

7.877

$$\textcircled{B} \quad 100 - 30 = \textcircled{70 - \text{range}}$$

$$\underline{51} \approx \bar{x}$$

$$\frac{1 + 6 + 1 + 3 + 49 + 6 + 9 + 6}{8} = 12.6 \approx \text{mean abs. deviation}$$

In Exercises 7–9, tell whether the events **A** and **B** are *dependent* or *independent*. Then find  $P(\text{A and B})$ .

7. A bag contains 3 red balls and 4 green balls. You randomly draw one ball, replace it, and randomly draw a second ball.

Event A: The first ball is red.

Event B: The second ball is red.

$$P(\text{A and B}) = P(A) \cdot P(B)$$

$$\frac{9}{49} = \frac{3}{7} \cdot \frac{3}{7}$$

independent

8. You write each of the letters of the word LISTED on pieces of paper and place them in a bag. You randomly draw one letter, do not replace it, then randomly draw a second letter.

Event A: The first letter is an L.

Event B: The second letter is a T.

$$P(\text{A and B}) = P(A) \cdot P(B \text{ given } A)$$

$$\frac{1}{30} = \frac{1}{6} \cdot \frac{1}{5}$$

dependent

9. You write each of the letters of the word BRIGHTNESS on pieces of paper and place them in a bag. You randomly draw one letter, replace it, then randomly draw a second letter.

Event A: The first letter is a B.

Event B: The second letter is an H.

$$P(\text{A and B}) = P(A) \cdot P(B)$$

$$\frac{1}{100} = \frac{1}{10} \cdot \frac{1}{10}$$

ind.

In Exercises 1–6, you draw a card from a bag that contains 4 yellow cards numbered 1–4 and 4 blue cards numbered 1–4. Tell whether the events **A** and **B** are *mutually exclusive* or *overlapping*. Then find  $P(A \text{ or } B)$ .

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|--|--|
| 1. Event A: You choose a yellow card.            | 2. Event A: You choose a blue card.                  |
| <i>mut. ex.</i> Event B: You choose a blue card. | <i>ov.</i> Event B: You choose a number 3 card.      |
| 3. Event A: You choose a number 1 card.          | 4. Event A: You choose a card with an odd number.    |
| <i>ov.</i> Event B: You choose a yellow card.    | <i>mut. ex.</i> Event B: You choose a number 2 card. |
| 5. Event A: You choose a blue number 4 card.     | 6. Event A: You choose a card with an odd number.    |
| <i>ov.</i> Event B: You choose a blue card.      | <i>ov.</i> Event B: You choose a yellow card.        |

$$\textcircled{1} P(A \text{ or } B) = P(A) + P(B)$$

$$\frac{4}{8} + \frac{4}{8} = \frac{8}{8} = 1$$

$$\textcircled{2} P(A) + P(B) - P(A \text{ and } B)$$

$$\frac{4}{8} + \frac{2}{8} - \frac{1}{8} = \frac{5}{8}$$

$$\textcircled{5} P(A) + P(B) - P(A \text{ and } B)$$

$$\frac{1}{8} + \frac{4}{8} - \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$$

$$\textcircled{3} P(A) + P(B) - P(A \text{ and } B)$$

$$\frac{2}{8} + \frac{4}{8} - \frac{1}{8} = \frac{5}{8}$$

$$\textcircled{4} P(A) + P(B)$$

$$\frac{4}{8} + \frac{2}{8} = \frac{6}{8} = \frac{3}{4}$$

$$\textcircled{6} P(A) + P(B) - P(A \text{ and } B)$$

$$\frac{4}{8} + \frac{4}{8} - \frac{2}{8} = \frac{6}{8} = \frac{3}{4}$$

Evaluate the expression.

15.  ${}_4P_3$

$$\frac{4!}{(4-3)!} = \frac{4!}{1!} = 24$$

16.  ${}_6P_2$

$$\frac{6!}{(6-2)!} = \frac{6!}{4!} = \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!}} = 30$$

17.  ${}_7P_4$

$$\frac{7!}{(7-4)!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot \cancel{3!}}{\cancel{3!}} = 840$$

18. **Concert** Seven friends go to a concert. In how many different ways can they sit together in a row of 7 empty seats?

$${}_7P_7 = \frac{7!}{(7-7)!} = 5040$$

19. **Appliance Delivery** An appliance delivery person has 5 deliveries to make. The destinations are all so close, it doesn't matter the order in which the appliances are delivered. In how many orders can the deliveries be made?

$${}_5P_5 = 5! = 120$$

$${}_nP_r = \frac{n!}{(n-r)!}$$

Evaluate the expression.

11.  ${}_8C_1 = \frac{8!}{(8-1)!1!} = \frac{8 \cdot \cancel{7}!}{\cancel{7}!} = 8$

12.  ${}_{10}C_3 = \frac{10!}{(10-3)!3!} = \frac{10 \cdot 9 \cdot 8 \cdot \cancel{7}!}{\cancel{7}! \cdot 3 \cdot 2 \cdot 1} = \frac{10 \cdot 9 \cdot 8}{120} = 120$

13.  ${}_9C_6 = \frac{9!}{(9-6)!6!} = \frac{9 \cdot 8 \cdot 7 \cdot \cancel{6}!}{3! \cdot \cancel{6}!} = \frac{9 \cdot 8 \cdot 7}{3 \cdot 2 \cdot 1} = \frac{9 \cdot 8 \cdot 7}{6} = 84$

In Exercises 14 and 15, tell whether the question can be answered using combinations or permutations. Explain your choice.

14. Five students from your class of 100 students will be selected to be sent on to a leadership conference. How many groups of 5 students are possible? *comb.*

15. Ten students try out to be in one of the 4 different positions of your track's relay team. In how many ways can the 4 positions be filled? *perm.*

16. **Art Fair** On the last day of an art fair, an artist offers a special on her photographs. You can buy 2 small photos and 1 large photo for \$75. She has 14 different small photos and 10 different large photos left to choose from.

a. How many different choices of 2 small photos are possible? *91*

b. How many different choices of 2 small photos and 1 large photo are possible?

$${}_nC_r = \frac{n!}{(n-r)!r!}$$

$${}_{14}C_2 = \frac{14!}{(14-2)!2!} = \frac{14 \cdot 13 \cdot \cancel{12}!}{\cancel{12}! \cdot 2 \cdot 1} = \frac{14 \cdot 13}{2} = 91$$

~~24~~

$${}_{10}C_1 = \frac{10!}{(10-1)!1!} = \frac{10 \cdot \cancel{9}!}{\cancel{9}!} = 10$$

$$\frac{91}{\text{sm.}} \times \frac{10}{\text{large.}} = \boxed{910}$$

## Review assignment for test:

p. 896: 4-5

p. 897: 6-8

p. 897: 11-13, 15

p. 898: 16-21

p. 899: 23

Opt.

p. 901: 1-12

p. 866: 23

p. 870: 2, 7, 8

p. 894: 4a, 4b