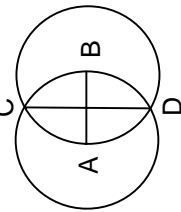
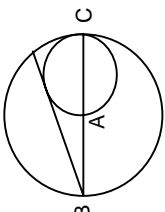
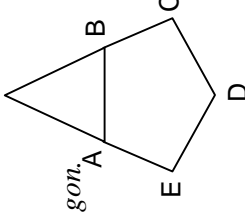
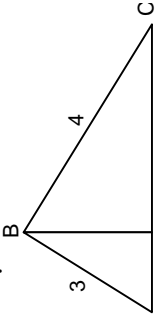
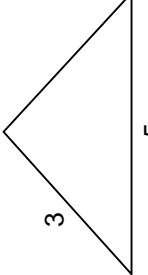
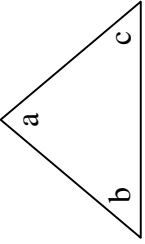
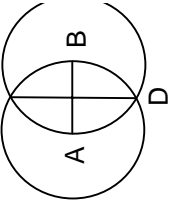
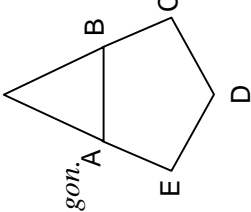
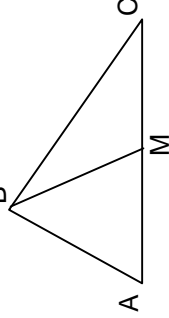
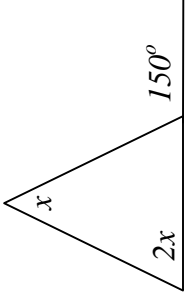
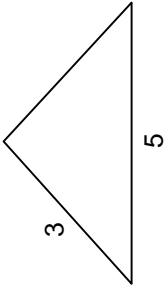
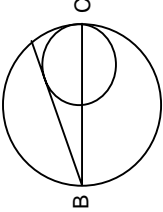
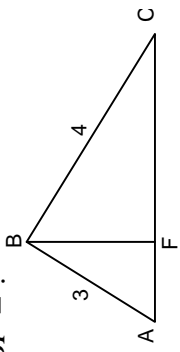


<p>A1 How many consecutive 0's are at the end when $7890 \cdot 7890^2 \cdot \dots \cdot 7890^{10}$ is written as one integer?</p>	<p>A2 How long is a side of an equilateral triangle of area $9\sqrt{3}$?</p>	<p>A3 How many solutions of $\sin(7x) = 1$ lie between 0 and π radians?</p>	<p>A4 $\log_{10} a + \log_{10} b = 2$ $a^2 b = 5$ $b = ?$ Simplify your answer.</p>	<p>A5 Find the largest real number c such that $x^2 - 5x + c$ has an integer root.</p>
<p>A6 The circles have centers A and B $AB = 2$ $CD = ?$</p> 	<p>A7 Simplify $\left(\frac{998}{999^2 - 1}\right)^{-\frac{1}{3}}$</p>	<p>A8 How many pigs are in a group of pigs and people that has 114 feet and 6 more hands than heads?</p>	<p>A9 $y = k$ and $y = x^2 + 12x + 40$ intersect at exactly one point. What is k?</p>	<p>A10 $x^3 + ax^2 + bx - 7$ has three different integer roots. What is a?</p>
<p>A11 If $0^\circ \leq x < 360^\circ$ solve for x in degrees: $\frac{\cos(x)}{2} + \frac{\cos(3x)}{4} + \frac{\cos(5x)}{8} + \dots = -1$</p>	<p>A12 Is the following quantity positive or negative? $1 + \frac{\sin 2}{2} + \frac{\sin 4}{4} + \frac{\sin 8}{8} + \dots + \frac{\sin 1024}{1024}$ Angles are in radians.</p>	<p>A13 $f(x) = \frac{2x+1}{x-3}$ $g(x) = \frac{3x+1}{x-2}$ Simplify $f(g(x))$.</p>	<p>A14 Simplify $\log \frac{1}{2} + \log \frac{2}{3} + \log \frac{3}{4} + \dots + \log \frac{2000}{2001} + \log \frac{2001}{2001}$</p>	<p>A15 $y = 5x$ reflects across $y = x$ to $y = mx$. $m = ?$</p>
<p>A16 $r^2 - h^2 = 101$ r and h are positive integers. $r = ?$</p>	<p>A17 How many ways are there to arrange the letters in the word SILLY?</p>	<p>A18 If $\frac{\sin \theta}{\cos \theta + 1} = \frac{1}{3}$, evaluate $\frac{\sin \theta}{\cos \theta - 1}$.</p>	<p>A19 A right triangle has hypotenuse $\sqrt{41}$ and legs of integer length. How long is the shorter leg?</p>	<p>A20 $4^a = 2$ $a + b = 3$ $a = ?$</p>

