Warm Up

1 A fair die is tossed twice. Find the probability of getting a 4 or 5 on the first toss and a 1, 2, or 3 in the second toss.

$$P(4 \text{ or } 5 \text{ and } 1,2 \text{ or } 3) = \frac{P(4 \text{ or } 5)}{\frac{2}{6}} \times \frac{P(1,2 \text{ or } 3)}{\frac{3}{6}} \qquad 1/6$$

$$\frac{1}{3} \times \frac{1}{2} =$$

$$\frac{1}{6}$$

2 Two balls are drawn successively without replacement from a box which contains 4 white balls and 3 red balls. Find the probability that

(a) the first ball drawn is white and the second is red; $P(W) \times P(R)$ 1

$\frac{4}{7} \times \frac{3}{62}$

(b) both balls are red. $P(R) \times P(R)$

$\frac{3}{7} \times \frac{2}{6}$ $\frac{4}{14}$

$\frac{1}{7}$

3

A bag contains 5 white marbles, 3 black marbles and 2 green marbles. In each draw, a marble is drawn from the bag and not replaced. In three draws, find the probability of obtaining white, black and green in that order. $\frac{1}{24}$

$$P(W \text{ and } B \text{ and } G)$$

$$= P(W) \times P(B) \times P(G)$$

$$\frac{5}{10} \times \frac{3}{9} \times \frac{2}{8}$$

$$\frac{1}{2} \times \frac{1}{3} \times \frac{1}{4}$$

$$\frac{1}{24}$$

3c)   9 Blue   P(B)
      6 Black

$$\frac{6}{15} \times \frac{5}{14} \times \frac{4}{13} \times \frac{3}{12} \times \frac{2}{11} \times \frac{1}{10} \times \frac{0}{9}$$

$$0$$

6 c) $P(D \sim D)$ b) $P(\bar{D}) = \frac{95}{100}$

$P(D \times P(D)$

$\frac{5}{100} \times \frac{4}{99}$

$\frac{1}{5\cancel{20}} \times \frac{4}{99}$

$\frac{1}{495}$

d) $P(\bar{D} \text{ and } \bar{D})$

$1 - \frac{1}{495}$

$\frac{494}{495}$

Summarize

"AND"

Independent & Dependent

multiply

with replacement.

"without replacement, denominator changes."

Mutually Exclusive Events

QUESTION - "What is the probability of
event A OR event B occurring?"

- when events <u>can not</u> happen at the SAME time.

> For mutually exclusive events,
>
> $$P(A \text{ or } B) = P(A) + P(B)$$

ex: Determine the probability of rolling a sum of
7 or 11 on two fair dice.

$$P(7 \text{ OR } 11) = P(7) + P(11)$$
$$\frac{6}{36} + \frac{2}{36}$$
$$\frac{8}{36}$$
$$\frac{2}{9}$$

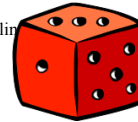$$\frac{1}{4} + \frac{1}{6}$$
$$\frac{3}{12} + \frac{2}{12}$$
$$\boxed{\frac{5}{12}}$$

Example: Find the Probability of Getting a 3 on a Spinner **OR** rolling

$$P(3 \text{ OR } 3)$$
$$P(3) + P(3)$$
$$\frac{1}{4} + \frac{1}{6}$$

- let's look at this type of probability using
something called a **Venn Diagram**...

ex: What is the probability of drawing a Jack or
an odd numbered card?

32 other cards

$$P(\text{Jack OR odd \#}) = P(\text{Jack}) + P(\text{odd \#})$$
$$= \frac{4}{52} + \frac{16}{52}$$
$$= \frac{20}{52} = \frac{5}{13}$$

ex: Determine the probability of drawing a club
or rolling a sum of 4 with two fair dice.

$$P(\text{club}) + P(\text{sum 4})$$
$$\frac{13}{52} + \frac{3}{36}$$
$$\frac{1}{4} + \frac{1}{12}$$
$$\frac{4}{12} = 1/3$$

ex: Determine the probability that a student is
randomly selected from this class and they
were born on a Thursday or in the month of May?

