IB Final Exam Ch 3 Review

$A \cap B$ means the INTERSECTION of A and B (Think A AND B)
$A \cup B$ means the UNION of A and B (Think A OR B)

Rectangle 'S' represents a sample space of possible outcomes.
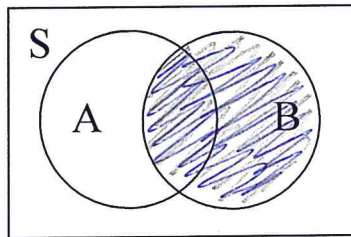Circles 'A' and 'B' each represent specific unique events in the sample space S.

If it is possible for two events A and B to both happen at the same time, then their circles will intersect on a Venn Diagram. **Anything not pertaining to A or B will be shown in rectangle 'S'**

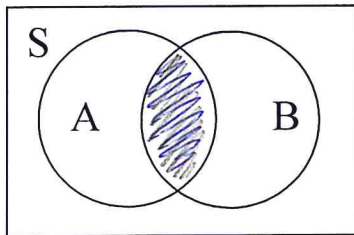I. Shade the region of the picture corresponding to each listed event.
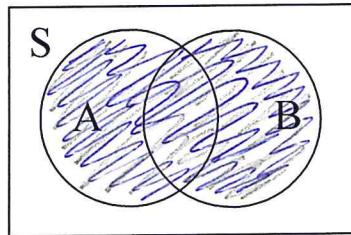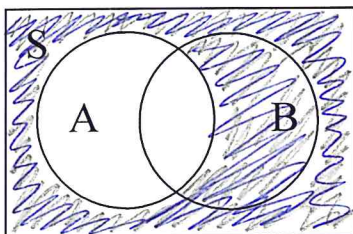
1.) A
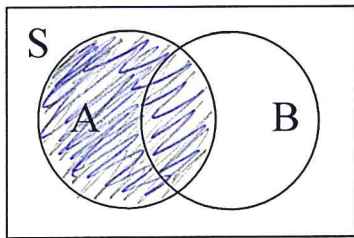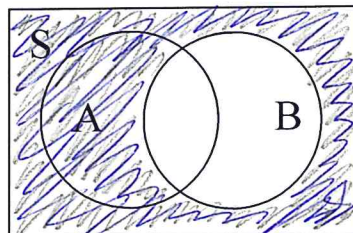
2.) B

3.) $A \cap B$

4.) $A \cup B$

The complement of an event 'A' refers to all outcomes that are NOT included in 'A'.
The notation for complement is A' . The probability of $A' = 1 - P(A)$.
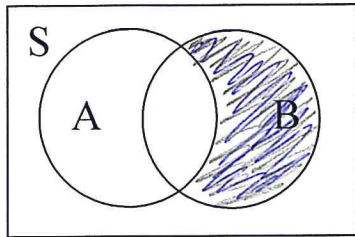
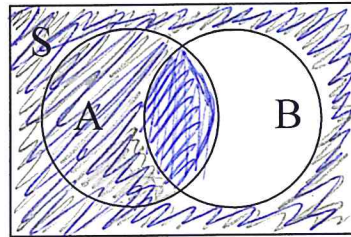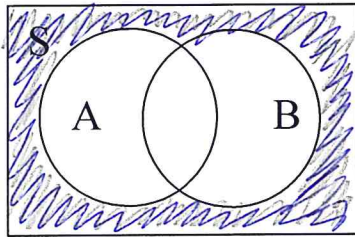Shade the region corresponding to each listed event.

5.) A'

6.) B'

7.) $A' \cap B$

8.) $A \cup B'$

9.) $A' \cap B'$

10.) $A' \cup B'$
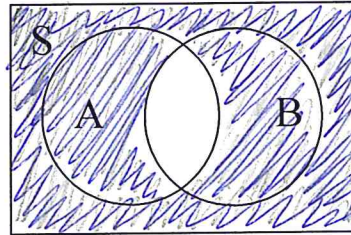
11.) $(A \cap B)'$
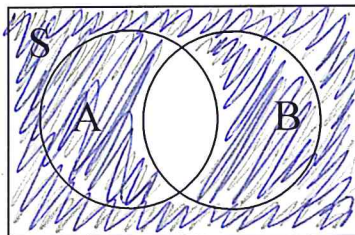
12.) $(A \cup B)'$
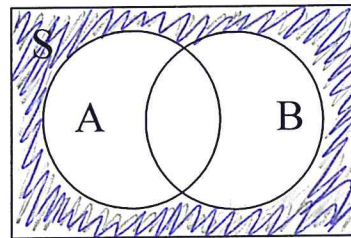
13. The Venn diagram displays the results of a survey of 100 families regarding technology in their homes. Computer (C), VCR (V) and fax machine (F).
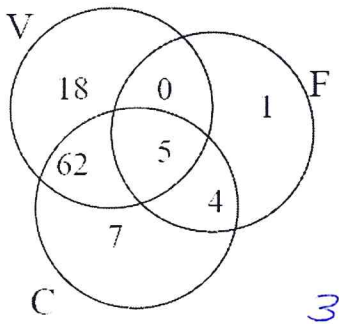
How many families have:
a) a computer at home? 78% (62+5+4+7)

b) all three machines? 5% (intersection of all 3)

c) none of the machines in their home? 3% (100−all #'s)

d) no fax machine? 90% (18+62+7+3)

e) a computer and a VCR? 67% (62+5)

f) a VCR or a computer? 96% (18+62+5+4+7)

