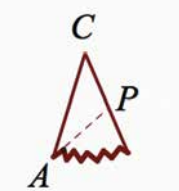


NOVEMBER

	<p>The Saint Joseph University (SJU) mascot, the Hawk, flaps its wings continuously during the 40-minute clock run at all basketball games. Its practice rate is about 40 flaps per minute. During a game, the Hawk flaps 10% faster when the team is ahead and 15% slower when it is behind. What is the Hawk’s average flap rate for a game if SJU is ahead for 18 minutes and behind for 15 minutes?</p>	<p>Triangle ABC is equilateral with sides of length 8. The triangle’s centroid is located at the origin, and base AC is parallel to the x-axis. Find exact values for the coordinates of A, B, and C.</p> 	<p>Viola has a bouquet of 24 flowers that includes 12 hibiscus, each with 5 petals, and 12 Virginia iris, each with 6 petals. She picks off the petals of each flower, alternating between hibiscus and iris. If she begins with “He loves me” as she plucks a hibiscus petal, what does Viola find out at the end?</p>
<p>A rectangular box fits exactly 5 cylindrical candles on its shorter side and exactly 7 on its longer side. Each candle has diameter 2.5 in. and height 4 in., which matches the height of the box. If the box is filled with candles, how much empty space is there?</p> 	<p>An ice hockey rink is basically rectangular, except for rounded corners. Suppose a rink measures 200 ft. by 85 ft. with circular corners of radius 28 ft. Find the area of the rink’s ice surface.</p>	<p>Consider again the ice hockey rink from problem 5. The ice is 1.08 inches thick. If ice weighs 57.4 pounds per cubic foot, what is the weight of the ice on the surface of the ice hockey rink?</p>	<p>Dan and Jeff are heated competitors in a video game. Each has a 50% chance of victory in the first round, but Dan is very emotional. When Dan wins, his chance of victory in the next round increases to 70%. When he loses, his chance of victory in the next round decreases to 20%. What is the probability of Dan’s winning at least two out of three games?</p>
<p>Andrew runs 6 miles every day of the week except Sunday. After his run on Monday, July 4, 2011, his cumulative total miles run reached 4224. What day did Andrew start running 6 miles per day?</p>	<p>Andrew’s cumulative sum of 4224 miles run (see problem 8) is a <i>palindrome</i>, a number that reads the same forward and backward. Suppose that Andrew reached his milestone 4224 miles after his run today, November 9, 2015. If he continues to run 6 miles per day, except on Sunday, what is the next date that he will end his run with a palindromic total?</p>	<p>If $xy = 28$ and $x + y = 7$, what is the sum of the reciprocals of x and y?</p>	<p>Premier League soccer teams earn 3 points for a win and 1 point for a draw over the course of a 38-game season. An above-average team finished the season with 72 points, having 12 more wins than draws. What was its overall win-loss-draw record for the season?</p>
<p>Cindy’s digital music library contains 1354 songs. It includes 36 songs by her favorite artist, one of which is her favorite song. If Cindy is using shuffle mode, which puts the 1354 songs in random order, what is the probability that Cindy’s favorite song is the fifth song played?</p>	<p>Prove that $n^2 + n$ is divisible by 2 for all integers $n \geq 1$.</p>	<p>How many lineup combinations can a hockey coach make if a team has 13 forwards, 7 defensemen, and 2 goalies available? Assume that there are 3 forwards, 2 defensemen, and 1 goalie on the ice at all times.</p>	<p>Detective Dee receives a piece of chocolate every day plus 2 extra pieces of chocolate for every mystery that she solves. From October 1 to January 31, inclusive, she received 321 pieces of chocolate. How many mysteries did she solve?</p>
<p>A pharmacist has an order for 20 gallons of 80% pure alcohol. (Distilled water accounts for the other 20%.) She has plenty of alcohol in stock, but the strengths are different; one is a 65% pure solution, the other 90% pure. Can the pharmacist fill the order? Explain.</p>	<p>A hospital has private single-patient rooms, semiprivate rooms for 2 patients, and wards for 8 people. A nurse can care for 4 private-room patients, for 6 semiprivate room patients, or for 12 ward patients. When operating at full capacity, the hospital has 80 beds in 27 rooms with 10 nurses on duty. How many patients of each type can it care for at a time?</p>	<p>Consider again the equilateral triangle centered at the origin with sides of length 8 (see problem 2). Find the proportion of the triangle’s area that lies below the x-axis. Can you find this fraction without directly calculating the area?</p>	<p>The slice of pie shown is $\frac{1}{6}$ of a pie of radius 6 inches. Before the slice was cut, point C lay at the pie’s center; point A lies on the edge. A single straight cut from point A to point P on the other cut side divides the slice in half. How far from C is point P?</p> 
<p>Find the distance between the x- and y-intercepts of the line $5x + 12y = 9300$.</p>	<p>Continuing problem 20: P is a point on the line $5x + 12y = 9300$ such that the distance between P and the origin O is as small as possible. Find OP.</p>	<p>Two positive numbers a and b have a product of 300. The ratio of the positive difference of their squares to the square of their difference is 7 : 1. Find $a + b$.</p>	<p>Find the smallest positive rational number that each of the fractions $\frac{6}{11}$, $\frac{7}{22}$, and $\frac{14}{33}$ will divide without remainder.</p>
<p>During an economic recession, a business owner decreased each employee’s salary by p percent to avoid laying anyone off. When business picked up, he returned salaries to their prerecession levels. By what percentage did the owner raise salaries?</p>	<p>The product $\sqrt[5]{8} \cdot \sqrt[3]{16}$ can be expressed as 2^n. What is the value of n?</p>	<p>This year Devon’s birthday falls on Thanksgiving Day, as it did in 1998, when he was born. What is the sum of all the years during Devon’s lifetime—excluding 2015 and 1998—when his birthday has fallen on Thanksgiving?</p>	<p>It takes Michaela 3.5 hours to prepare a large flower delivery for sale as small bouquets. When Nikhil helps her, the two complete the job in 2 hours. If Nikhil had to do the entire job by himself, how much time would he need?</p>
<p>Two copies of a 9-12-15 right triangle have been placed in quadrant I so that the legs of one triangle coincide with the positive x- and y-axes and the hypotenuse of the second triangle coincides with the positive x-axis, as shown. Find the areas of regions I, II, and III.</p> 	<p>The equiangular hexagon shown has 4 congruent sides of length a and 2 congruent sides of length b. Write a formula for its area in terms of a and b.</p> 	<p>Write the following numerical expressions in order, from smallest to largest, without using a calculator:</p> <p>$-64^{\frac{1}{2}}$, $64^{\frac{2}{3}}$, $-64^{\frac{2}{3}}$, $-64^{\frac{2}{3}}$, $64^{\frac{1}{2}}$, $64^{\frac{1}{2}}$</p>	