Finals Round

Please put all answers on the provided answer sheet, units are not required.

1. In Wonderland, Alice decides to play croquet with flamingos and hedgehogs. The arc of one hedgehog can be modeled with the equation h = -t^2+24t + 6, where h represents the height the hedgehog is in the air (in feet), and t represents time. What is the highest point a hedgehog will reach (in feet)?

Ans:
150 feet

2. Ariel has a chest that contains different colors of seashells. 30 % of the seashells are blue, 20% are brown, 15% are red, 10\% are yellow, and the other 30 seashells are pink. If half of the blue seashells are replaced with brown seashells, how many seashells will be brown?

Ans: 42

3. Elsa needs to find the perfect triangular shape of icicles to make her sister Anna a winter wonderland. To do so, she has to figure out the height she should make her icicles so that they have enough structural integrity. Her icicle is depicted below. If b = 24, and z = 10, then h can be expressed as the sqrt(x). What is x? (figure not drawn to scale)
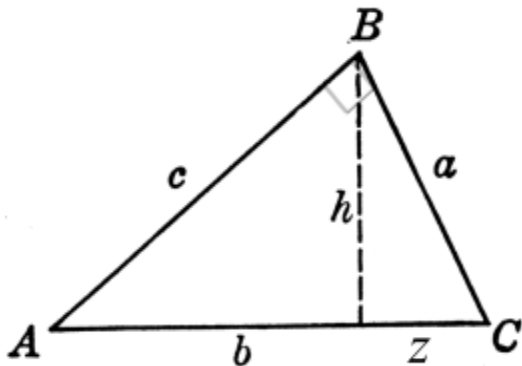
Answer: x = 240

4. Disney was founded in 1923. That makes this year Disney's 100th anniversary! What is the remainder when 1923^100 is divided by 5?

Answer: 1
(1920+3)^100, all terms in expanded expression will have 1920 as a multiple and be divisible by 5 except the last term 3^100
**3^100 = 9^50**
9 to even power has units digit of 1, division by 5 has remainder of 1

5. Chip n Dale are playing a game. When a number n is shown, Chip always responds with the value of n/3 and Dale always responds with the value 3n. All the positive integers from 1-1000 are shown. How many of those values will result in Chip and Dale both responding with a three-digit whole numbers? Ex. If the number 300 is shown, Chip will respond with 100 and Dale will respond with 900. 100 and 900 are both three-digit whole numbers, so 300 satisfies the criteria.

Answer: 12

6. Rapunzel is painting a mural. In the mural, she draws a regular hexagon with side lengths of 2 feet. Inside the hexagon, she draw a quadrilateral such that 2 of the vertices of the quadrilateral are shared with the hexagon, and the other 2 vertices lie on the midpoint of the hexagon's sides. (Visual Below) The perimeter of the quadrilateral can be written in simplest form as a√b. What is a + b?
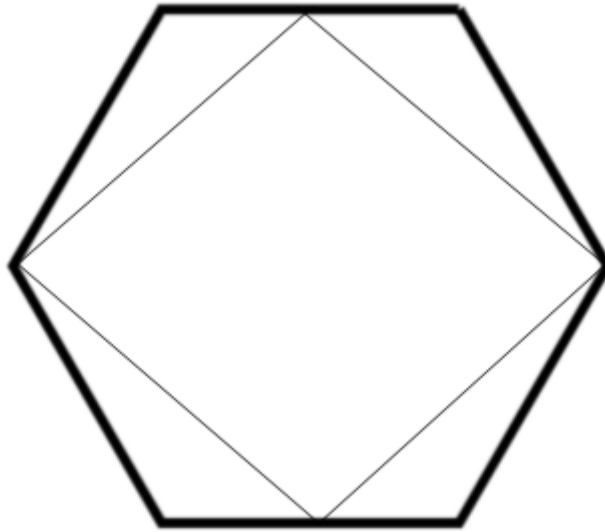
Answer: 11
4 sqrt 7

7. In Beast's garden, 2/5 of the roses have 5 petals, and 3/4 of the roses are red. What is the minimum number of roses in the garden that have 5 petals and are red?

Answer: 3

8. Mushu rolls four fair 6-sided dice. What is the probability that at least one of the numbers Mushu rolls is greater than 4 and at least two of the numbers he rolls are greater than 2?

Answer: 61/81