

I. Find each probability if a coin is tossed 4 times.

1.) P (exactly 4 heads)

$$4C4 (.5)^4 (.5)^0 = \boxed{6.25\%}$$

2.) P (0 heads)

$$4C0 (.5)^0 (.5)^4 = \boxed{6.25\%}$$

3.) P (exactly 3 heads)

$$4C3 (.5)^3 (.5)^1 = \boxed{25\%}$$

4.) P (exactly 2 heads)

$$4C2 (.5)^2 (.5)^2 = \boxed{37.5\%}$$

5.) P (exactly 1 head)

$$4C1 (.5)^1 (.5)^3 = \boxed{25\%}$$

6.) P (at least 3 heads)

$$P(3) + P(4) \rightarrow 4C3 (.5)^3 (.5)^1 + 4C4 (.5)^4 (.5)^0 = \boxed{31.25\%}$$

II. Find each probability if a die is rolled 3 times.

7.) P (exactly one 2)

$$3C1 \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^2 = \boxed{34.7\%}$$

8.) P (exactly two 2's)

$$3C2 \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^1 = \boxed{6.9\%}$$

9.) P (exactly three 2's)

$$3C3 \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^0 = \boxed{4.6\%}$$

10.) P (at most one 2)

$$P(0) + P(1) \rightarrow 3C0 \left(\frac{1}{6}\right)^0 \left(\frac{5}{6}\right)^3 + 3C1 \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^2 = \boxed{72.6\%}$$

III. A town that presents a fireworks display during its July 4 celebration found the probability that a family with two or more children will watch the fireworks is 60%. If 5 of these families are selected at random, find each probability.

11.) P (exactly 3 families watch the fireworks)

$$5C3 (.6)^3 (.4)^2 = \boxed{34.6\%}$$

12.) P (exactly 2 families watch the fireworks)

$$5C2 (.6)^2 (.4)^3 = \boxed{23\%}$$

13.) P (exactly 5 families watch the fireworks)

$$5C5 (.6)^5 (.4)^0 = \boxed{7.8\%}$$

14.) P (no families watch the fireworks)

$$5C0 (.6)^0 (.4)^5 = \boxed{1\%}$$

15.) P (at least 4 families watch the fireworks)

$$P(4) + P(5) \rightarrow 5C4 (.6)^4 (.4)^1 + 5C5 (.6)^5 (.4)^0 = \boxed{33.7\%}$$

16.) P (at most 2 families watches the fireworks)

$$P(0) + P(1) + P(2) \rightarrow 5C0 (.6)^0 (.4)^5 + 5C1 (.6)^1 (.4)^4 + 5C2 (.6)^2 (.4)^3 = \boxed{31.7\%}$$

IV. One section of a standardized English language test has 10 true/false questions.

Find each probability when a student guesses at all ten questions.

17.) P (exactly 8 correct)

$$10C8 (.5)^8 (.5)^2 = \boxed{4.4\%}$$

18.) P (exactly 40% correct)

$$10C4 (.5)^4 (.5)^6 = \boxed{20.5\%}$$

19.) P (exactly half correct) ^{exactly 5 correct}

$$10C5 (.5)^5 (.5)^5 = \boxed{24.6\%}$$

20.) P (all 10 correct)

$$10C10 (.5)^{10} (.5)^0 = \boxed{.00098\%}$$

21.) P (0 correct)

$$10C0 (.5)^0 (.5)^{10} = \boxed{.098\%}$$

22.) P (at least 7 correct)

$$P(7) + P(8) + P(9) + P(10) \rightarrow 10C7 (.5)^7 (.5)^3 + 10C8 (.5)^8 (.5)^2 + 10C9 (.5)^9 (.5)^1 + 10C10 (.5)^{10} (.5)^0 = \boxed{17.2\%}$$

V. The probability of Chris making a free-throw is 67% and he shoots 5 times.

If he shoots 5 times, find each probability. ^{miss = 33%}

23.) P (all shots are missed) ^{0 made}

$$5C0 (.67)^0 (.33)^5 = \boxed{.39\%}$$

24.) P (all shots are made)

$$5C5 (.67)^5 (.33)^0 = \boxed{13.5\%}$$

25.) P (exactly 2 shots made)

$$5C2 (.67)^2 (.33)^3 = \boxed{16.1\%}$$

26.) P (exactly 1 missed) ^{4 made}

$$5C4 (.67)^4 (.33)^1 = \boxed{33.2\%}$$

27.) P (at least 3 made) $P(3) + P(4) + P(5) \rightarrow$

$$5C3 (.67)^3 (.33)^2 + 5C4 (.67)^4 (.33)^1 + 5C5 (.67)^5 (.33)^0 = \boxed{79.5\%}$$

28.) P (at most 2 made) $P(0) + P(1) + P(2) \rightarrow$

$$5C0 (.67)^0 (.33)^5 + 5C1 (.67)^1 (.33)^4 + 5C2 (.67)^2 (.33)^3 = \boxed{20.5\%}$$

VI. In 2001, the American Heart Association reported that 50 percent of the Americans who Receive heart transplants are ages 50 – 64 and 20 percent are ages 35 – 49.

29.) In a randomly selected group of 10 heart transplants recipients, what is the probability that at least 8 of them are ages 50 – 64?

$$P(8) + P(9) + P(10) \rightarrow 10C8 (.5)^8 (.5)^2 + 10C9 (.5)^9 (.5)^1 + 10C10 (.5)^{10} (.5)^0 = \boxed{5.5\%}$$

30.) In a randomly selected group of 5 heart transplants recipients,

$$\text{what is the probability that 2 of them are ages 35 – 49? } P(2) \rightarrow 5C2 (.2)^2 (.8)^3 = \boxed{20.5\%}$$