1. **31 (D)**
2. so , and so . **12 (D)**
3. ; ; . 10+1+.1=**11.1 (D)**
4. **6 (A)**
5. Remember that exponents of constants do not affect the degree. The first term has degree 3+1=4. The second has degree 5+1=6, and the third has degree 1+4=5. Therefore, the degree of the expression is **6 (E)**
6. Originally there were 20 windows. This was increased to 13(3)=39 windows. 39-20=**19 (B)**
7. **40 (D)**
8. The median is 1.0. The mode is 0.9. The mean is . The sum of all three is 1.0+0.9+1.1=**3.0 (C)**
9. ; **8 (C)**
10. To decorate 2 rooms, 84 cobwebs are needed. The smallest amount of packs needed is 17. 17 packs will cost **$35.70 (E)**
11. The area, in terms of x, is so . This factors to , so x=4 since the length cannot be negative. y=4+10=14. The perimeter is therefore **36 (D)**
12. The integers on either side of are  and . Clearly is closer to . The answer is **11 (B)**
13. For a number to be divisible by 9, the sum of its digits must equal a multiple of 9. In answer choice A, 1+2+4+5+6=18. **12456** is therefore a multiple of 9. **(A)**
14. The number of ways to get to each room is equal to the sum of the number of ways to get to the room to the left and the number of ways to get to the room below. Rooms 1-4, 5, and 9 have 1’s because there is only 1 way to get to those rooms.

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 1+2=3 | 3+3=6 | 6+4=10 |
| 1 | 1+1=2 | 2+1=3 | 3+1=4 |
| 1 | 1 | 1 | 1 |

There are **10** ways to get to room 12. **(C)**

1. Put both lines into slope-intercept form. You get:  and . These lines have the same slope, but are not the same line. They have no solutions, and are therefore **Inconsistent only (A)**
2. Prime factorize (or use other methods) to determine that the GCD of 72 and 204 is 12. (and ). If you hear 12 loops in an hour, each loop must be =**5** minutes long **(A)**
3. **(x+2)(x-1)(x+1) (D)**
4. . Therefore the larger solution is **4 (D)**
5. After 2 seconds, kid #1 has gone 6*x* meters north and kid #2 has travelled 8*x* meters east. This can be equated to the distance between (0, 6*x*) and (8*x*, 0), or **10*x* (C)**
6. 2012 has factors 1, 2, 4, 503, 1006, and 2012. The sum of these is **3528 (D)**
7. Each step has one less than twice the number of cockroaches on the previous step. You can also notice that on each step, it is one more than 2 raised to the step number’s power. (, , etc.) The number of cockroaches on step #6 is therefore **65** **(E)**
8. **544640 (B)**
9. Consider the x-coordinate and y-coordinates separately. The x-distance from 2 to 1 is 202-22=180. Since Rat #2 travels 3 times as fast, we have 4x=180, where x is the distance Rat #2 travelled and 3x is the distance Rat #2 travelled. x=45, so the x-coordinate is 22+45= 202-3(45)=67. Similarly, 4y=90-(-30)=120, so y=30. The y-coordinate: 90-30=-30+3(30)=60. The point they meet is at (67, 60).67+60=**127 (A)**
10. Rearranging and isolating the variable gives so *n*=**10 (D)**
11. Plug into the formula: **6π (B)**
12. You can solve to see that  and so the roots are 14 and 4, 14+4=**22**. Alternatively, the sum of the roots of a quadratic of form is equal to ; **22 (C)**
13. The prime factorization is as follows: . The prime factors are 2, 5, and 41; hence there are **3** prime factors **(B)**
14. If Niral can design 1 house in 3 days, then in 6 days, he designs 2 houses. That means Nathan designs 5-2=3 houses in 6 days, or 1 house every 2 days. It takes =**10** days for Nathan to design 5 houses. **(E)**
15. I. is true. II is false, . III is true. IV is false, the line x=0 has undefined slope. The answer is **2 (B)**
16. Jimmy’s volume after *x* seconds can be modeled by , while Joyce’s volume can be equated as . We wish to find the point where these two values are equal, so we set them equal and solve for *x*: **5 (A)**