<p>A21 5 goats eat a lawn in 4 hours. How many minutes does it take 6 goats to eat the lawn?</p>	<p>A22 $x - 3$ is a factor of $kx^3 - 2x^2 + kx - 12$. $k = ?$</p>	<p>A23 The big circle has center A and is tangent to the small circle at C. If $AC = 2$, what is BD?</p> 	<p>A24 Simplify $\frac{(2+i)^5(2-i)^4}{5^4}$ for $i^2 = -1$.</p>	<p>A25 $\log_{x^2}(x^x) = 6$ $x = ?$</p>
<p>A26 $a_1 = 1$ $a_{n+1} = \frac{a_n}{1 + a_n}$ Evaluate a_{100}</p>	<p>A27 $x + y = k$ and $x^2 + y^2 = 18$ intersect at exactly one point, $k = ?$</p>	<p>A28 $ABCDE$ is a regular pentagon. Find $\angle AFB$ in degrees.</p> 	<p>A29 Simplify $\frac{(5^2 - 1)(9^2 - 1) \dots (41^2 - 1)}{(3^2 - 1)(7^2 - 1) \dots (39^2 - 1)}$</p>	<p>A30 $y = x^2 - 6$ and $x = y^2 - 6$ intersect in the first quadrant at (a, b). What is a?</p>
<p>A31 Write $8^{666}(2^4 + 3^2)^{1001}$ in lowest terms without exponents.</p>	<p>A32 $\angle ABC = 90^\circ = \angle AFB$. $AB = 3$ and $BC = 4$. $BF = ?$</p> 	<p>A33 Simplify $\frac{11 + 9(1,222,221)}{11}$</p>	<p>A34 Simplify $\log_8 9 \cdot \log_5 16 \cdot \log_6 25 \cdot \log_7 36 \cdot \log_8 49 \cdot \log_8 64$</p>	<p>A35 $a - b = 80$ $\sqrt{a} - \sqrt{b} = 4$ $a = ?$</p>
<p>A36 Simplify $\frac{11 + 9(1,222,221)}{11}$</p>	<p>A37 The triangle has area 6. What is its perimeter?</p> 	<p>A38 What is the largest prime factor of 29391?</p>	<p>A39 What is the rightmost digit when $1 + 2001 + 2001^2 + \dots + 2001^{2001}$ is written as an integer?</p>	<p>A40 How many consecutive zeros are at the end when $2001^{2001} - 1$ is written as an integer?</p>

<p>B1</p> <p>What is the largest prime factor of $59^2 - 42^2$?</p>	<p>B2</p> <p>$a - b = 5^\circ$ $b - c = 20^\circ$ $a = ?$</p> 	<p>B3</p> <p>How many consecutive 0's are at the end when $7890 \cdot 7890^2 \cdot \dots \cdot 7890^{10}$ is written as one integer?</p>	<p>B4</p> <p>$x^2 + kx + 5x$ has exactly one root. $k > 0$ $k = ?$</p>	<p>B5</p> <p>The circles have centers A and B $AB = 2$ $CD = ?$</p> 
<p>B6</p> <p>$a - b = 80$ $\sqrt{a} - \sqrt{b} = 4$ $a = ?$</p>	<p>B7</p> <p>Simplify $8^8(2^4 + 3^2)^{11}10^{-20}$ writing it without exponents.</p>	<p>B8</p> <p>How many points (x,y) whose coordinates are positive integers lie on the line $y = -7x + 100$?</p>	<p>B9</p> <p>ABCDE is a regular pentagon. Find $\angle AFB$ in degrees.</p> 	<p>B10</p> <p>A 2-digit number is 72 more than the sum of its digits. What is its tens digit?</p>
