MATH 7 HOMEWORK 2 REVIEW

September, 22 2024

1. You throw a coin 5 times. What is the probability to get a) TTHTT? b) HHHTT?

2. In how many ways can one arrange 5 books on a shelf?

3. We roll two identical dice. What is the probability of getting 1 and 3?

4. A group of 6 club members always dine at the same round table in the club. There are exactly 6 chairs at the table. They decided that each day, they want to seat in a different order. How many different arrangements are possible? Sitting arrangement is considered different if it can't be reduced to the existing one by rotation.

5. In a computer game, a wizard is more powerful than an orc, so when a wizard fights an orc, he has 60% chance of winning. If a wizard fights one by one a group of 5 orcs, what are the chances that he will defeat them all?

6. For each of the sets below, draw it on the number line and then describe its complement

   (a) $[0,2]$ (b) $(-\infty, 1] \cup [3, \infty)$ (c) $(0,5) \cup (2, \infty)$

Hint: you should have 6 number lines.

7. Solve the following inequalities, draw solution on the number line
   a. $-x < 2$
   b. $2 - 3x > 5$
   c. $3x + 1 < 5x + 7$
   d. $1 + 5x < 3x$
   e. $2x - 1 < x - 7$

8. Solve the following inequality: $(x + 1)(x - 2) > 0$

9. Expand the expressions:

   a. $2x(a + 2b + 3c)$
   b. $-3y(a - ay + by)$
   c. $(a^2 + 2a + 1)(a + 1)$
   d. $(b^2 - 2b + 1)(b - 1)$
   e. $(4x - 7y)(4x + 7y)$
   f. $(6x^2 - y)(7x^2 - 2x - 5)$

10. Factor (i.e., write as a product) the following expressions:
   a. $ac + ab$
   b. $x^2 + 3x^3$
   c. $x^2 - 2x - yx + 2y$
   d. $4x^2 - 4x + 1$
   e. $4x^2 + 16x + 2xy + 8y$
   f. $x^2(x + 4) + 5(x + 4)$
   g. $100x^8y^2 - 16x^4y^6$
   h. $-a^2 + 4ab + 4b^2a^2 - 2a + 1 - 1$
   i. $x^2 - 7$ $Hint: 7 = (\sqrt{7})^2$
   j. $a^4 - b^4 Hint: a^4 = (a^2)^2$