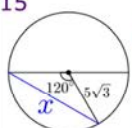
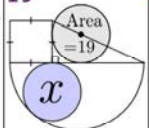
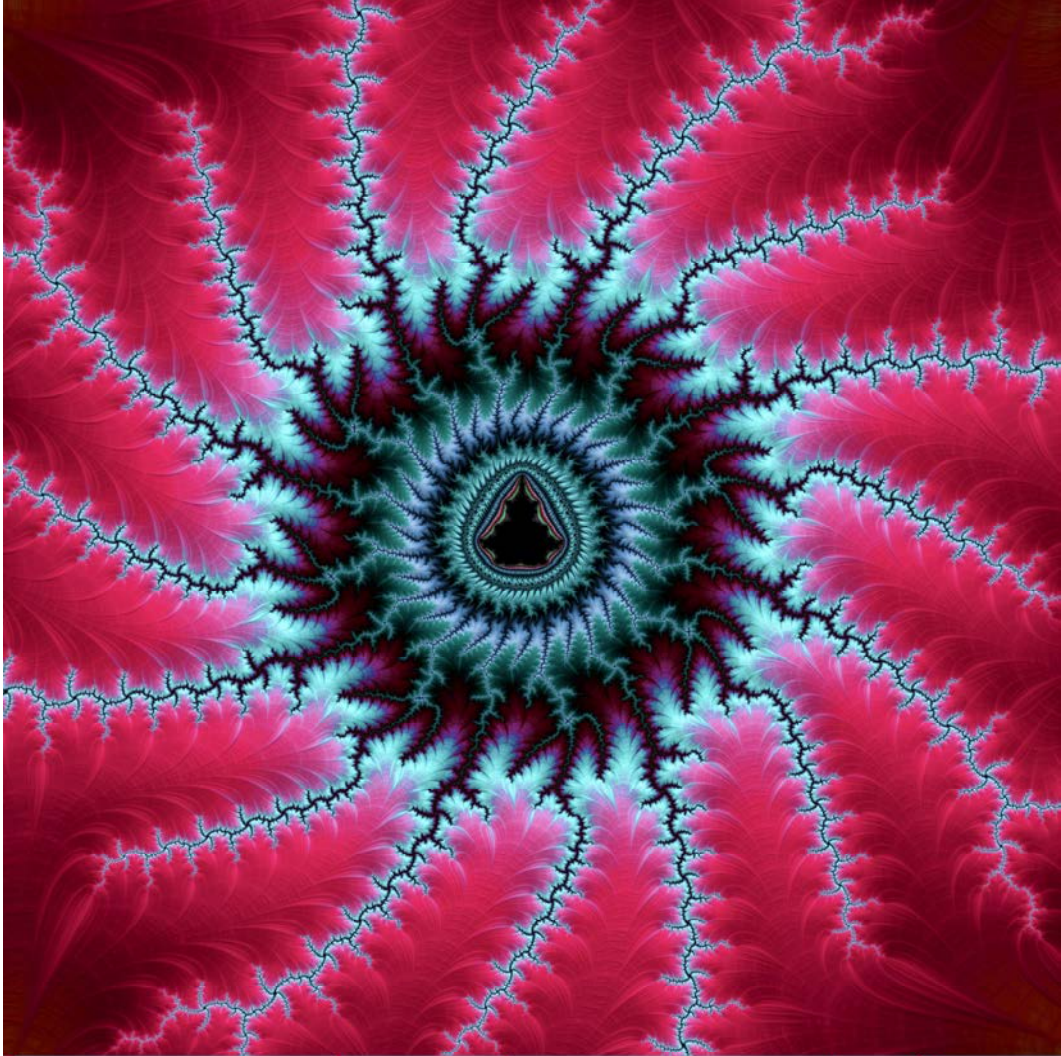




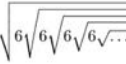
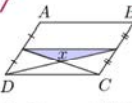
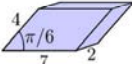


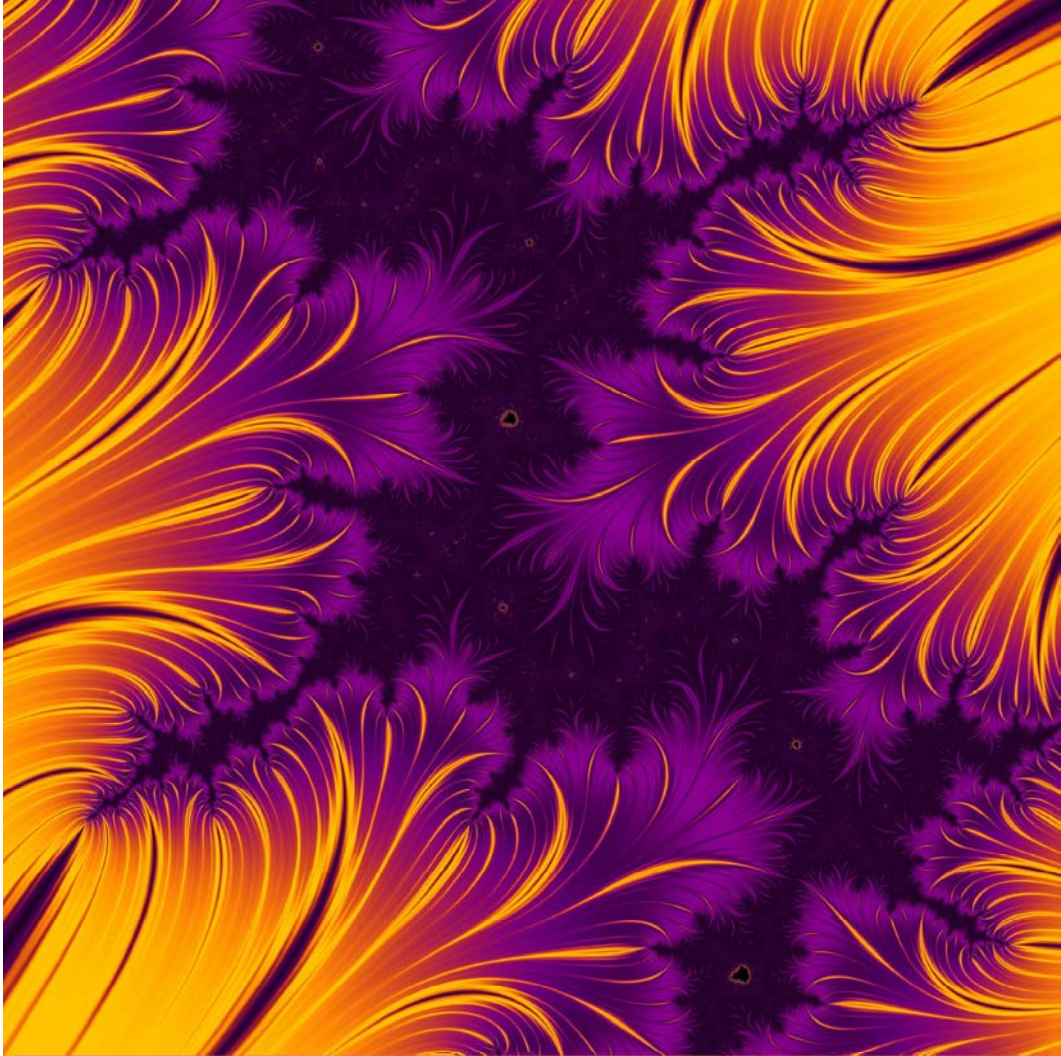
APRIL

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																				
<p>March</p> <table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr><tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr><tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr><tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td></td></tr></table>	S	M	T	W	T	F	S				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		<p>May</p> <table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr><tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td></tr><tr><td>28</td><td>29</td><td>30</td><td>31</td><td></td><td></td><td></td></tr></table>	S	M	T	W	T	F	S		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								<p>1</p> <p>Let A be the coefficient of x^5 in the Taylor expansion of e^x</p> <p>Find $5! \cdot A$</p>
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<p>2</p> <p>Find the integer a such that $x^2 - x + a$ is a factor of $x^{13} + x + 90$</p> <p><i>Palm Sunday</i></p>	<p>3</p> <p>$3^{2023^{2023}} \bmod 7$</p>	<p>4</p> <p>$\frac{\sqrt[3]{y^{18}}}{y^2} = y^x$ for $x, y \in \mathbb{Z}$</p>	<p>5</p> <p>What is the expected number of diamond cards in a random 20 card hand (from a standard deck)?</p> <p><i>Passover</i></p>	<p>6</p> <p>Find the second derivative of $f(x) = x^{3/2}$ at $x = \frac{1}{64}$</p>	<p>7</p> <p>For $w = 2$, $y = 5$, $z = 7$, evaluate $z^2 - y^3 + 5w^2 + 9z$</p> <p><i>Good Friday</i></p>	<p>8</p> <p>Find the largest zero of $y^3 - 7y^2 - 10y + 16$</p>																																																																																				
