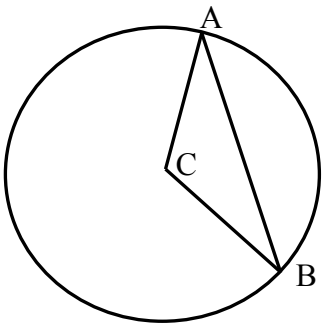
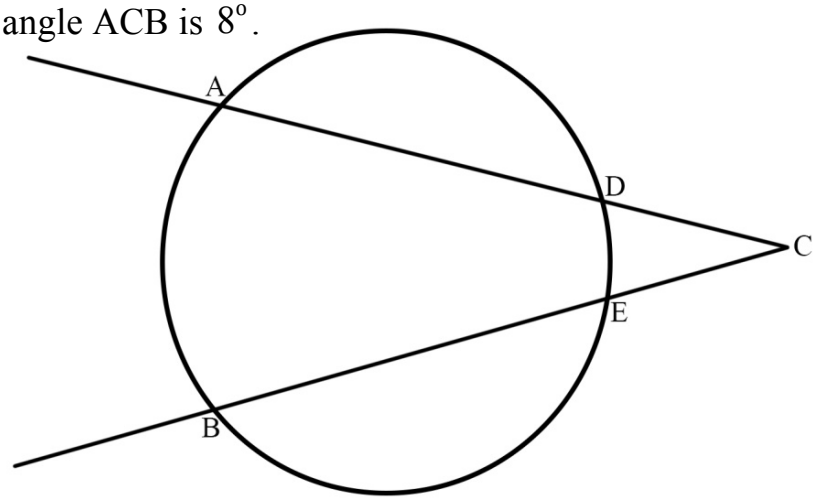
Geometry Homework #12

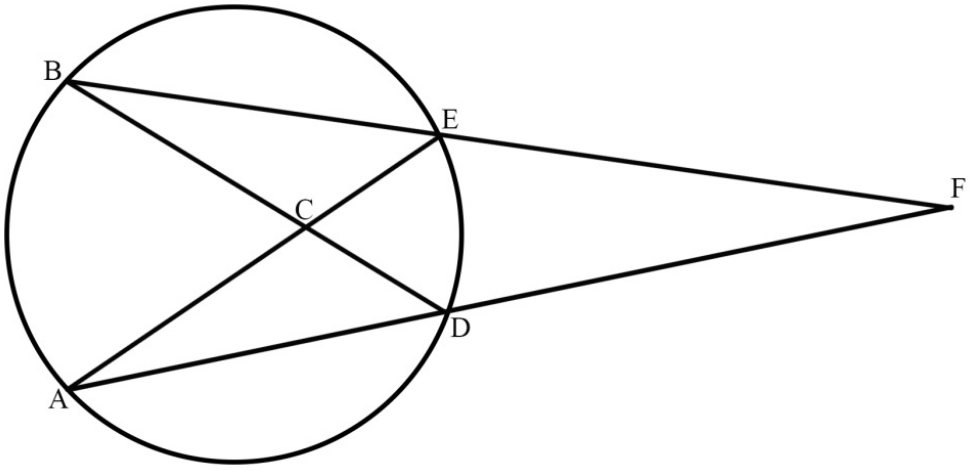
1) In the following circle, C, determine, exactly, the length of chord AB, the length of arc AB, and the area of sector ACB if the length of BC is 8 and angle ACB is 120 degrees.



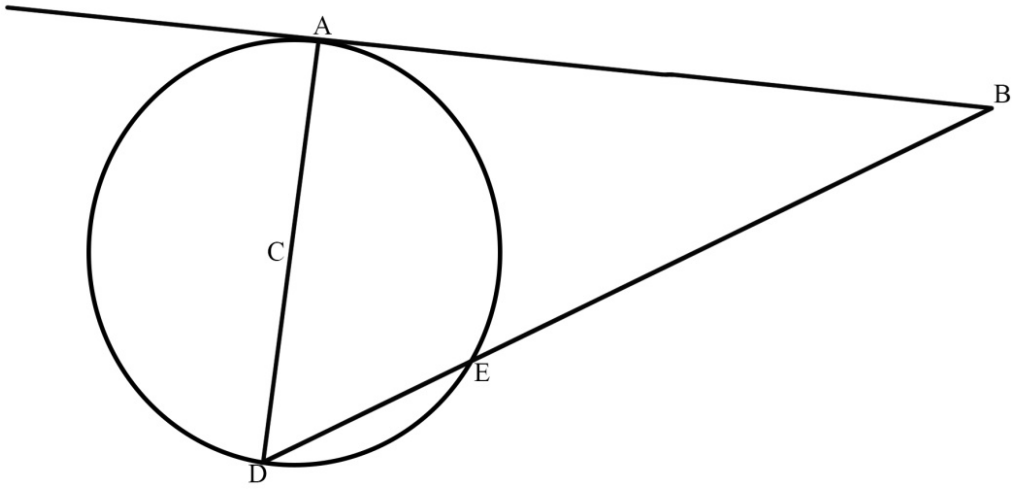
2) In the following circle, determine the size of angular measure of minor arc AD if the angular measure of minor arc AB = 91^o, the angular measure of minor arc BE = 117^o, and angle ACB is 8^o.



