

1. Compute each of the following.

$$(a) \binom{6}{0} - \binom{6}{1} + \binom{6}{2} - \binom{6}{3} + \binom{6}{4} - \binom{6}{5} + \binom{6}{6} = 0$$

$$(b) \binom{6}{0} + \binom{6}{1} + \binom{6}{2} + \binom{6}{3} + \binom{6}{4} + \binom{6}{5} + \binom{6}{6} = 64$$

2. We throw a die twice. How many outcomes are possible where the sum of the two numbers rolled is 4 or more? **33**

3. There are 24 people in the room.

(a) If everyone shakes hands with everyone else, how many handshakes took place?  $\binom{24}{2} = 276$

(b) How many different 3-person committee can be elected in the room?  $\binom{24}{3} = 2024$

(c) If there is a competition, how many different outcomes are possible for the first, second, and third place?  $24(23)22 = 12144$

4. We pull 4 cards from a standard deck of 52.

(a) How many different ways are there to end up with three red cards and a black card?  $\binom{26}{3}26 = 67600$

(b) How many different ways are there to end up with three kings and an ace?  $\binom{4}{3}4 = 16$

5. We toss a coin eight times.

(a) How many different outcome is possible?  $2^8 = 256$

(b) How many outcomes are there where we get no tails and eight heads? **1**

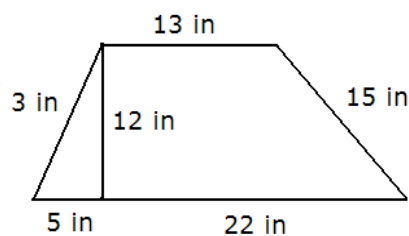
(c) How many outcomes are there where we get one tails and seven heads? **8**

(d) How many outcomes are there where we get two tails and six heads?  $\binom{8}{2} = 28$

(e) How many outcomes are there where we get three tails and five heads?  $\binom{8}{3} = 56$

(f) How many outcomes are there where we get four tails and four heads?  $\binom{8}{4} = 70$

6. Consider the trapezoid shown on the picture below.



- (a) Find the perimeter of the trapezoid. Include units in your computation and answer.  $P = 58$  in
- (b) Find the area of the trapezoid. Include units in your computation and answer.  $A = 240$  in<sup>2</sup>
7. Consider a circle with radius 3 ft long.
- (a) Find the circumference of the circle. Include units in your computation and answer.  $6\pi$  ft  $\cong$  18.8496 ft
- (b) Find the area of the circle. Include units in your computation and answer.  $9\pi$  ft<sup>2</sup>  $\cong$  28.2743 ft<sup>2</sup>
8. The price of a product has increased from \$ 120 to \$ 138. What percent of an increase is this? 15%
9. The population of a town has increased by 19%. Now there are 69 020 people living in the town. What was the population before the increase? 58 000
10. We have borrowed \$ 2000 for two years, with a simple annual interest rate of 6%. After one year, we make a partial payment of \$ 800. After an additional six months, we make another partial payment of \$ 500. How much money do we need to pay at the end of the two years? \$ 885.39