$$P(T) + P(M)$$
$$\frac{1}{7} + \frac{1}{12}$$
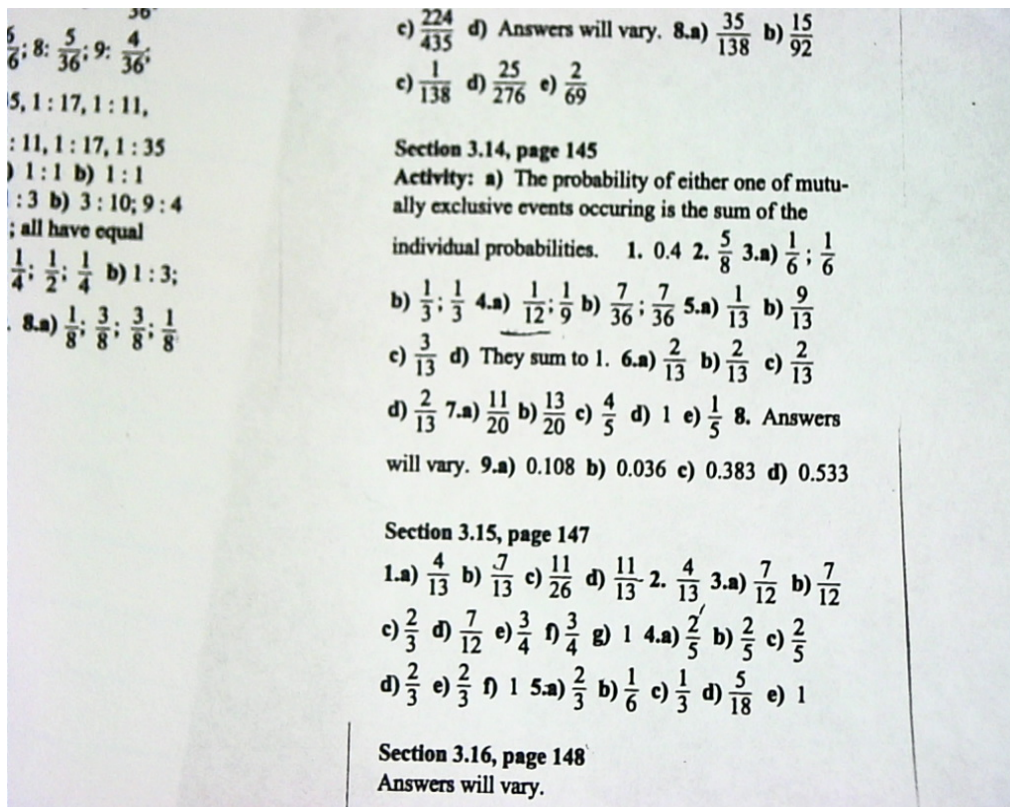$$\frac{12}{84} + \frac{7}{84}$$
$$\frac{19}{84}$$

3

3.14

#1-7

dont do : 4b

        5d,e

Answers

$\frac{5}{6}$; 8: $\frac{5}{36}$; 9: $\frac{4}{36}$;

5, 1 : 17, 1 : 11,

: 11, 1 : 17, 1 : 35

) 1 : 1   b) 1 : 1

: 3   b) 3 : 10; 9 : 4

; all have equal

$\frac{1}{4}$: $\frac{1}{2}$: $\frac{1}{4}$ b) 1 : 3;

. 8.a) $\frac{1}{8}$, $\frac{3}{8}$, $\frac{3}{8}$, $\frac{1}{8}$

c) $\frac{224}{435}$ d) Answers will vary.   8.a) $\frac{35}{138}$ b) $\frac{15}{92}$

c) $\frac{1}{138}$ d) $\frac{25}{276}$ e) $\frac{2}{69}$

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Activity: a) The probability of either one of mutually exclusive events occuring is the sum of the individual probabilities.   1. 0.4   2. $\frac{5}{8}$ 3.a) $\frac{1}{6}$; $\frac{1}{6}$

b) $\frac{1}{3}$; $\frac{1}{3}$ 4.a) $\frac{1}{12}$; $\frac{1}{9}$ b) $\frac{7}{36}$; $\frac{7}{36}$ 5.a) $\frac{1}{13}$ b) $\frac{9}{13}$

c) $\frac{3}{13}$ d) They sum to 1.   6.a) $\frac{2}{13}$ b) $\frac{2}{13}$ c) $\frac{2}{13}$

d) $\frac{2}{13}$ 7.a) $\frac{11}{20}$ b) $\frac{13}{20}$ c) $\frac{4}{5}$ d) 1   e) $\frac{1}{5}$ 8. Answers

will vary.   9.a) 0.108   b) 0.036   c) 0.383   d) 0.533

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1.a) $\frac{4}{13}$ b) $\frac{7}{13}$ c) $\frac{11}{26}$ d) $\frac{11}{13}$ 2. $\frac{4}{13}$ 3.a) $\frac{7}{12}$ b) $\frac{7}{12}$

c) $\frac{2}{3}$ d) $\frac{7}{12}$ e) $\frac{3}{4}$ f) $\frac{3}{4}$ g) 1   4.a) $\frac{2}{5}$ b) $\frac{2}{5}$ c) $\frac{2}{5}$

d) $\frac{2}{3}$ e) $\frac{2}{3}$ f) 1   5.a) $\frac{2}{3}$ b) $\frac{1}{6}$ c) $\frac{1}{3}$ d) $\frac{5}{18}$ e) 1

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Answers will vary.

HOMEWORK...

3.14

Worksheet - Mutually Exclusive Events.doc

- Omit #8   omit 4b
" #5d,e   omit 9

utually Inclusive $P(A \text{ or } B) = P(A) + P(B)$

Quiz: Counting principle, tree diagram, sample space, probability,
        Odds, independent/dependent events

• Work on mutually exclusive worksheet when finished

Attachments

Worksheet - Mutually Exclusive Events.doc