<p>9</p> <p>Find the area between the x-axis and $y = \frac{3}{2}x - \frac{1}{4}x^2$</p> <p><i>Easter Sunday</i></p>	<p>10</p> <p>$1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + 9 - 10 + 11 - 12 + 13 - 14 + 15 - 16 + 17 - 18 + 19$</p>	<p>11</p> <p>A boat travels 18 miles upstream in 2 hours and (with the same current speed) travels 39 miles downstream in 3 hours. What is the speed of the boat in mph ignoring the current?</p>	<p>12</p> <p>Find the distance between the roots of $y^2 - 6y - 27$</p>	<p>13</p> <p>$\int_0^{\sqrt{\frac{\pi}{2}}} 26y \cdot \cos(y^2) dy$</p>	<p>14</p> <p>What is the smallest positive integer n such that $126n$ is a perfect square?</p>	<p>15</p> 																																																																																				
<p>16</p> <p>How many differently labeled trees can one make on 4 vertices?</p> <p><i>Orthodox Easter</i></p>	<p>17</p> <p>$f(z) = \begin{cases} \frac{e^z - 1}{z} & \text{if } z \neq 0 \\ 1 & \text{if } z = 0 \end{cases}$</p> <p>If $g(z)$ is the sixteenth differential of $f(z)$, what is $1/g(0)$?</p> <p><i>Yom HaShoah</i></p>	<p>18</p> <p>Find the number of non-negative integer solutions (y, z) to $7y + 8z = 1000$</p>	<p>19</p> 	<p>20</p> <p>$\frac{5\pi}{\sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1}}$</p>	<p>21</p> <p>$6^2 - \sum_{n=1}^5 n$</p> <p><i>Eid al-Fitr</i></p>	<p>22</p> <p>What is the maximum number of regions formed by 6 lines in a plane?</p>																																																																																				
<p>23</p> <p>$\frac{11}{3} - \frac{37}{6} - \frac{15}{2}$</p>	<p>24</p> <p>How many factors does 78645 have?</p>	<p>25</p> <p>$\int_0^{200\pi} \frac{1}{\pi} \sin^2(t) \cos^2(t) dt$</p>	<p>26</p> <p>Find the number of solutions to $x^2 + y^2 \equiv 0 \pmod{7}$ where $0 < x < 20$ and $10 < y < 100$</p> <p><i>Administrative Professionals' Day (US)</i></p>	<p>27</p> <p>Two complementary angles have measure $x + 3$ and $2x + 6$</p>	<p>28</p> <p>Find the number of positive integer pairs (x, y) for