30. A — emphasized**

**Bold** is not used in the sense of bolded text in a document, therefore **cunning** and **extruding** are both incorrect. **Cunning** may be a mechanism for describing the neuroscientists, but the definition of **bold** is unrelated to sharpness or wit.



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