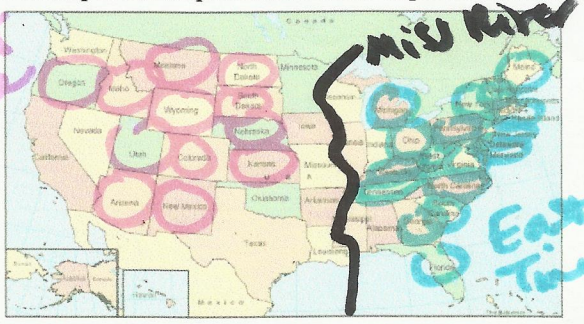
Advanced Functions – 2.2 WS: Basic Probability Name: Key

I. Use the map to find the probabilities below. Express answers as a fraction and as a percent.



1.) P (next to the Pacific Ocean) = $\frac{5}{50} = 10\%$

2.) P (borders Mexico) = $\frac{4}{50} = 8\%$

3.) P (has at least five neighboring states) = $\frac{21}{50} = 42\%$

4.) P (is surrounded by water) = $\frac{1}{50} = 2\%$

5.) P (next to the Atlantic Ocean) = $\frac{14}{50} = 28\%$

6.) P (borders Canada) = $\frac{11}{50} = 22\%$

7.) P (next to the Mississippi River) = $\frac{10}{50} = 20\%$

8.) P (has Mountain Standard Time) = $\frac{12}{50} = 24\%$

9.) P (next to the Gulf of Mexico) = $\frac{8}{50} = 16\%$

10.) P (has Eastern Standard Time) = $\frac{21}{50} = 42\%$

II. Nicholas is posting 2 photographs on his website. He has narrowed his choices to 4 landscape photographs and 3 portraits. If he chooses the two photographs at random, find the probability of each selection. Express your answers as a percent

11.) P (2 Portrait) $\frac{3C_2}{7C_2} = 14.3\%$ 12.) P (2 Landscape) $\frac{4C_2}{7C_2} = 28.6\%$ 13.) P (1 of each) $\frac{4C_1 \cdot 3C_1}{7C_2} = 57.1\%$

III. The Robinsons have a collection of 28 video movies, including 12 westerns and 16 science fiction. Elise selects 3 of the movies at random to bring to a sleep-over at her friend's house. Find the probability of each selection. Express your answer as a percent.

14.) P (3 Western) $\frac{12C_3}{28C_3} = 6.7\%$ 16.) P (2 Western and 1 Science Fiction) $\frac{12C_2 \cdot 16C_1}{28C_3} = 32.2\%$ 18.) P (1 Western and 2 Science Fiction) $\frac{12C_1 \cdot 16C_2}{28C_3} = 44\%$

15.) P (3 Science Fiction) $\frac{16C_3}{28C_3} = 17.1\%$ 17.) P (3 Comedy) $\frac{0C_3}{28C_3} = 0\%$ 19.) P (2 Science Fiction and 2 Western) $\frac{16C_2 \cdot 12C_2}{28C_3} = 24\%$

IV. A bag contains 1 green, 4 red, and 5 yellow balls. Two balls are selected at random. Find the probability of each selection. Express your answer as a percent.

20.) P (2 red) $\frac{4C_2}{10C_2} = 13.3\%$ 21.) P (1 red and 1 yellow) $\frac{4C_1 \cdot 5C_1}{10C_2} = 44.4\%$ 22.) P (1 green and 1 yellow) $\frac{1C_1 \cdot 5C_1}{10C_2} = 11.1\%$ 23.) P (2 green) $\frac{1C_2}{10C_2} = 0\%$ 24.) P (2 yellow and 1 red) $\frac{5C_2 \cdot 4C_1}{10C_2} = 55.7\%$

3 balls selected... ↓ 0%

V. Use the table that shows the range of verbal SAT scores for freshmen at a small liberal arts college. If a freshmen student is chosen at random, find each probability. Express answer as a percent.

