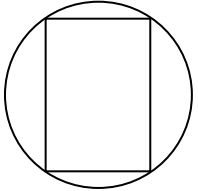
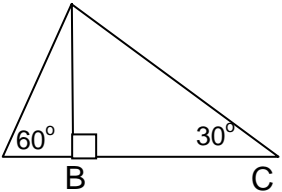
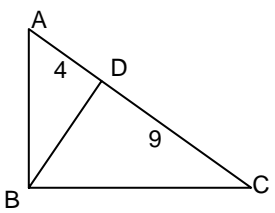
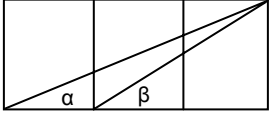
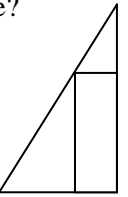
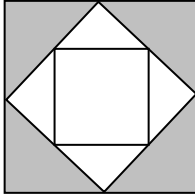
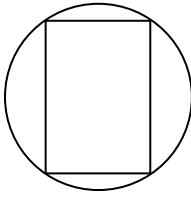
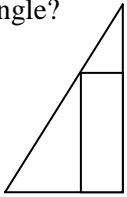
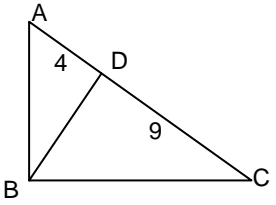


<p>A1</p> <p>What is the area of a circle circumscribed about a 2-by-6 rectangle?</p> 	<p>A2</p> <p>The line through $(-3,b)$ and $(1,2)$ has slope $-1/2$. $b = ?$</p>	<p>A3</p> <p>Evaluate $\log_{64}((8^8)^8)$.</p>	<p>A4</p> <p>For what number k is the circle $x^2 + 6x + y^2 - 2y = k$ tangent to the y-axis?</p>	<p>A5</p> <p>Evaluate θ in degrees if $1 + \cos \theta + 5 \sin^2 \theta = 0$ and $0^\circ \leq \theta < 360^\circ$.</p>
<p>A6</p> <p>If k is a positive integer and $(k + 2)! = 90(k!)$, what is k? Recall that $n! = n(n - 1) \cdots 2 \cdot 1$</p>	<p>A7</p> <p>$f(x) = 3x + 2$ for all x. Solve for r: $f(f(r)) = 17$.</p>	<p>A8</p> <p>Simplify $\cos^{-1}(1/4) + \sin^{-1}(1/4)$ in radians.</p>	<p>A9</p> <p>What is the area of the triangle with vertices $(0,0)$, $(-1,1)$, and $(2,2)$?</p>	<p>A10</p> <p>$\log_{10}(100^x) = 12$. What is x?</p>
<p>A11</p> <p>$\tan \theta = 3$. Evaluate $\sin(2\theta)$.</p>	<p>A12</p> <p>$4x^2 + kx + 20$ has integer roots. $k > 0$. $k = ?$</p>	<p>A13</p> <p>Three vertices of a parallelogram are $(0,0)$, $(2,1)$ and $(-1,3)$. The fourth vertex is (h,k) for $h < 0$. Find h.</p>	<p>A14</p> <p>$y = x^2 - 6x + 14$ intersects $y = r$ exactly once. $r = ?$</p>	<p>A15</p> <p>How many 2-digit integers have two different digits?</p>
<p>A16</p> <p>$AB = 1$ $AC = ?$</p> 	<p>A17</p> <p>What is the smallest number k such that the graphs of $-\frac{x^2}{9} + \frac{y^2}{16} = 1$ and $x^2 + y^2 = k$ intersect?</p>	<p>A18</p> <p>What is the probability that two rolled dice show different numbers of spots?</p>	<p>A19</p> <p>What is the period of $\sin(x/4) + \cos(x/2)$?</p>	<p>A20</p> <p>The system $3x + y = 0$ $(k + 1)x + ky = 1$ has no solutions. What is k?</p>

<p>A21</p> $f(x) = \frac{4x-1}{2x+5}$ <p>$f^{-1}(3) = ?$</p>	<p>A22</p> <p>Solve for x:</p> $x^{\log_5 x} = x$ <p>$x > 1$</p>	<p>A23</p> <p>$\angle ABC = 90^\circ = \angle ADB$, $AD = 4$, $DC = 9$. $BD = ?$</p> 	<p>A24</p> <p>Multiplying out $(x + k)^4$ gives a term $108x$. Find k.</p>	<p>A25</p> <p>Simplify completely</p> $\cos^2 x (1 - \tan^4 x + \sec^4 x)$
<p>A26</p> <p>$\angle ABC = 90^\circ$, $A = (2, 6)$ $B = (0, 0)$, $C = (r, 1)$. $r = ?$</p>	<p>A27</p> <p>Simplify</p> $\left(\frac{6^x + 6^{-x}}{2}\right)^2 - \left(\frac{6^x - 6^{-x}}{2}\right)^2$	<p>A28</p> <p>What positive number is the y-intercept of a line of slope -2 that forms a triangle of area 36 with the coordinate axes?</p>	<p>A29</p> <p>Evaluate</p> $\sin(120^\circ) + \sin(240^\circ)$	<p>A30</p> <p>Let $f(x) = x10^x$. Solve for a: $f(a+1) = 5f(a)$.</p>
<p>A31</p> <p>Solve for x:</p> $\left(\frac{1}{x} - \frac{1}{3}\right)^3 = \frac{1}{3x} - \frac{1}{27}$	<p>A32</p> <p>How many ways are there to arrange the letters in TILT so that the I and the L do not touch?</p>	<p>A33</p> <p>$f(x) = x^2 + kx + 5$ has minimum value 4. $k = ?$</p>	<p>A34</p> <p>The figure shows three squares.</p>  <p>Find $\tan(\alpha + \beta)$.</p>	<p>A35</p> <p>If $i^2 = -1$, simplify $(2 + i)^3 + (2 - i)^3$.</p>
<p>A36</p> <p>$x^5 = 11^{27}y$. $11^6x = y^4$. $x > 0, y > 0$. $\log_{11}(y) = ?$</p>	<p>A37</p> <p>A 4-by-1 rectangle is inscribed in a right triangle that has a leg of length 3. What is the area of the triangle?</p> 	<p>A38</p> <p>True or false: $\left(1 + \frac{1}{6}\right)^6 > 2$</p>	<p>A39</p> <p>Find the next term in the sequence $-1, 3, 11, 27, 59, \dots$</p>	<p>A40</p> <p>$f(x) = x^3 + 2003x + 4$ Evaluate $f(2003) + f(-2003)$</p>

