1. (B) Line passes through $(0, a)$ and $(a, 0)$. $m = (a - 0)/(0 - a) = -a/a = -1$

2. (E) The set is: $\{\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}\}$. Of the 10 elements, only the decimal representations of $\frac{1}{3}$ and $\frac{2}{3}$ do not terminate. So 8 of 10 terminate, thus 4/5.

3. (D) The dimensions of the box are $s \times \frac{36}{s} \times \frac{63}{s}$; If the sides have integer length, the largest value for s is 9 and the smallest value is 1. $V = \frac{2268}{s}$; Minimum value for V is 252, maximum is 2268.

4. (C) Let a be the value of the fifth score. $\bar{x} = \frac{a+388}{5}$. For $\bar{x}$ to be an integer, a must be 2 plus a multiple of 5. 97 works, 92 works, anything less than 92 will not work.

5. (B) The numbers are 96, 95, 87.

6. (B) P(misses two) $\cap$ [P(makes one) $\cup$ P(misses one and makes one)] $= 0.2^2[0.8 + 0.2 \times 0.8] = 0.0384$

7. (D) $5a - 3b = 0, -10a + 6b = 0, 5c - 3d = 0, -10c + 6d = 0 \rightarrow a = \frac{3}{5}b, c = \frac{3}{5}d$. If a, b, c, and d must be positive integers, $b = 5$ and $d = 5$ which makes $a = 3$ and $c = 3$.

8. (B) Let w be the number of hours worked on weekdays, t for Saturdays, and n for Sundays. $w + t + n = 180$ and $10w + 15t + 20 = 2315$. In the first equation, solve for t and substitute into the second equation. $t = 180 - w - n \rightarrow 10w + 15(180 - w - n) = 2315$. Simplify to get $w - n = 77$.

9. (D) $s(s(1/6)) + S(S(1/3)) = s(\sin \frac{\pi}{6}) + S(\sin^2 \frac{\pi}{3}) = s(\frac{1}{2}) + S(\frac{3}{4}) = \sin \frac{\pi}{2} + \sin^2 \frac{3\pi}{4} = 1 + \frac{1}{2}$

10. (C) $p = 2, q = 17, r = 59$, $p + q + r = 78$ which is even, so one of the primes must be 2. The problem reduces to finding the pairs of primes that sum to 76. All possible other solution sets: $\{2, 3, 73\}, \{2, 5, 71\}, \{2, 23, 53\}, \{2, 29, 47\}$.

11. (B) $105 = 3 \cdot 5 \cdot 7$. Eliminate all numbers less than 1000 that are divisible by 3, 5 and 7. 333 divisible by 3, $200 - 66 = 134$ divisible by 5 and not 3, $142 - 47 - 28 + 9 = 76$ divisible by 7 but not 3 or 5. So we get $1000 - (333 + 134 + 76) = 457$.

12. (D) Let M be the midpoint of $\overline{\text{AB}}$. EM $= 12$, the altitude of $\triangle$ABE. $\triangle$MBE $\sim$ $\triangle$GCB so $\frac{12}{5} = \frac{10}{\text{CG}} \rightarrow \text{CG} = \frac{25}{6}$. Area $= 10^2 - (2)(\frac{1}{2})(\frac{25}{6})(10)$.

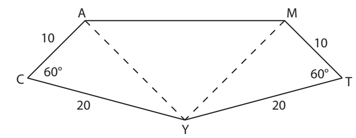
13. (A) $x^{\log_{25} 9} + 9^{\log_{25} x} = 54 \rightarrow (25^{\log_{25} x})^{\log_{25} 9} + (25^{\log_{25} 9})^{\log_{25} x} = 54 \rightarrow 2 \cdot 9^{\log_{25} x} = 54 \rightarrow 9^{\log_{25} x} = 27 \rightarrow \log_{25} x = \frac{3}{2} \rightarrow x = 125$. Solve $x^3 - 125x^2 - x + 125 = 0$ using factoring by grouping to get $x = \{-1, 1, 125\}$.

14. (A) What is the prob. that in 5 chosen (lost) at random, you have exactly one pair? $P = \dfrac{8 \times_7 C_3 \times 2^3}{_{16}C_5}$. 8 is the number of ways to pick a pair, $_7C_3$ is the number of ways to chose three socks that don't match, 2^3 because there are two ways to pick the first non pair, two ways to pick the second and two ways to pick the third. $_{16}C_5$ is the number of ways to pick 5 socks from the 16.

15. (C) irrational zeros of $h(k(x))$ are $x = \frac{3\pm\sqrt{37}}{2}$, irrational zeros of $k(h(x))$ are $x = \frac{1\pm\sqrt{17}}{4}$

16. (A) rational zero of $h(k(x))$ is $x = \frac{1}{2}$, rational zero of $k(h(x))$ is $x = -\frac{7}{4}$

17. (D) We can conclude that $\angle C = \angle T = 60°$. Draw lines AY and MY and you have triangles with sides in the ratio of 2:1 with a 60° included angle so they must be 30-60-90° triangles. It follows that AYM is a 45-45-90° right triangle. AY = MY = $10\sqrt{3}$. The area is then $2(\frac{1}{2})(10)(10\sqrt{3}) + \frac{1}{2}(10\sqrt{3})^2 \approx 323$



18. (B)

19. (E) $3^{2007} = (10^{\log_{10} 3})^{2007} \approx (10^{0.4771})^{2007} \approx 10^{957.5824} = 10^{0.5824} \times 10^{957} \approx 3.8226 \times 10^{957}$

20. (E) $a_2/a_1 = 2, \quad a_3/a_2 = 2.5, \quad a_4/a_3 = 3, ... \quad a_n/a_{n-1} = \frac{1}{2}n + 1$