

Math 9 placement test

1. Open brackets and expand the following expressions

a. $(a + b)^2 =$

b. $(a - b)^3 =$

2. Factor the following expressions

a. $a^2 - b^2 =$

b. $a^3 - b^3 =$

c. $a^3 + b^3 =$

d. $1 + a + a^2 + a^3 =$

3. Find the coefficient of x^5 in the expression $(1 + 2x)^8$

4. Find the remainder of 3^{2014} upon division by 7.

5. Solve the equation

$$\frac{x^2 + 1}{2x} + \frac{2x}{x^2 + 1} = 2$$

6. Eight teams have reached the quarter-finals of the soccer World Cup.

a. How many ways are there for these teams to be paired to play the quarter-final games?

b. How many different outcomes of which team wins which medal (gold, silver, bronze) are possible?

7. Corners of a square with the side a are cut off so that a regular octagon is obtained. Find the area of this octagon.