Score Range	400–449	450–499	500–549	550–559	600–649	650+
Number of Students	129	275	438	602	620	412

25.) P (600 – 649) $\frac{620}{2476} = 25.04\%$

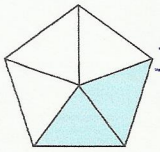
26.) P (400 – 499) $\frac{129+275}{2476} = 16.3\%$

27.) P (450 – 559) $\frac{275+438+602}{2476} = 53\%$

28.) P (at least 650) $\frac{412}{2476} = 16.7\%$

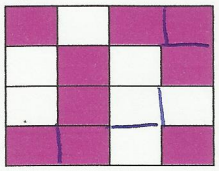
VI. Find the geometric probability of each figure below. Express answer as a percent. Must show work!

29.) A dart hits the board below. Find the probability that the dart landed in the shaded region.



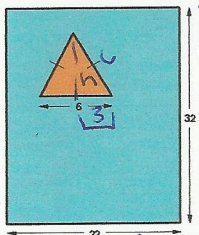
$\frac{\#\text{Shaded}}{\text{total}} = \frac{2}{5} = 40\%$

30.) A coin is tossed on the mat below. Find the probability that the coin landed in the shaded region.



$\frac{\#\text{Shaded}}{\text{total}} = \frac{9}{16} = 56.3\%$

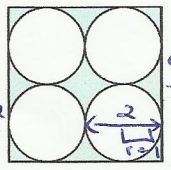
31.) A sky diver is trying to hit a triangular target on a rectangular landing pad. What is the probability that he will hit his target?



$h^2 + 3^2 = 6^2$, $h = 5.2$

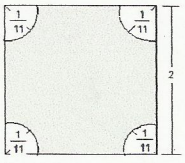
$\frac{\text{area } \triangle}{\text{area } \square} = \frac{\frac{1}{2} \cdot 6 \cdot 5.2}{32 \cdot 32} = \frac{15.6}{704} = 2.2\%$

32.) A dart hits the dart board below. Find the probability that the dart landed in the shaded region?



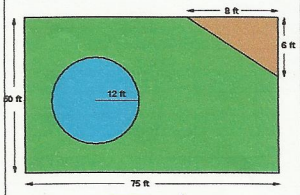
$\frac{\text{area } \square - [4(\text{area } \bigcirc)]}{\text{area } \square} = \frac{4^2 - [4(1^2 \cdot \pi)]}{4^2} = \frac{16 - 12.6}{16} = 21.3\%$

33.) What is the probability of a sky diver landing in the shaded region?



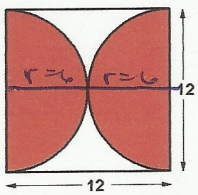
$\frac{\text{area } \square - \text{area } \bigcirc}{\text{area } \square} = \frac{(2.2) - (\pi(\frac{1}{11})^2)}{2.2} = \frac{4 - \frac{\pi}{121}}{4} = 99.4\%$

34.) The rectangular yard shown has a circular pool and a triangular garden. A ball from the adjacent golf course lands at a random point within the yard. Find the probability that the golf ball landed on the grass.



$\frac{\text{area } \square - (\text{area } \bigcirc + \text{area } \triangle)}{\text{area } \square} = \frac{50.75 - (12^2\pi + \frac{1}{2} \cdot 8 \cdot 6)}{50.75} = 87.3\%$

35.) A dart is thrown at the board below. Find the probability that the dart hit the shaded region.



$\frac{\text{area } \bigcirc}{\text{area } \square} = \frac{6^2\pi}{12^2} = 78.5\%$

36.) Arrow is being thrown at the target below. The 10-point circle has a 4.8 inch diameter and each of the other rings is 2.4 inches wide. What is the probability of the arrow hitting the blue area?

$r = 2.4 \times 10$

$r = 24$

$\frac{\text{area of target} - (\text{area yellow} + \text{area red})}{\text{area of bag } \bigcirc} = \frac{(14 \cdot 4^2 \cdot \pi) - (9 \cdot 6^2\pi)}{24^2\pi} = 20\%$