**Instructions : Choose the letter of the best answer. In all cases, E) NOTA means “none of these answers”.**

1. What is 592– 412? If you solve it, you can join the Avengers, they need cool kids like you!

**a)       1600             b) 1680 c) 1740            d) 1800            e) NOTA**

1. There are 76 characters in Avengers: Infinity War. How many numbers less than 76 are relatively prime to 76?

**a) 24                b) 33 c) 36                 d) 38 e) NOTA**

1. Tony Stark wants to buy some cars for the other Avengers. He decides on some Lamborghini Veneno Roadsters. However, he doesn’t know how many he wants. He decides that the number he gets is equal to eight less than three times the number he gets. How many Lamborghini Veneno Roadsters does he decide to buy?

**a) 1               b) 2                  c) 3 d) 4                e) NOTA**

1. Seven of the Avengers are having a meeting at Stark Tower. They all shake each other’s hands once. How many handshakes take place?

**a) 7 b) 8         c) 20 d) 28             e) NOTA**

5. Black Panther wants to build another building for his kingdom Wakanda. He has a rectangular plot of land that is 30 miles by 20 miles. He decides to put a wooden stake every 2 miles so that he can make a boundary. He also decides to place a stake on each corner of the plot of land. What is the least number of stakes he can use?

**a)  48          b) 50             c) 52             d) 53             e) NOTA**

6. Filippo the Mushroom-head wants to become an agent for S.H.I.E.L.D. He can only join if he answers this question presented by Nick Fury correctly.

If *f*(x) = 3x4 - 4x2 + 2x - 6, what is *f*(-2)?

**a) -12       b) 18           c) 22      d) 30e) NOTA**

7. Ultron is made inside of box shaped like a rectangular prism. The rectangular prism has faces of area 63 ft2, 108 ft2, and 84 ft2. What is the volume of this prism?

**a) 640 ft3      b) 702 ft3           c) 756 ft3          d) 820 ft3           e) NOTA**

8. Black Widow is on a secret mission for the Avengers when she is seen by an enemy spy. Hurry! If Black Widow is at the point (6, -6) and the enemy spy is at (1, 6), how far apart are they?

**a) 5             b) 8             c) 13             d) 29             e) NOTA**

9. Vision is flying along a line graphed by 2x - 3y = 17. War Machine is flying along a line that is parallel to Vision’s path, while Falcon is flying along a line that is perpendicular to Vision’s path. What is the sum of the slope of War Machine’s path, the slope of Vision’s path, and the slope of Falcon’s path?

1. **           b)           c)             d)             e) NOTA**

10. Two very fast trains are 6000 miles apart and are moving towards each other. One train is moving at a rate of 400 mph and the other train is moving at a rate of 350 mph. Iron Man is flying back and forth between these trains as they move towards each other. How far will he have traveled before the trains crash if he is flying at a rate of 50 mph? (Assume Iron Man does not waste time changing direction and travels in a straight line parallel to the ground.)

**a) 200 mi         b) 300 mi c) 400 mi         d) 500 mi e) NOTA**

11. Black Widow and Loki had an argument about who is smarter. They decide to settle it with a quick math problem. What is the sum of the factors of 48?

**a)       76             b)108 c) 124             d) 284 e) NOTA**

12. Captain America wants to find the area of the gray part of his shield (That’s his favorite color), which is a perfect circle. He knows that the diameter of his shield is 2 feet long. The diameter of the black circle is half a foot long and each ring has a thickness of 3 inches. What is the area of the two gray rings? (Picture not drawn to scale)



**a)       24 ft2                   b) 27 ft2                  c) 64  in2                 d) 90 in2                  e) NOTA**

13. Ultron and Thanos decide to have a race. Ultron can run x miles per second, while Thanos can run y miles per second. If the least common multiple of the positive integers x and y is 225 and the greatest common factor of x and y is 15, what is the product of x and y?

**a) 3025              b) 3325 c) 4225            d) 4500 e) NOTA**

14. Imagine a number line ranging from -20 to 100. Vision can only fly in the zone between the smallest and largest positive prime numbers, within the number line. What fraction of the number line can Vision fly in?

1. **         b)           c)              d)       e) NOTA**

15. Hulk is playing a card game with Clint using a standard 52-card deck. What is the probability that Hulk **does not** draw a number card (A, 2, 3...10) **or** he draws a diamond?

**a)            b)    c)    d)           e) NOTA**

16. Shuri is making a mixture to put in her brother’s suit. There is 300mL of the mixture. It is 99% vibranium. How many milliliters of vibranium must be removed to make the potion 97% vibranium?

**a) 1 mL         b) 20 mL      c) 150 mL     d) 200 mL    e) NOTA**

17. One lap of a track is 10 miles long. Vera and Kaitlyn are in a relay. Vera runs one lap and finishes in 5 hours. Then Kaitlyn runs one lap. How fast in mph must Kaitlyn run to make the average speed for the 2 laps to equal 5 mph?

**a) 6 mph       b) 8 mph  c) 9 mph      d) 10 mph e) NOTA**

18.  J.A.R.V.I.S needs to hack into Ultron’s computing system to stop him. However, there is a complicated code that he needs to solve:

*a + b + c = 3*

*a2 + b2 + c2 = 29*

*a3 + b3 + c3 = 45*

What is *6a + 7b + 5c* if *a ≤ b ≤ c* and *a, b, c* are integers?

