Sum up the News – April 24th, 2017

Vocabulary

1. F(x) = 2kx where k is a positive integer and G(x) = $\sqrt{5x}$. If G(F(6)) is equal to a rational number, then which of the following could be the prime factorization of k?

A. $2 * 3^3 * 5$

B. $2^2 * 3^2 * 5$

C. $3^2 * 5$

D. $3^3 * 5$

2. An equilateral triangle has a perimeter of P. What is the area of the triangle in terms of P?

A. $\frac{\sqrt{3}}{36}P$

B. $\frac{1}{12}P$

C. $\frac{\sqrt{3}}{36}P^2$

D. $\frac{1}{12}P^2$

3. If the lateral area of a cone is twice the area of its circular base and its base has an area of 25π, then what is the height of the cone?

A. 5

B. $5\sqrt{3}$

C. 10

D. $5\sqrt{5}$

Based on the article "'Rough commutes' ahead as Seattle I-5 gets repaving" on page A1 of the Tuesday, April 18th, Seattle Times.

4. This week, for the first time since it was built in the 1960's, a long stretch of northbound I-5 will finally be repaved. The 22-mile section of the freeway will be resurfaced and the work is scheduled to be completed by the end of October in 2019. If the repaving project takes 20% longer than projected, then approximately how many feet of highway will be repaved each month? (1 mile = 5280 feet)

A. 3200 feet per month

B. 3600 feet per month

C. 3900 feet per month

D. 4600 feet per month

5. For most of the repaving work, the Washington State Department of Transportation (WSDOT) will be laying pavement over existing concrete panels. WSDOT will us a machine to crack the concrete panels, before they overlay the asphalt. The panels are each 12 feet by 15 feet. If northbound i-5 is an average of 60 feet wide, how many panels will be cracked and resurfaced each day.

A. 22 panels per month

B. 36 panels per month

C. 44 panels per month

D. 73 panels per month

Based on the article "Wind power will fuel light-rail trains" on page B6 of the Wednesday, April 19th, Seattle Times.

6. Sound Transit has contracted with Puget Sound Energy to ensure that all the electricity used to power its light rail systems will come from renewable sources. Thanks to the contract, PSE will order 130 megawatts of wind energy from wind farms that will open soon. This will let the utility offer 100% renewable energy packages to 10% of their customers by volume. Currently 41% of PSE's energy comes from renewable sources. How many megawatts of renewable energy does PSE currently have access to?

A. 90 megawatts

B. 130 megawatts

C. 900 megawatts

D. 2200 megawatts

7. Sound Transit pay will 5.1 cents per kilowatt-hour starting in 2019, which includes a 2% annual increase from current prices. That price represents slight increase over the current price of 4.7 cents per kilowatt-hour for the electricity from a mix of renewable and fossil fuel sources. How much does electricity from just fossil fuels cost right now?

A. 4.43 cents per kWh

B. 4.56 cents per kWh

C. 4.65 cents per kWh

D. 4.89 cents per kWh

8. Sound Transit's contract could save them money in the long term as it locks in a slow rate of increase for the price they are paying, just 2% a year for the next 10 years. Their light rail system uses 6.7 million kilowatt-hours each year. Overall, energy costs are expected to rise between 2.4% and 4.8% on average over the next decade. If energy prices rise 3.6% annually over the next decade, then how much would Sound Transit save in the last year of their contract compared to the standard mix of energy?

A. $19,000

B. $51,000

C. $65,000

D. $89,000

Based on the article "Cassini's grand finale: a dive between Saturn and its rings" on page A3 of the Saturday, April 22nd, Seattle Times.

9. The Cassini spacecraft has been circling Saturn for over a decade and is now preparing to crash into the planet's surface. Cassini has discovered several potential locations on Saturn's moons where life could possibly form, and rather than risk contaminating those location with bacteria from Earth, NASA has decided to send the

probe to burn up in the planet's atmosphere. The spacecraft reached Saturn in 2004 and since then has completed 270 orbits. Approximately many days did each orbit take?

A. 16 days

B. 18 days

C. 20 days

D. 22 days

10. NASA is calling the lead up to Cassini's planned crash the Grand Finale and as part of that the orbit of the spacecraft will exponentially decay as it begins diving inside Saturn's signature rings. The Grand Finale consists of 22 dives, each about a week apart. Each trip inside the rings of Saturn will slow down the spacecraft, leading to closer and closer flybys of the planet. Up until now Cassini has only gotten to within 150,000 km of Saturn, but the second to last dive will bring it to within 54,000 km of the planet. If Cassini's speed is directly related to how close it gets to the planet, then by what percent does each pass through the rings slow down Cassini?

A. 4.1%

B. 4.5%

C. 4.7%

D. 4.8%

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