which $\frac{x^2 + y^2}{x - y}$ is an integer that divides 1995 and $x + y > 4$</p>	<p>29</p> <p>$\left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \dots \left(1 - \frac{1}{x^2}\right) = \frac{15}{29}$</p>																																																																																				
<p>30</p> <p>$\frac{(3!)!}{4!}$</p>																																																																																										



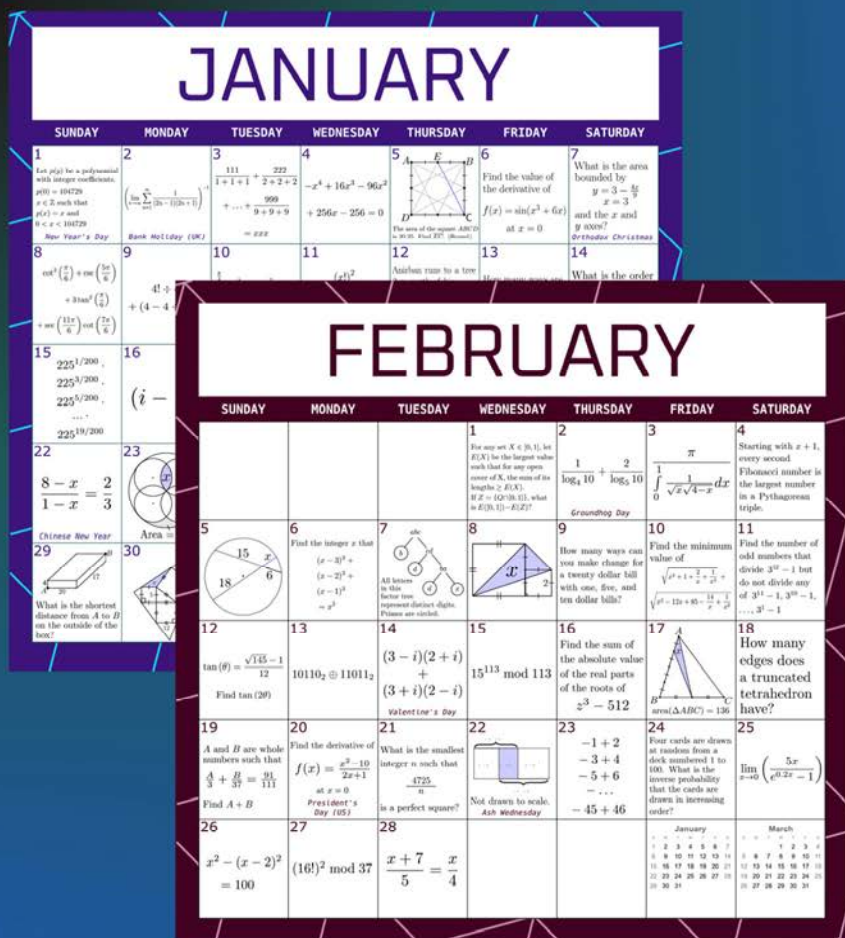
JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>June</p> 	<p>August</p> 					<p>1</p> <p>A sequence has</p> $a_n = -\cos(2\pi\sqrt{n^2-n})$ <p>Find $\lim_{n \rightarrow \infty} a_n$ for $n \in \mathbb{Z}$</p> <p>Canada Day (CAN)</p>
<p>2</p> <p>Find $x \in \mathbb{N}$ such that $x^3 - 1$ is prime</p>	<p>3</p> <p>For the digit x, the five digit number $4x3x5$ is divisible by 9</p>	<p>4</p> <p>Twenty coins that are either dimes or quarters total \$2.60. Find the number of quarters.</p> <p>Independence Day (US)</p>	<p>5</p> $\binom{x+2}{x} = 21$ $x > 0$	<p>6</p> 	<p>7</p> 	<p>8</p> <p>Find the maximum value of</p> $(\cos(\theta) - \sin(\theta))^6$
<p>9</p> <p>x is a square that is the product of four consecutive odd integers</p>	<p>10</p> <p>At the top of the hour, a bell tower rings a number of times equal to the hour. How many times does it ring from 12:30 to 4:30?</p>	<p>11</p> <p>Find the multiple root of</p> $x^4 - 19x^3 + 57x^2 + 319x + 242$	<p>12</p> <p>Find the minimum perimeter of a quadrilateral whose vertices are on different sides of a square with area 18</p>	<p>13</p> <p>Alec runs to a wall 8m north of his starting location, then runs to a spot 4m south and 5m west of his starting location. How long was the second leg of his run?</p>	<p>14</p> $\frac{d^{15}}{dx^{15}} x e^x = \frac{d}{dx} x e^x$ e^x	<p>15</p> <p>Find the number of ways to roll two six sided dice so that their product is divisible by 6.</p>
