Unit 11 Day 7 Notes And vs Or
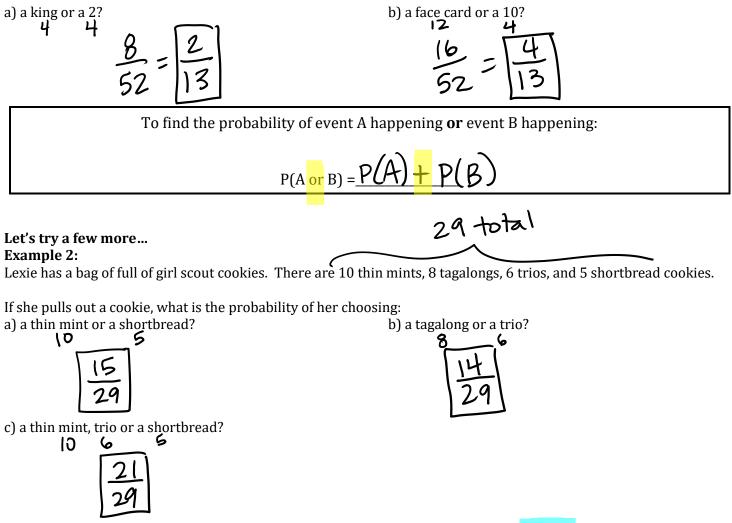
Example 1:
Emma is drawing a card from a standard deck of 52 cards:
What is the probability that she draws...

a) a king or a 2?

4   4

$$\frac{8}{52} = \boxed{\frac{2}{13}}$$

b) a face card or a 10?

12   4

$$\frac{16}{52} = \boxed{\frac{4}{13}}$$

To find the probability of event A happening **or** event B happening:

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

Let's try a few more...
Example 2:
Lexie has a bag of full of girl scout cookies. There are 10 thin mints, 8 tagalongs, 6 trios, and 5 shortbread cookies.

29 total

If she pulls out a cookie, what is the probability of her choosing:

a) a thin mint or a shortbread?

10   5

$$\boxed{\frac{15}{29}}$$

b) a tagalong or a trio?

8   6

$$\boxed{\frac{14}{29}}$$

c) a thin mint, trio or a shortbread?

10   6   5

$$\boxed{\frac{21}{29}}$$

What if she pulls out two cookies, what is the probability of her picking a thin mint and then a trio?

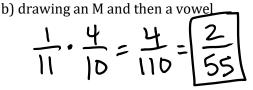$$\frac{10}{29} \cdot \frac{6}{28} = \frac{60}{812} = \boxed{\frac{15}{203}}$$

To find the probability of event A **and then** event B happening:

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

Example 3: Each of the letters of the word MISSISSIPPI ~~11 total~~ are written on separate pieces of paper that are then folded, put in a hat, and mixed thoroughly. If Allison picks two pieces of paper from the hat without replacement, find the probability of...

a) drawing an I and then an S

$$\frac{4}{11} \cdot \frac{4}{10} = \frac{16}{110} = \boxed{\frac{8}{55}}$$

b) drawing an M and then a vowel

$$\frac{1}{11} \cdot \frac{4}{10} = \frac{4}{110} = \boxed{\frac{2}{55}}$$

Example 4:

~~44 total~~

Troy has a bag of marbles, 9 green, 12 blue, 7 red, 10 yellow and 6 white. If he picks a marble, replaces it and then picks another marble, find the probability they are...
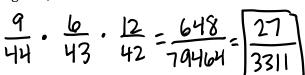
a) a yellow and then a green

$$\frac{10}{44} \cdot \frac{9}{44} = \frac{90}{1936} = \boxed{\frac{45}{968}}$$

b) a white and then another white

$$\frac{6}{44} \cdot \frac{6}{44} = \frac{36}{1936} = \boxed{\frac{9}{484}}$$

Now Troy picks a marble and does not replace it, find the probability of him picking a

c) blue and then a red

$$\frac{12}{44} \cdot \frac{7}{43} = \frac{84}{1892} = \boxed{\frac{21}{473}}$$

d) a green, a white and then a blue

$$\frac{9}{44} \cdot \frac{6}{43} \cdot \frac{12}{42} = \frac{648}{79464} = \boxed{\frac{27}{3311}}$$

Partner Practice:

~~12 total~~

1) Denise has 2 math, 4 history, and 6 science books in a pile on her desk. She randomly selects a book and does not replace it to the pile. She then randomly selects another book.

a) What is the probability that she selects 1 history and then 1 math?

$$\frac{4}{12} \cdot \frac{2}{11} = \frac{8}{132} = \boxed{\frac{2}{33}}$$

b) What is the probability that she selects 1 math and then 1 science?

$$\frac{2}{12} \cdot \frac{6}{11} = \frac{12}{132} = \boxed{\frac{1}{11}}$$

c) What is the probability that she selects 1 math, 1 history, and then another history?
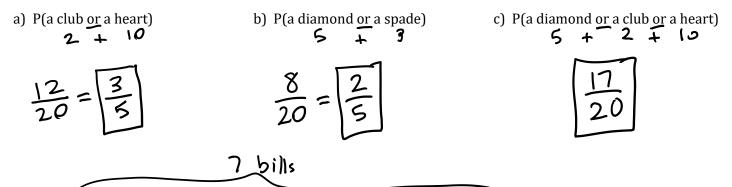
$$\frac{2}{12} \cdot \frac{4}{11} \cdot \frac{3}{10} = \frac{24}{1320} = \boxed{\frac{1}{55}}$$

2) When a die is rolled three times, what is the probability that the first roll is even, the second roll is 6, and the third roll is odd?

$$P(E) \cdot P(6) \cdot P(Odd)$$

$$\frac{3}{6} \cdot \frac{1}{6} \cdot \frac{3}{6} = \frac{9}{216} = \boxed{\frac{1}{24}}$$

20 total

3) Vanessa has a stack of playing cards consisting of 5 diamonds, 10 hearts, 3 spades, and 2 clubs. If she selects a card at random from this stack, what is the probability that she will pick:

a) P(a club or a heart)

2 + 10

$$\frac{12}{20} = \boxed{\frac{3}{5}}$$

b) P(a diamond or a spade)

5 + 3

$$\frac{8}{20} = \boxed{\frac{2}{5}}$$

c) P(a diamond or a club or a heart)

5 + 2 + 10

$$\boxed{\frac{17}{20}}$$

7 bills

4) Theo has 1 twenty-dollar bill, 4 ten-dollar bills, and 2 five-dollar bills in his wallet. He randomly selects one bill, looks at it, and then replaces it. He then randomly selects another bill.

a) What is the probability of Theo picking a ten-dollar bill and then a five-dollar bill?

$$\frac{4}{7} \cdot \frac{2}{7} = \boxed{\frac{8}{49}}$$

b) What is the probability of Theo picking a five-dollar bill and then a twenty-dollar bill?
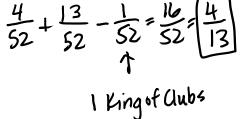
$$\frac{2}{7} \cdot \frac{1}{7} = \boxed{\frac{2}{49}}$$

c) What is the probability of Theo picking a ten-dollar bill and then another ten-dollar bill?
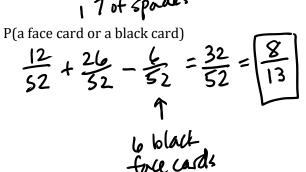
$$\frac{4}{7} \cdot \frac{4}{7} = \boxed{\frac{16}{49}}$$

5) What is the probability of drawing, without replacement a 4 and then a Queen from a standard deck of cards?

$$\frac{4}{52} \cdot \frac{4}{51} = \frac{16}{2652} = \boxed{\frac{4}{663}}$$

6) Rudy has a standard deck of playing cards. She picks one card out of the deck. For "or" problems, Lookout for overlap!
What is the probability that she will pick:

a) P(a red card or an Ace)

$$\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} = \boxed{\frac{7}{13}}$$

↑
2 red Aces

b) P(a 7 or a spade)

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$$

↑
1 7 of spades

c) P(a King or a club)

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$$

↑
1 King of Clubs

d) P(a face card or a black card)

$$\frac{12}{52} + \frac{26}{52} - \frac{6}{52} = \frac{32}{52} = \boxed{\frac{8}{13}}$$

↑
6 black
face cards

7) What is the probability of drawing with replacement a face card, then a black, and then another black from a standard deck of cards?

$$\frac{12}{52} \cdot \frac{26}{52} \cdot \frac{26}{52} = \frac{8112}{140608} = \boxed{\frac{3}{52}}$$