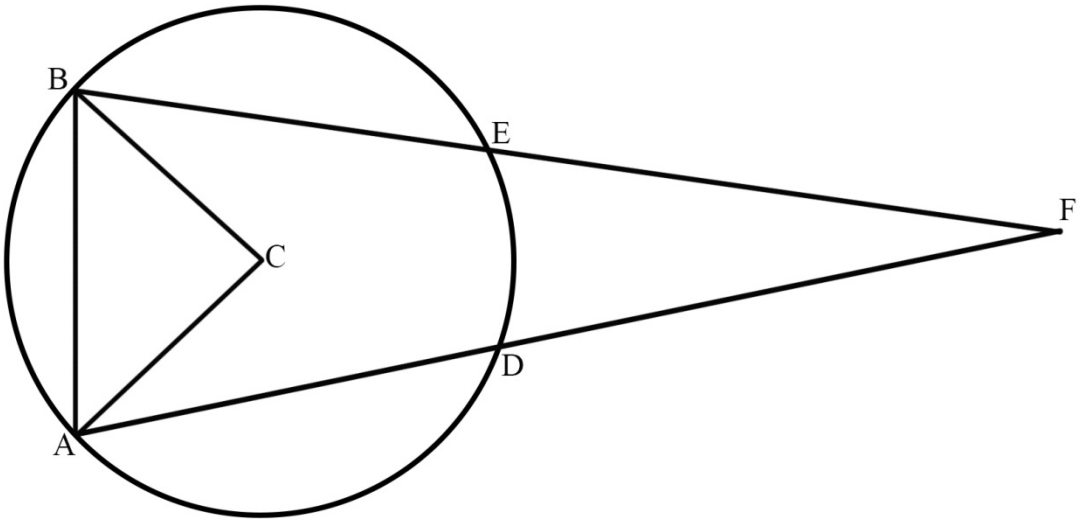
3) If angle BFA = 13^o, the angular measure of minor arc AD = 94^o, and the angular measure of minor arc AB = 87^o, find the size of angle BCE.



4) Line AB is tangent to circle C at point A, and AD is a diameter of circle C. If the angular measure of minor arc DE is 74^o, and segments AB = 15, DE = 3, and DC = 4, what is the size of angle ABD and the length of segment BE?



5) Lines BE and AD are both secants of circle C and intersect at point F. If the angular measure of minor arc AD is 140^o, the angle measure of minor arc ED is 62^o, AC = 18, and angle AFB is 9^o, what is the size of angle ACB, what is the angular measure of minor arc BE, and how long, exactly, is arc length BA?



6) If you flip a coin 5 times, what is the probability that it will come up heads every time?

7) Simplify: $\frac{15!}{13!}$

8) If you roll a pair of normal, six-sided dice, what is the probability that you will roll a sum of seven?

9) Simplify: $\frac{8!6!}{12!}$

10) If you roll a pair of normal dice and flip a coin, all at the same time, what is the probability of getting the coin to come up heads while rolling a sum of nine on the dice?

11) Simplify: $\frac{5!9!}{14!} \div \frac{16!}{17!6!}$

12) If you have a standard deck of cards (52 cards in the deck) that has been randomly shuffled, what is the probability that the first four cards dealt are all kings? If you take that same deck of cards and randomly shuffle it, turn over the top card, look at it, turn it back over, reshuffle the deck, and then keep doing this process over and over, what is the probability that the first four cards you turn over are all kings?

13) Simplify: $\dfrac{10!4!}{3!5!9!}$

14) What is the probability that the first five cards dealt from a randomly shuffled deck of cards are the four, five, six, seven, and eight of hearts? What is the probability if they must be dealt in exactly that order?

15) Simplify: $\dfrac{9!4!}{12!3!} \div \dfrac{15!5!}{17!}$

16) If you roll three normal dice, what is the probability that the sum of the roll is 12? What is the probability that you roll three fours? What is the probability that, if you threw the three dice twice, you would roll a sum of 12 the first time followed by a roll of three fours?

17) Suppose you are placed in charge of running a fundraising event for your church. You invent a game where people can receive a cash prize if they win, and you decide to charge $1 per person per chance to win. The game consists of rolling two normal dice, spinning a wheel that is broken up into 27 sections marked with the numbers 1 through 27, and flipping a coin. People can win if they roll a sum of 5 with the dice while spinning the wheel and landing on a number that is a multiple of 3 and also flipping the coin and having it show up heads. If the church is hoping to make a $700 profit from the playing of your fundraising game and you expect that 2,700 people will play your game once, how much should a winning prize be worth?

18) Simplify: $\dfrac{12!7!}{8!14!} \div \dfrac{13!6!}{19!} \cdot \dfrac{9!10!}{16!20!} \div \dfrac{2!}{18!5!}$

19) An insurance company offers insurance for farmers in the event that there is a severe drought and the farmers' crops fail. The policy states that the insurance company will pay the farmers $1,000 per acre of lost crops, and the meteorologists project that there is a 5% chance of a severe drought occurring during any growing season. If this information is both reliable and accurate, what is the minimum amount of money the policy costs per acre, per growing season, to ensure that the insurance company does not lose money over time?

20) Your friend randomly shuffles a normal deck of cards, turns the top card over for everyone to see, and then places it face up on a table. The first eight cards your friend turns over are an ace, a king, an ace, a king, an ace, a king, an ace, and a king. You are amazed and start wondering if your friend is a magician or just really lucky. What is the probability of that pattern of cards occurring if your friend isn't a magician?