<p>16</p> $25 \cdot 25 - 21 \cdot 29$	<p>17</p> $8^{2023} \pmod{55}$	<p>18</p> <p>Find the sum of the digits of the largest two-digit prime and the smallest two-digit prime</p>	<p>19</p> <p>Find the number of times that</p> $y = \sin(x) \text{ and } y = \frac{x}{10\pi}$ <p>intersect</p>	<p>20</p> <p>Artem, Burian, and Danilo have 47 pens. Artem has 15 more than Burian and 2 fewer than Danilo. How many pens does Artem have?</p>	<p>21</p> $\sqrt{\frac{4x-3}{x+4}} \in \mathbb{Q}$ $x \in \mathbb{N}$	<p>22</p> <p>Find the largest value of</p> $\frac{a+b}{a-b-1}$ <p>for $a, b \in \mathbb{Z}$ and $1 \leq b \leq a \leq 12$</p>
<p>23</p> <p>Find x in the sequence: 5, 14, x, 32, 41</p>	<p>24</p> <p>How many ways can Akiko, Bao, Chan, and Deepak stand in a line?</p>	<p>25</p> <p>Find the final two digits of</p> 5^{100}	<p>26</p> <p>What is the smallest number with three distinct representations as the sum of three distinct primes?</p>	<p>27</p> <p>Find the number of divisors of 4900</p>	<p>28</p> 	<p>29</p> $\frac{1^2 + 2^2 + \dots + 43^2}{1 + 2 + \dots + 43}$
<p>30</p> <p>How many ice blocks can be stacked in a four layer square pyramid?</p>	<p>31</p> <p>How many integers from 1 to 99 are divisible by 5 or 7?</p>					



SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>August</p>	<p>October</p>				<p>1</p> $(e^x)^x = xe^x$	<p>2</p> <p>Find $\phi^2 - \frac{1}{\phi}$ where ϕ is the golden ratio</p>
<p>3</p> <p>At a math conference with 30 attendees, 24 speak English, 17 speak French, and 22 speak Chinese. At least how many must speak all three languages?</p>	<p>4</p> <p>Find the ratio of the area of ABC to XYZ <i>Labor Day (US/CAN)</i></p>	<p>5</p> $3^{x-1} + 3^{x+1} = 810$	<p>6</p> <p>The Cubs scored 2, 5, and 11 runs in the first three of a four game series. How many runs must they score in the final game to average 5 runs for the series?</p>	<p>7</p> $y = 1 + 2 + 3 - 4 - 5 + 6 + 7 - 8 - 9$ $x = y $	<p>8</p> <p>How many cubes are in a tesseract unfolded into 3D space?</p>	<p>9</p> <p>(x, y) are positive integers such that $x^3 + 8x^2 - 6x + 8 = y^3$</p>
