1. The numbers two, three, five and seven have no factors besides one and themselves, and are therefore prime. One is not considered prime nor composite. **(B)**

28 **(C)**

1. A number followed by the words “less than”, then followed by another number implies subtraction of the first number from the second number.

250,000

-249,900

\_\_\_\_\_\_\_\_\_

100 **(B)**

1. Label Arya’s arms 1 through 6. The first arm will need to shake hands with arms 2 through 6- That’s 5 handshakes. The second arm will need to shake hands with arms 3 through 6 (not #1 because they already shook hands), or 4 handshakes. Arms 3, 4, and 5 will shake hands with 3, 2, and 1 more hand, respectively. (Arm 6 will have already shaken hands with the other arms.) Therefore, the number of handshakes is 5+4+3+2+1=**15** handshakes **(A)**
2. One foot equals 12 inches. Therefore, you have one foot with three inches left over. However, the fraction can be reduced to after dividing by three. This leaves you with the mixed fraction 1 **(A)**
3. 96

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2 48

/ \

6 8

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2 3 4 2

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2 2

The prime factorization is all of the prime numbers, 25 • 3. **(E)**

1. The average time is all of the times added together, then divided by the number of times there are. 30 + 23 + 70 + 47 + 32 = 202 202 ÷ 5 = 40.4 **(B)**
2. Quadrant I contains all points where both numbers in an ordered pair are positive. The only answer in which both the x and y values are positive is **(C)**
3. This problem can be solved in two ways: The first way is to divide eight by twenty-five. The second way is to multiply the denominator and numerator by four, giving you , which can easily be transformed into the decimal 0.32 **(B)**
4. A square root is irrational if the number underneath is not a perfect square, and a decimal is rational only if it ends or repeats a pattern. In choice A, 1 is a perfect square () so it is rational. Answer choice B is also rational, since the decimal repeats itself. , so C is also rational. 243, however, is not a perfect square (), so choice D is irrational. **(D)**
5. If Dang can run 365 miles in five hours, his speed must be divided by five to find his average speed. 365 ÷ 5 = 73 **(C)**
6. First, you can get rid of the denominator by subtracting the bottom exponents from the corresponding exponents in the numerator giving you 5*a*4*b*4. Since *a*=-2, multiply (-2)(-2)(-2)(-2) to get 16. Then do the same for *b*, getting 81. Then, multiply 5∙16∙81, getting 6480. **(C)**
7. We try to notice a pattern. The numbers seem to be getting large quite quickly, leading us to think that the previous number of brownies is being multiplied by some number. A quick check shows that multiplying the previous number by 3 gives a number one more than the new number, so the number of brownies Farrah eats is equal to one less than three times the number of brownies eaten in the previous hour. Therefore, in hour six, Farrah will consume brownies **(B)**
8. We start this problem by taking the number of brownies per hour and dividing each by two. Then, we add these numbers: **(B)**
9. is the reciprocal of 8, meaning . 8 can also be expressed as a power of 2: . Therefore, **(C)**
10. By definition, the domain is the set of inputs (in this case, the x values). Therefore, the set of domains is the first number in each ordered pair: {0, 5, -2, -9, 6} **(B)**
11. The formula for circumference of a circle is 2π*r* (r standing for radius). Since diameter is twice the radius, the circumference would be 5π2. **(C)**
12. The first number in scientific notation must be no less than one and no greater than ten. Therefore, the answer cannot be B or D. Raising the 10 to a negative exponent would move the decimal to the left instead of the right, making it smaller (0.00000002012 in this case). Answer choice C adds five zeroes to the end of the number, and therefore is the correct answer **(C)**
13. To find the median, put the numbers in order from least to greatest: 2.3, 4.2, 5.1, 6.5, 6.7, 7.0, 8.7, 9.4. The average of the middle numbers is 6.6. **(C)**
14. In most cases, percentages are expressed out of a maximum of 100%. So, to change a percentage to a decimal, you have to find the hundredths place, which is the second decimal place (following the tenths place). Therefore, the decimal is 0.1115. Then you multiply 2000 x 0.1115 to get 223. **(C)**
15. Since the volume is supposed to be in the form of inches, each measurement must be multiplied by 12 before being multiplied by each other. So, the length will be 78 inches, the width will be 36 inches, and the height will be 30 inches. After multiplying, you get the answer 84240. **(D)**
16. The formula for slope is . In other words, the change in the y values over the change in the x values: . This simplifies to or. **(B)**
17. We start this problem with point slope form: y-y1 = slope(x-x1). Using the first point, the equation is y-5 = (x-4). We can first simplify this to y-5 = x + . To add the five to the other side, we change it to an improper fraction over three, which is . This gives us **(B)**
18. The factors of 24 are: 1, 2, 3, 4, 6, 8, 12, and 24. The factors of 48 are: 1, 2, 3, 4 ,6, 8, 12, 16, 24, and 48. The greatest common factor is 24. **(D)**
19. The distributive property states that a(b + c) = ab + ac. This operation is demonstrated by distributing the six to the two and four in answer choice **(D)**
20. 7(t + 4) – 2 = 9t – 6(4 – 3)

7t + 28 – 2 = 9t – 24 + 18

7t + 26 = 9t – 6

32 = 2t

16 = t **(C)**

1. Every fraction in the expression has a common denominator of 36. By multiplying the second fraction by two, we get . Then, by multiplying the third fraction by six, we get . After adding these fractions with the first one, we realize they add up to one. Next, we add 1 + 7 + 9 + 11 to find the sum of 28. **(C)**
2. The factors of 50 are: 1, 2, 5, 10, 25, and 50. Only 20, 25, and 50 have factors (besides one and themselves). **(A)**
3. By definition, a circle contains 360 degrees. **(D)**
4. The formula for slope is (the change in y values over the change in x values). In this case, . Just by looking at the denominator, we can see that the slope is undefined. **(D)**