

Problem set 1

1.

(A) Consider a stack of three tennis balls. Is the height of the stack less or greater than the circumference of one tennis ball?

(B) Now answer the same question with ping-pong balls. Is the answer the same or different?

(C) Now make a statement about 3 stacked spheres in general. Explain/prove your statement.

2. Suppose there are n people in a math 196L class. If they all shook hands with each other what is the total number of handshakes?

3. Suppose there are n people in a math 196L class. If person A shakes hands with person B who shakes hands with person C who again shakes hands with person A, we have a group of 3 people. What is the total number of such possible groups in the class? (Equivalent to 3 people fist-bump)
- 4.
- (A) A coin is flipped 10 times, and the number of heads and tails is counted. How many different ways can one get exactly 3 heads?
- (B) A coin is flipped n times, and the number of heads and tails is counted. How many different ways can one get exactly 3 heads?

Algebra Practice:

1.
$$\frac{\frac{1}{3}(x^2 + 7)^{1/2} - 2x(x^2 + 7)^{-1/2}}{(x^2 + 7)}$$

2.
$$\frac{\frac{3}{(x+h)^2} - \frac{3}{x^2}}{h}$$

3. Write in complete factored form:
- $$6(z-3)^4 - 7(z-3)^3(2z-1)$$