

# S.M.ART School MBB2 HW due 01-21-2025

## Factor using Major Algebraic Identities

F1  $(17x)^2 - 11^2$

F2  $400x^2 - 169 =$

F3  $9m^2 - 12mn + 4n^2$

F4  $441A^2 - B^2/25 =$

F5  $(16x - 8)^2 - 8^2$

F6  $(1/4)(n+1)^2 - (1/4)(n-1)^2$

F7  $0.25*n^2 + 2*m*n + 4*m^2$

Q1  $4*x + 5*y = 6*x + 8*y$ , what is the ratio of  $y/x$  ?

W1 In a sport car race Sam gives Dan a head start of 40 miles. Sam's car has a speed of 60 miles per hour. Speed of Dan's car is 50 miles per hour. How many minutes should it take for Sam to catch up to Dan if they start at the same time?



V1 By how much fraction  $5/8$  will change if you add 5 to numerator and 5 to the denominator?

V2 By how much fraction  $8/5$  will change if you add 5 to numerator and 5 to the denominator?

B1 What is greater  $1 / (n + 2)$  or  $1 / (n + 1)$  and by how much?

E1 
$$1 / (1 + 1 / (x + 1)) = 3$$

We already discussed how the most elegant way of solving equations like these. We repeat the approach we talked about here below.

The best way to approach this kind of equations is to start flipping both sides.

So the first step here is to rewrite the above equation in the following form:

$$1 + 1/(x + 1) = 1/3.$$

$$\text{Then } 1/(x + 1) = -2/3$$

Now, flip both sides again:

$$x + 1 = -3/2, \text{ and then } x = -5/2$$

**Use the same technique to solve the following equations**

E2 
$$1 / (1 - 1 / (x - 1)) = 3$$

$$E3 \quad 1 / (1 - 1 / (1 - 1 / (x - 1))) = 2$$

### Let's refresh what we have learnt about Probabilities

Probability is defined as a ratio of number of favorable outcomes (M) over total number of possible outcomes (N)

$$P = M / N$$

**Example:** What is the probability of getting number 1 or 2 on the top, when rolling the dice.

**Solution.** First, we have to figure out the N, total number of outcomes.

N = 6, because the top of the dice can be any of its six sides.

Then we have to compute M, number of favorable outcomes.

It is 2, because 1 or 2 on the top are both favorable outcomes for the even we are considering.

Thus,  $P = M / N = 2/6 = 1/3$ .

P1. Let's say you have all two-digit numbers in a bucket. You randomly pull out one number from the bucket. What is the probability, that the number you picked is less than 53 and also divisible by 5? .

P2 What is the probability that when you roll the dice twice the sum of the numbers on the top is divisible by 3?