**a) 12             b) 14             c) 16             d) 18             e) NOTA**

19. The positive odd integers are grouped together: {1}, {3, 5}, {7, 9, 11}, {13, 15, 17, 19}, … The groups are numbered 1, 2, 3, 4, etc. What is the value of the sum of the numbers in the 6th group plus the sum of the numbers in the 7th group? The Avengers suck at math, but a smart kid like you can help them solve this problem. What is the right answer?

**a) 468            b) 486 c) 503            d) 559 e) NOTA**

20. What type of number is 0.5555…?

1. Irrational
2. Real
3. Integer
4. Rational

**a)       II only    b) IV only    c) I and II  d) II and IV   e) NOTA**

21. Doctor Jane Foster, a renowned astrophysicist, creates a company that helps study astronomical anomalies. The company becomes extremely popular after she meets Thor and her stock increases by 1100%. If Dr. Foster’s stock was worth $2100 before the increase, how much is her stock worth now?

**a) $21,000 b) $23,100 c) $25,200 d) $30,000 e) NOTA**

22. The Tesseract is a cube that contains the Space Stone, one of the six Infinity Stones which contain infinite power. How many distinct arrangements of the word TESSERACT are there?

**a)       45360            b) 60480 c) 90720          d) 362880 e) NOTA**

23. The distribution of test grades for two S.H.I.E.L.D training classes are perfectly symmetric with no scores matching the 1st or 3rd quartile. Within a class the scores are unique whole numbers. In the first class there are 19 students with a lower quartile of 79 and an interquartile range of 11. The second class has 21 students with a median of 80 and a upper quartile of 89. What is the percentage of all students in both classes that got a B (80% to 89%)?

**a) 15% b) 25% c) 37.5% d) 50% e) NOTA**

24. Heimdall, Guardian of Bifrost (the bridge connecting Earth to Asgard), decides to play a joke on Thor, who needed to cross the bridge. Heimdall said he would double the amount of Midgard money (dollars) Thor had each time he crossed the bridge if Thor paid him $20 before crossing each time. Thor thought he was going to become rich. But, he crossed the bridge 4 times and when he paid Heimdall $20 right before he was about to cross the bridge the fifth time, he realized he was out of dollars :( How much money did Thor have with him before talking to Heimdall?

**a) $35 b) $37.50 c) $38.75 d) $39.38 e) NOTA**

25. Thor tells Captain America that he will be able to lift Thor’s hammer, Mjölnir, if he can solve this question. The captain knows he won’t be able to lift it, but attempts to answer the question anyway.

Store 1 sells 17 capes for $15. Store 2 sells 35 capes $31. Store 3 sells 25 capes for $23. Which store has the best deal (least cost per cape)?

**a)** [**Store 1**](https://www.codecogs.com/eqnedit.php?latex=%5Csqrt%7B2%7D%250) **b)** [**Store 2**](https://www.codecogs.com/eqnedit.php?latex=%5Csqrt%7B3%7D%250) **c) Store 3**

**d)  More than 1 store has the best deal      e) NOTA**

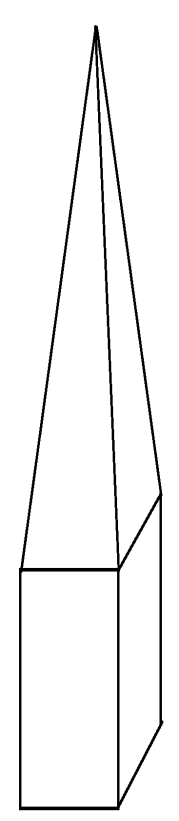
26. Brandon is a combo king. He was on a secret mission for the Avengers, but he was distracted by this combo question: How many ways can you choose 3 vertices of a cube such that the 3 vertices form a right triangle? Help him solve it so he can get back to his mission.

**a) 36                b) 42 c) 48                 d) 56 e) NOTA**

27. There are eight hooks in a line in a closet for the Avengers to hang up their suits. Black Panther, Spiderman, Hawkeye, and Falcon cannot hang their suits directly adjacent to each other because the material in each of their suits is different.  How many ways can the four different suits be hung up in the closet with no suit directly adjacent to another? Using Hook 1 is different than using Hook 2.

**a)       24               b) 72 c) 96                d) 120 e) NOTA**

28.  The Stark Tower is made up of a square prism with integer side lengths and a square pyramid on top. The square prism’s length and width line up perfectly with the square pyramid’s base.  The volume of the square prism is 504 units3 and the square prism is as wide as possible (while still having integer side lengths). What is the volume of the tower if the height of the whole tower is 32 units?



**a) 712 units3              b)  720 units3          c) 736 units3                d) 750 units3               e) NOTA**

29. Dr. Bruce Banner needs some help at his lab. He wants to know how many numbers between 1-100 inclusive are divisible by 3 or 8 but not both. What is the correct answer to this problem?

**a) 24 b) 37 c) 41 d) 45 e) NOTA**

30. Thanos is angry at you for being smarter than him. As a last-ditch attempt to stop you from completing the test, he gave you one last problem: There is a room with 200 light bulbs in a line and there are 200 robots outside of the room. On each light bulb, there is a switch that when flipped once, turns the light bulb on, when flipped twice, turns the light bulb off, when flipped 3 times, turns the light bulb on, etc. The robots enter one by one, and the first robot flips every switch, the second robot flips every other switch, the third robot flips every third switch…, and the 200th robot flips every 200th switch. How many light bulbs are on after all 200 robots pass through the room?

**a) 12    b) 13             c) 14             d) 15             e) NOTA**