1. $\boxed{\text{B}}$. There are two cases here. The probability of Keigo tossing no head is $\frac{1}{2}$ and the probability of Ephraim tossing no head is $\frac{1}{4}$ so there is $\frac{1}{2} \cdot \frac{1}{4} = \frac{1}{8}$ chances of tossing 0 head by both of them.

   The probability of Keigo tossing 1 head is $\frac{1}{2}$ and the probability of Ephraim tossing 1 head is also $\frac{1}{2}$ for a combined $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$.

   Add the two cases together, we have $\frac{1}{8} + \frac{1}{4} = \boxed{\frac{3}{8}}$.

2. $\boxed{\text{B}}$. The ratio of single women to married women is 2 : 3. Thus, the ratio of single women to married women to married men is 2 : 3 : 3. The fraction is then $\boxed{\frac{3}{8}}$.

3. $\boxed{\text{D}}$. There are a total of $\binom{8}{2} = 28$ selections. There are $\binom{4}{1} = 4$ ways to select a pair of same letters and $2 \times \binom{4}{2} = 12$ ways to select a pair of same color. Thus, the probability is $\dfrac{\binom{4}{1} + \binom{4}{2} + \binom{4}{2}}{\binom{8}{2}} = \boxed{\frac{4}{7}}$.

4. $\boxed{\text{D}}$. Let's change the problem to Alice randomly selected one ball that happens to be red ($\frac{1}{5}$ of a chance) and Bob randomly selected one ball that happens to be red as well (the probability is $\frac{2}{6} = \frac{1}{3}$. Then, we have a probability of $\frac{1}{5} \cdot \frac{1}{3} = \frac{1}{15}$. Now, selecting the red ball is the same as the other four color, so we have five equal cases. The probability is $5 \cdot \frac{1}{15} = \boxed{\frac{1}{3}}$.

   Remark: Recasting the probability to make is simple is a frequently used problem solving strategies. By thinking of selecting only one color, we made it easy to calculate the combined probability. Extending the results to five equal cases became very straight forward.

5. $\boxed{\text{C}}$. The unit digit of 3^a follows a pattern of 3, 9, 7, 1. The unit digit of 7^b follows a pattern of 7, 9, 3, 1. To get a unit digit of 8, we have three cases: (7, 1), (9, 9), (1, 7) out of 16 possibilities. Thus, the probability is $\boxed{\frac{3}{16}}$.

6. $\boxed{\text{D}}$. We can simply list the outcomes for the sum of first two numbers each to third.

   1: 0

   2: (1, 1)

   3: (1, 2), (2, 1)

   4: (1, 3), (2, 2), (3, 1)

   5: (1, 4), (2, 3), (3, 2), (4, 1)

   6: (1, 5), (2, 4), (3, 3), (4, 2), (5, 1).

   So, the total case is 15. Out of the 15 cases, 8 contains a digit of 2. Therefore the probability is $\boxed{\frac{8}{15}}$.

Remark: Be careful to include the 2: (1, 1) case as the problem just asks a 2 is tossed, but did not say it must be in the first two tosses. Sometime, a problem seems complex, but a brutal force approach will work as long as the number of cases are limited and you are detailed oriented to list all cases. Here, listing 15 cases is very manageable so don't need to risk a careless mistake using other techniques.

7. $\boxed{\text{C}}$. First, convert the ratio into probability. The probability of rolling 1, 2, 3, 4, 5 and 6 are respectively $\frac{1}{21}$, $\frac{2}{21}$, $\frac{3}{21}$, $\frac{4}{21}$, $\frac{5}{21}$, and $\frac{6}{21}$.

   There are three cases of getting a 7 from two dice:

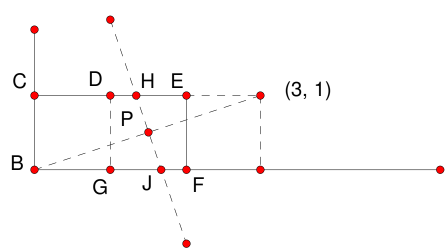
   (1, 6): the probability is $\frac{1}{21} \cdot \frac{6}{21}$.

   (2, 5): the probability is $\frac{2}{21} \cdot \frac{5}{21}$.

   (3, 4): the probability is $\frac{3}{21} \cdot \frac{4}{21}$.

   Each has two equal cases, e.g., (1, 6) and (6, 1), for a total of $\frac{2}{21^2}(6 + 10 + 12) = \boxed{\frac{8}{63}}$.

8. $\boxed{\text{C}}$. This is a geometric probability problem. Drawing an accurate diagram will greatly improve your ability of solving them. As in the diagram, points in area [BCHJ] is closer to origin and points in area [EFHJ] is closer to (3, 1). Thus, the probability is $\frac{[BCHJ]}{[BCEF]} = \boxed{\frac{3}{4}}$.



9. $\boxed{\text{E}}$. Each of the integers can be even or odd to have a total of $2^4 = 16$ choices. Since we have 2008 numbers, there is an equal possibility of selecting an even and an odd number, which simplifies the calculation. Use complimentary counting, we can list the cases that $ad - bc$ is odd: $OO - OE, OO - EO, OO - OO, OE - OO, EO - OO, EE - OO$ for a total of 6 cases. Thus, the probability is $1 - \frac{6}{16} = \boxed{\frac{5}{8}}$.

   Remark: Again, we take a brutal force approach to simply list the six cases in question without the need of advanced techniques.