14. A group of 60 students were asked if they played field hockey (F), basketball (B) or soccer (S). The diagram below displays the results. 27 students play field hockey, 17 students play basketball, and 22 students play soccer.
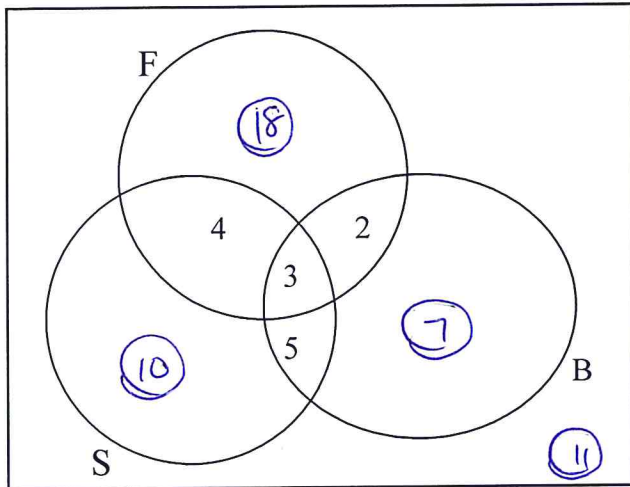
What percent of the group play:
a) field hockey & basketball? 8.33% $\left(\frac{3+2}{60}\right)$

b) field hockey or basketball? 65% $\left(\frac{18+4+2+3+5+7}{60}\right)$

c) field hockey & soccer? 11.67% $\left(\frac{4+3}{60}\right)$

d) neither of the three sports? 18.33% $\left(\frac{60-\text{all \#'s in circle}}{60}\right)$

e) only 1 sport? 58.33% $\left(\frac{18+10+7}{60}\right)$

15. A die is rolled twice. Find each probability as a reduced fraction.

a. P (twos 4s)

$\frac{1}{6} \cdot \frac{1}{6} = \boxed{\frac{1}{36}}$

b. P (2 and 3)

$2\left(\frac{1}{6} \cdot \frac{1}{6}\right) = \boxed{\frac{1}{18}}$

c. P (no 6s)

$\frac{5}{6} \cdot \frac{5}{6} = \boxed{\frac{25}{36}}$

d. P (at least one 3)

$\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$ (2 3's)

$+ 2\left(\frac{1}{6} \cdot \frac{5}{6}\right) = \frac{10}{36}$ $\boxed{\frac{11}{36}}$

16. There are 8 action, 3 comedy, and 5 drama DVDs on a shelf. Suppose three DVDs are selected at random from the shelf. Find each probability as a reduced fraction.

a. three action movies, with replacement $\frac{8}{16} \cdot \frac{8}{16} \cdot \frac{8}{16} = \left(\frac{1}{2}\right)^3 = \boxed{\frac{1}{8}}$

b. 2 action then a comedy without replacement

$\frac{8}{16} \cdot \frac{7}{15} \cdot \frac{3}{14} = \frac{168}{3360} = \boxed{\frac{1}{20}}$

17. There are 20 pieces of candy in a bag, 15 are chocolate and 5 are hard candy. Two pieces are selected at random and eaten. Find each probability as a reduced fraction.

a. Both are hard candy $\frac{5}{20} \cdot \frac{4}{19} = \frac{20}{380} = \boxed{\frac{1}{19}}$

b. One chocolate and one hard candy

c. At least one hard candy

$\frac{15}{20} \cdot \frac{5}{19} + \frac{5}{20} \cdot \frac{15}{19} = \frac{15}{76} + \frac{15}{76} = \frac{30}{76} = \boxed{\frac{15}{38}}$

prob of a + b $= \frac{1}{19} + \frac{15}{38} = \boxed{\frac{17}{38}}$

Answers:

13. a) 78%   b) 5%   c) 3%   d) 90%   e) 67%   f) 96%

14. a) 8.33%   b) 65%   c) 11.67%   d) 18.33%   e) 58.33%

15. a) 1/36   b) 1/18   c) 25/36   d) 11/36

16. a) 1/8   b) 1/20

17. a) 1/19   b) 15/38   c) 17/38