<p>B11</p> <p>$x - 3$ is a factor of $kx^3 - 2x^2 + kx - 12$. $k = ?$</p>	<p>B12</p> <p>$\angle BAC = 57^\circ$ $\angle ACB = 33^\circ$ $AM = 2 = CM$. $BM = ?$</p> 	<p>B13</p> <p>$r^2 - h^2 = 101$ r and h are positive integers. $r = ?$</p>	<p>B14</p> <p>$y = k$ and $y = x^2 + 12x + 40$ intersect at exactly one point. What is k?</p>	<p>B15</p> <p>What is the largest prime factor of 29391?</p>
<p>B16</p> <p>Find x in degrees.</p> 	<p>B17</p> <p>Solve for x:</p> $x^3 - 3x^2 + 3x - 1 = 8 \cdot 10^9$	<p>B18</p> <p>The lines $y = 0$, $x + 3$, $y = mx$ form a triangle of area 18. $m = ?$</p>	<p>B19</p> <p>$(3 + r\sqrt{2})^2 = 17 + s\sqrt{2}$ r and s are rational numbers. $r > 0$ $s = ?$</p>	<p>B20</p> <p>Simplify</p> $[1 - (x^{-1} + 1)^{-1}]^{-1}$

<p>B21</p> <p>Simplify $\left(\frac{998}{999^2 - 1}\right)^{-\frac{1}{3}}$</p>	<p>B22</p> <p>The triangle has area 6.</p> <p>What is its perimeter?</p> 	<p>B23</p> <p>5 goats eat a lawn in 4 hours. How many minutes does it take 6 goats to eat the lawn?</p>	<p>B24</p> <p>$x^3 + ax^2 + bx - 7$ has three different integer roots.</p> <p>What is a ?</p>	<p>B25</p> <p>How many points with integer coordinates lie on the circle of radius 5 centered at the origin?</p>
<p>B26</p> <p>Simplify</p> $\frac{(5^2 - 1)(9^2 - 1) \dots (41^2 - 1)}{(3^2 - 1)(7^2 - 1) \dots (39^2 - 1)}$	<p>B27</p> <p>How many ways are there to arrange the letters in the word SILLY ?</p>	<p>B28</p> <p>Solve for x:</p> $x(x^{1/2} + 6)^{-1} = 3.$	<p>B29</p> <p>The big circle has center A and is tangent to the small circle at C. If $AC = 2$, what is BD?</p> 	<p>B30</p> $24^r 18^s = \frac{2}{27}$ <p>r and s are integers.</p> <p>$r = ?$</p>
<p>B31</p> $r^2 + s^2 = 10$ $rs = 3$ <p>Evaluate $(r + s)^4$.</p>	<p>B32</p> <p>$\angle ABC = 90^\circ = \angle AFB$.</p> <p>$AB = 3$ and $BC = 4$.</p> <p>$BF = ?$</p> 	<p>B33</p> <p>Simplify</p> $\frac{11 + 9(1,222,221)}{11}$	<p>B34</p> <p>Find the largest real number c such that $x^2 - 5x + c$ has an integer root.</p>	<p>B35</p> $\frac{4^a}{8^b} = 2$ $a + b = 3$ $a = ?$
<p>B36</p> <p>A circle of radius r is inscribed in a right triangle with two legs of length 2. Evaluate and simplify $2-r$.</p>	<p>B37</p> <p>For how many integers n is $\sqrt{n+3} + \sqrt{4-n}$ a real number?</p>	<p>B38</p> <p>A triangle has area 1 and sides of lengths 1 and 2. How long is the third side?</p>	<p>B39</p> <p>What is the rightmost digit when $1 + 2001 + 2001^2 + \dots + 2001^{2001}$ is written as an integer?</p>	<p>B40</p> <p>How many consecutive zeros are at the end when $2001^{2001} - 1$ is written as an integer?</p>