

<p>1. C.</p>	<p>2. B. The altitude is the mean proportional between the hypotenuse segments.  <math>10/20 = 20/40</math>.  <math>10^2 + 20^2 = 500</math>; Shorter leg = <math>10\sqrt{5}</math></p>
<p>3. D. Coefficients must equal zero  <math>a - c = -2</math>  <math>a - 2b = -1</math>  <math>a + b - c = 0</math>  <math>a = 3</math>; <math>b = 2</math>; and <math>c = 5</math></p>	<p>4. D. Radius of the circumcircle is 6.5.  Radius of the incircle is 2.  Area bounded by both circles =  <math>\frac{169p - 16p}{4} = \frac{153p}{4}</math></p>
<p>5. E. <math>\frac{40 + 17\sqrt{5}}{2 + \sqrt{5}} - \frac{2 - \sqrt{5}}{2 - \sqrt{5}} = 5 + 6\sqrt{5}</math></p>	<p>6. D. <math>2001 = \frac{a}{1 - \frac{1}{3}}</math>; <math>2001 = \frac{3a}{2}</math>; <math>a = \frac{4002}{3}</math></p>
<p>7. D. <math>x^3 - 7x + 6 = 0</math>  <math>x = -3, 1, \text{ or } 2</math></p>	<p>8. C. Use the pattern:  <math>a^3 + b^3 = (a + b)(a^2 - ab + b^2)</math></p>
<p>9. C. <math>\frac{1}{7} \sum_{n=1}^{35} n + (35)(2)</math>  <math>\frac{1}{7} (630) + 70 = 160</math></p>	<p>10. A. <math>1000N = 590.9090\dots</math>  <math>10N = 5.9090\dots</math>  <math>990N = 585</math>; <math>N = 13/22</math></p>
<p>11. D. <math>a = 2001 = (3)(667)</math>  <math>b = (4)(667) = 2668</math>  <math>c = (5)(667) = 3335</math></p>	<p>12. B. <math>e^{2000} \cdot \frac{1}{e^{2000}} = 1</math></p>
<p>13. C. Two choices for the hundreds digit  Five choices for each other digit.  <math>2 \times 5 \times 5 \times 5 \times 5</math></p>	<p>14. A. <math>1 - \frac{40 \cdot 39 \cdot 38 \cdot 37 \cdot 36}{40 \cdot 40 \cdot 40 \cdot 40 \cdot 40} = .2288</math></p>
<p>15. B. <math>1000 = 500(1.06)^n</math>  <math>\log 2 = n \log 1.06</math>  <math>n = 11.9</math></p>	<p>16. C. <math>\frac{1}{a} + \frac{1}{b} = \frac{b + a}{ab}</math>;  Sum of reciprocals = <math>\frac{1002}{2001} = \frac{334}{667}</math></p>
<p>17. C. The 55th term is the last term of the tens.  <math>1^2 + 2^2 + 3^2 + \dots + 10^2 = 385</math></p>	<p>18. B. area is 1/2 the absolute value of the  determinant: <math>\begin{vmatrix} 1 &amp; 2 &amp; 4 \\ 1 &amp; 8 &amp; 3 \\ 1 &amp; -3 &amp; 12 \end{vmatrix}</math></p>

19. **A.** When the cube is completely submerged it displaces its total volume. after water has been removed, the displacement is only half or what it was. Hence the cube is only half submerged. So, the depth of the water is 2.5 inches.

20. **A.** Select three letters from P R B O L:  ${}_5C_3$   
 Arrange five things where 2 are alike.  $10 \times \frac{5!}{2!}$

21. **A.**  $\frac{1}{3}\pi r^2 h = \frac{2}{3}\pi r^3$  ;  $h = 2r$

22. **C.** The points are  $\frac{20x}{60}$ ;  $\frac{21x}{60}$ ;  $\frac{22x}{60}$ ;  $\frac{23x}{60}$ ;  $\frac{24x}{60}$

23. **B.**  $\frac{30 \times 25 \times 60}{5000 + 25 \times 60} = 6.9$

24. **C.** The prime factors of 2001 are 3, 23, and 29  
 Hence, there are  $2^3$  positive integral divisors

25. **B.**  $2001^{21} = (2000 + 1)^{21}$   
 $= \dots 21(2000) + 1 = \dots + 42000 + 1$

26. **D.**  $xy = 1$

27. **A.** The coordinates of the centroid:  
 The average of the coordinates.  
 $\frac{3+9+-6}{3}, \frac{4+1+7}{3}$

28. **B.**  $v(t) = 3(t^2 - 4t + 3) = 3(t-3)(t-1)$   
 $v(t)$  is negative for  $1 < t < 3$

29. **A.**  $g(0)=-1$ ;  $g(1)=1$ ;  $g(2)=-3$ ;  $g(3) = 7$   
 $g(4)=-17$ ;  $g(5)=41$ ;  $g(6) = -99$

30. **A.** The odd numbers must be in the order 1, 3, 5, 7. There are 5 places for the first even number pick, then 6 for the second and lastly 7. Total  $5 \times 6 \times 7$   
 Probability:  $\frac{5 \times 6 \times 7}{7!} = \frac{1}{24}$