1. $\tan(\left(81\right))=\frac{height of triangle}{100} height of Tower of Terror=100\tan(\left(81\right))+6=637 E $
2. By drawing the triangle, $sin^{-1}\left(\frac{8}{9}\right) A$
3. $A$
4. **E**. This is an arithmetic sequence. Ten minutes is 600 seconds. The 600th term of the sequence is . The sum of the first 600 terms is .
5. $\frac{100rev}{3min}∙\frac{2πrad}{1rev}∙\frac{1min}{60s}=^{10π}/\_{9 D}$
6. To find the arc length, 120 degrees is one-third of a full circle $\left(\frac{2π(5)}{3}\right)=\frac{10π}{3}$ **B**
7. This is a Donkey Theorem question. The altitude to side AB would have to have a length of $8sin50=6.16$, which makes the smallest possible value of a=7. **C**
8. Airplane’s Vector: $\left〈-200cos10,200\right〉$+Wind’s Vector: $\left〈50cos10,-50sin10\right〉$=$\left〈-150cos10,150sin10\right〉=\left〈-147,25.5\right〉$ **C**
9. (3 R’s)(3 vowels)=9 ways **A**
10. Both cans Veggie: (3/8)(2/7) + Both Cans Noodle: (5/8)(4/7) = 13/28 **D**
11. The 200 would be opposite the 60 degree angle in one of the six triangles formed in the hexagon. This makes the side of the hexagon $\frac{400}{\sqrt{3}}$ , so to find the area you just use the formula: $\frac{6s^{2}\sqrt{3}}{4}=80000\sqrt{3 }$**B**
12. Since the vectors are in component form, they start from the origin (tail). So 30% of the way to the tip of the second vector is just <2.1, 3.5, 1.4> **D (Thrown Out at Convention)**
13. The Single Digit Quadruples are: (1,2,2,3), (2,3,6,7), (1,4,8,9), (4,4,7,9). **D**
14. $\left[\begin{matrix}0&-1\\1&0\end{matrix}\right]\left[\begin{matrix}1&3&5\\-1&2&-4\end{matrix}\right]=\left[\begin{matrix}1&-2&4\\1&3&5\end{matrix}\right]$ **C**
15. **B**. This is a geometric sequence. The ratio is 2. After 12 hours, the number of bacteria is .
16. For this ellipse, the minor radius (b) would be 15, and the major radius (a) would be 25. Using the Pythagorean relation $a^{2}-b^{2}=c^{2}$ to solve for c, we find c=20. The eccentricity is c/a = 4/5 **B**
17. **C**. First, the mouse must go from (0,0) to (5,3). This requires 8 moves, 5 across and 3 up. The number of ways is . The number of ways to go from (5,3) to (6, 8) is one move across and 5 moves up. The number of ways is . 56(6) = 336.
18. **B**. There are two equations, one on number of animals and one on the number of legs. They are . Solving these equations leads to x = 56 and y = 225. The positive difference between the two animals is 225 – 56 = 169.
19. **A**
20. $S\_{10}=\frac{10}{2}\left[6+6+9(5)\right]=285$ **D**
21. By physics and breaking up the vector into components,

$x=-t\left(60\right)\cos(\left(120\right))+20=30t+20 y=0.5\left(-32\right)t^{2}+t\left(60\right)\sin(\left(120\right))+14=-16t^{2}+30\sqrt{3}t+14$ **A**

1. The height is found from the y equation, and the max value is when cosine would be -1, so 34. **C**
2. By drawing a picture, we can see this is in the Third Quadrant with a reference angle of 60 degrees. **B**
3. **B**
4. $2=\left(1+\frac{r}{8}\right)^{8\left(10\right)}, ln\left(2\right)=80ln\left[1+\frac{r}{8}\right]. $ $8\left(2^{^{1}/\_{80}}-1\right)$ **A**
5. **C**. There are three ways in order for heads to occur. This leads to a total probability of . Therefore, the probability of tails is . In order for the game to be fair, the amount won times the probability for each person must be equal. So, .
6. $y=-\frac{1}{F}x^{2}+100;0=-\frac{1}{F}2^{2}+100;F=\frac{1}{25};y=-25x^{2}+100;y\left(0.5\right)=\frac{375}{4}D$
7. **C**

.12

.56

.19

.13

U

M

1. $\left|\begin{matrix}1&-1&0\\-3&-1&\frac{1}{2}\\1&0&-1\end{matrix}\right|=1+\frac{5}{2}=3.5$ **D**
2. Arc Length: $\frac{C}{24}=\frac{8π}{24}=\frac{π}{3}$+2 radii (8), so $8+\frac{π}{3}$ **B**