<p>10</p> <p>52 All seven squares have the same dimensions. <i>Grandparent's Day (US)</i></p>	<p>11</p> <p>Find the number of permutations on four objects with exactly 2 cycles</p>	<p>12</p> $\begin{vmatrix} 1 & -2 & 3 \\ 3 & -2 & 1 \\ 2 & -1 & 3 \end{vmatrix}$	<p>13</p> $a + b = \sqrt{14}$ $a - b = \sqrt{12}$ $x = 2ab(a^2 + b^2)$	<p>14</p> $28_{16} - 32_8$	<p>15</p> <p><i>Rosh Hashanah</i></p>	<p>16</p> $\lim_{n \rightarrow \infty} \frac{2^n + 3^{n+3} + 4^{n+2}}{2^{n-4} + 3^n + 4^n}$
<p>17</p> $(1+1)^{(1+1)^{(1+1)}} + 1$	<p>18</p> <p>How many 6 inch \times 8 inch flyers can be made by cutting a single 2 foot \times 3 foot sheet of paper?</p>	<p>19</p> $7^0 + 4 \div 2 + 3 \times 6 \div 2 \div (1 + 2) + 2^2 + \sqrt[3]{256} + 5$	<p>20</p> <p>Find the constant term of the expansion of $(x + \frac{1}{x})^6$</p>	<p>21</p> $\left(\frac{20^{101} + 20^{100}}{+ 20^{99} + \dots + 1} \right) \left(\frac{20^{100} + 20^{98}}{+ 20^{96} + \dots + 1} \right)$	<p>22</p> <p>$x\%$ of a square is closer to the center than the perimeter. (Round)</p>	<p>23</p> $\sum_{n=-\infty}^{\infty} \frac{147}{20(1+n^2)}$ <p>(Round) <i>Fall Equinox</i></p>
<p>24</p> $f(x) = \frac{1}{\ln 2} (2^x - 1) \cdot (2^x - 2)(2^x - 3) \cdot (2^x - 4)(2^x - 5)$ <p>Find $f'(0)$ <i>Yom Kippur</i></p>	<p>25</p> $\vec{v} = \langle 11, 1, 17, 8, 10, 7, 1 \rangle$ <p>Find $\ \vec{v}\$</p>	<p>26</p> <p>The area of each square ≈ 5.75. Find the area of the large equilateral triangle. (Round)</p>	<p>27</p> $x + y + z = 22$ $x - y - z = 32$ $x - y + z = 42$	<p>28</p> $\sqrt[3]{98 \cdot 56 \cdot 4}$	<p>29</p> <p><i>Sukkot</i></p>	<p>30</p> $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 4 & 5 & 6 \\ 6 & 5 & 4 \\ 4 & 5 & 5 \end{pmatrix}$ $= \begin{pmatrix} a_1 & a_2 & a_3 \\ a_4 & x & a_5 \\ x_6 & a_7 & a_8 \end{pmatrix}$



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