

Name: _____

School: _____

1. _____ Find $3 + 4 + 5 + \dots + 29 + 30 + 31$.
2. _____ Find the vertex of $y = 2x^2 - 9x + 10$.
3. _____ Let $A = \begin{bmatrix} 7 & -4 \\ 3 & 1 \end{bmatrix}$. Find the determinant of A^{-1} .
4. _____ Find the positive difference between the arithmetic mean and median of the data set: $\{3, 18, 7, 14, 3\}$.
5. _____ Let $x + \frac{1}{x} = 3$ and $x > 0$. Find the value of $x^2 + \frac{1}{x^2}$.
6. _____ Find the number of integral factors of 2016.
7. _____ Kyle is playing Pokemon Go. He has caught 3 Rattatas each of which take 25 candies to evolve, 4 Pidgies each of which take 12 candies to evolve, and 1 Magikarp which takes 400 candies to evolve. Find the weighted average of the number of candies needed for one of Kyle's Pokemon to evolve.
8. _____ Find the sum of the first 13 perfect squares.
9. _____ 4.2% of x is 19.8. Find x to the nearest whole number.
10. _____ Evaluate $\sin\left(\frac{\pi}{6}\right) + \tan\left(\frac{2\pi}{3}\right) + \cot\left(-\frac{\pi}{4}\right) + \cos\left(\frac{3\pi}{2}\right)$.
11. _____ Find the coefficient of the $x^3y^4z^2$ term in the simplified expansion of $(x - 3y + 2z)^9$.
12. _____ The point (3,4) is reflected across $y = x$, translated 7 units to the left, reflected across the y -axis, and finally rotated 90° counter clock-wise. What are the coordinates of the point's final position?
13. _____ Ms. Pickett loves the Fibonacci Sequence. Find the 15th Fibonacci number, if 1 is the first Fibonacci number.
14. _____ Find the eccentricity of $2x^2 - 12xy + 18y^2 + 3x + 17 = 0$.
15. _____ Rationalize the denominator of $\frac{4}{\sqrt{5} - \sqrt{3} + \sqrt{2}}$. (Hint: Rewrite the denominator as $(\sqrt{5} - \sqrt{3}) + \sqrt{2}$.)
16. _____ Let x be the number of space diagonals in a dodecahedron. Let y be the number of space diagonals in an icosahedron. Find $x - y$.
17. _____ Find the last two digits of 8^{8^8} .
18. _____ Jasmine comes upon a block of tofu. If she slices it 6 times, what is the maximum number of distinct pieces she can get?
19. _____ Wenxin and Kim have finally gotten their driver licenses. A license plate is made up of a combination of 2 letters followed by 3 non-zero single digit numbers. Find the number of possible license plate combinations.
20. _____ What is $121 \cdot 27$?