<p>B1 Simplify</p> $\frac{1}{2 - \frac{1}{1 - \frac{3}{5}}}$	<p>B2 The figure shows three squares. The innermost one has area 1. Find the shaded area.</p> 	<p>B3 If k is a number such that $x^2 - 2003x + k$ has 2001 as one root, what is the other root?</p>	<p>B4 $10 \cdot 100 \cdot 1000 \cdots 10^{10} = 10^x$ $x = ?$</p>	<p>B5 What is the largest integer b such that $x^3 - bx + 3$ has an integer root?</p>
<p>B6 What is the area of a circle circumscribed about a 2-by-6 rectangle?</p> 	<p>B7 What integer is 5 more than 4 times its positive square root?</p>	<p>B8 What is the largest prime factor of 9,191?</p>	<p>B9 <i>The system</i> $3x + y = 0$ $(k + 1)x + ky = 1$ <i>has no solutions.</i> What is k?</p>	<p>B10 What is the area of a triangle that has two sides of length 5 and one of length 8?</p>
<p>B11 If $i^2 = -1$, simplify $(2 + i)^3 + (2 - i)^3$.</p>	<p>B12 What is the smallest positive integer that has 200, 64, and 75 as factors?</p>	<p>B 13 $x^5 = 11^{27}y$. $11^6x = y^4$. $y = 11^k$. $k = ?$</p>	<p>B14 Simplify</p> $\frac{3^{10} - 1}{3^9 + 3^8 + \dots + 1}$	<p>B15 Switching the digits of a two-digit number reduces it by 27. The digits add up to 13. What is the larger digit?</p>
<p>B16 Multiplying out $(x + k)^4$ gives a term $108x$. Find k.</p>	<p>B17 Evaluate $99r$ for $r = 2.0202020\dots$</p>	<p>B18 What is the probability that two rolled dice show different numbers of spots?</p>	<p>B19 $4x^2 + kx + 20$ has integer roots. $k > 0$. $k = ?$</p>	<p>B20 Set A has 10 elements. Set B has 15 elements. $A \cup B$ has 22 elements. How many elements does $A \cap B$ have?</p>

<p>B21</p> <p>The lines $y = 3x$, $y = 0$, and $x = r$ enclose a triangle of area 150.</p> <p>$r = ?$</p>	<p>B22</p> $a + \frac{1}{a} = 3$ $a^2 + \frac{1}{a^2} = ?$	<p>B23</p> <p>What integer n with $20 < n < 30$ has exactly one integer factor k with $1 < k < n$?</p>	<p>B24</p> <p>Solve for x:</p> $ x = x - 3 + 1$	<p>B25</p> <p>A 4-by-1 rectangle is inscribed in a right triangle that has a leg of length 3. What is the area of the triangle?</p> 
<p>B26</p> <p>In what base b does $3_b \cdot 17_b = 45_b$?</p>	<p>B27</p> <p>How many quarts of antifreeze must be added to 6 quarts of water to give a solution that is 40% antifreeze?</p>	<p>B28</p> <p>For what number k is the circle $x^2 + 6x + y^2 - 2y = k$ tangent to the y-axis?</p>	<p>B29</p> <p>True or false:</p> $\left(1 + \frac{1}{6}\right)^6 > 2$	<p>B30</p> <p>Simplify</p> $\left(\frac{6^x + 6^{-x}}{2}\right)^2 - \left(\frac{6^x - 6^{-x}}{2}\right)^2$
<p>B31</p> <p>$\angle ABC = 90^\circ = \angle ADB$, $AD = 4$, $DC = 9$. $BD = ?$</p> 	<p>B32</p> <p>How many 2-digit integers have two different digits?</p>	<p>B33</p> <p>$y = x^2 - 6x + 14$ intersects $y = r$ exactly once.</p> <p>$r = ?$</p>	<p>B34</p> <p>If k is a positive integer and $(k + 2)! = 90(k!)$, what is k?</p> <p>Recall that $n! = n(n - 1) \cdots 2 \cdot 1$</p>	<p>B35</p> <p>Evaluate</p> $\frac{(2003)^2 - 2000^2 - 3^2}{2000}$
<p>B36</p> <p>Solve for x:</p> $\left(\frac{1}{x} - \frac{1}{3}\right)^3 = \frac{1}{3x} - \frac{1}{27}$	<p>B37</p> <p>Find the next term in the sequence $-1, 3, 11, 27, 59, \dots$</p>	<p>B38</p> <p>How many ways are there to arrange the letters in TILT so that the I and the L do not touch?</p>	<p>B39</p> <p>How many digits are there in the expansion of 2^{21}?</p>	<p>B40</p> <p>Evaluate</p> $1997 + 1998 + 1999 + 2000 + 2001 + 2002 + 2003$