Math 5b, homework 5.

1. Simplify the expressions:
   $5^5 \cdot 5^5$; $5^5 : 5^5$; $5^5 \cdot 5^{-5}$; $5^5 : 5^{-5}$;

   $5^{-5} \cdot 5^5$; $5^{-5} : 5^5$; $5^{-5} \cdot 5^{-5}$; $5^{-5} : 5^{-5}$;

2. Compare with 0 and with 1 and -1:
   Example:
   $$3^{-3} = \frac{1}{3^3}; \quad \frac{1}{3^3} < 1; \quad \frac{1}{3^3} > 0; \quad \frac{1}{3^3} > -1$$

   2^{-3}; $(-2)^3$; $(-2)^{-3}$; -2^{-3};

   2^{-4}; $(-2)^4$; $(-2)^{-4}$; -2^{-4};

3. Compare:
   $a.\ 5^0\ and\ (-5)^0$; $b.\ -3^2\ and\ (-3)^2$; $c.\ 5^{-2}\ and\ 5^2$;

   $d.\ -3^2\ and\ (-3)^2$; $e.\ 3^{-5}\ and\ \left(\frac{1}{3}\right)^5$; $f.\ \left(\frac{2}{3}\right)^5\ and\ \left(\frac{3}{2}\right)^{-5}$;

4. *Is the product
   $$20^2 \cdot 27^3$$
   divisible by 12, 15, 17, 18, 35, 36?

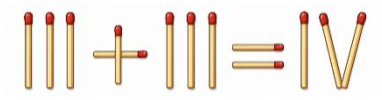
5. Is it true that if a natural number leaves a remainder of 7 when divided by 15, then it leaves a remainder of 1 when divided by 3? Explain your reasoning. Do not simply answer "Yes" or "No."

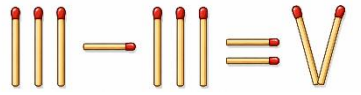
6. Without doing calculation prove that
   $a.\ \frac{1}{3} + \frac{1}{4} > \frac{1}{2}$; $b.\ \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} > \frac{1}{2}$

7. Evaluate:
   $a.\ 5 \cdot (-3)^3 + 7$ $b.\ -2 \cdot (-1.1)^2 + 15$ $c.\ 10 - 7 \cdot (-2)^7$

   $d.\ -20 - 10 \cdot (-0.1)^2$; $e.\ 7 \cdot (-1)^3 - 4 \cdot (-1)^2 - 8$; $f.\ -10 \cdot (-0.3)^2 - 5 \cdot (-0.3) + 1$;

8. Move one matchstick to make the equation correct.





9.