# 2014 <br> Leap Frog Relay Grades 9-10 Part I 

No calculators allowed
Correct Answer $=4$, Incorrect Answer $=-1$, Blank $=0$

1. The sum of the prime divisors of 2014 is . . .
(a) 76
(b) 78
(c) 80
(d) 82
(e) None of these
2. In $\triangle A B C$, the base length $A B$ is 10 feet and the length $A D$ is $x$ feet. What is the value of $x$ so that the area enclosed by $\triangle A D C$ is twice the area enclosed by $\triangle B D C$ ?

(a) $x=8$.
(b) $x=\frac{9}{2}$
(c) $x=5$
(d) $x=\frac{20}{3}$
(e) None of these
3. The Antarctic Shoe Store is running a $30 \%$ off sale. Sales tax is $10 \%$. The pre-sale price of a pair of shoes is $\$ 78$. When you pay for your pair of shoes, you hand the cashier a $\$ 100$ bill. How much change do you get back?
(a) $\$ 39.82$
(b) $\$ 39.86$
(c) $\$ 39.90$
(d) $\$ 39.94$
(e) None of these
4. A cube of ice has melting so that its surface area has decreased by $19 \%$. Assuming at all times, the cube maintains length $=$ width $=$ height, by what percentage has the volume decreased?
(a) $26.7 \%$
(b) $26.9 \%$
(c) $27.1 \%$
(d) $27.3 \%$
(e) None of these
5. The 9 -digit number $N=1234 d 4321$ is divisible by 9 . What is the value of the digit $d$ ?
(a) 7
(b) 6
(c) 5
(d) 4
(e) None of these
6. In the figure below $A B C D$ is a rectangle with indicated side lengths. Also, $\overline{B F} \perp \overline{A E}$. Find the length of $B F$.

(a) $B F=2 \sqrt{3}$
(b) $B F=\sqrt{5}$
(c) $B F=\frac{5}{2}$
(d) $B F=\frac{3 \sqrt{2}}{2}$
(e) None of these
7. Find the value of $a$ so that the two lines $2013 x+2012 y=1$ and $2014 x+a y=1$ are mutually perpendicular.
(a) $-\frac{2027091}{1009}$
(b) $-\frac{2027091}{1008}$
(c) $-\frac{2027091}{1007}$
(d) $-\frac{2027091}{1006}$
(e) None of these
8. A standard calendar year has 365 days. A leap year has 366 days. A year is a leap year if it is divisible by 4 , except if it is a new century year not divisible by 400 . So 1900 was not a leap year (1900 is not divisible by 400), but 2000 was a leap year ( 2000 is divisible by 400). December 25, 2013 was a Wednesday. What day of the week will December 25 be in the year 3013 ?
(a) Friday
(b) Saturday
(c) Sunday
(d) Monday
(e) None of these
9. Lenny asks Rodney to choose a number. Lenny then doubles Rodney's number and subtracts 6 . Lenny repeats this procedure 2 more times (for a total of 3 times) using the result of the previous calculation as the starting number with each repeat. Lenny then notes that the end result is the number 2014. What was Rodney's starting number?
(a) 253
(b) 254
(c) 255
(d) 256
(e) None of these
10. Lenny has 45 coins (nickels, dimes and quarters) in his purse that add up to $\$ 4$. The Magic Fairy instantly switches the respective numbers of nickels and quarters, doubling the amount of money in Lenny's purse, giving him $\$ 8$. How many quarters did Lenny originally have?
(a) 8
(b) 7
(c) 6
(d) 5
(e) None of these
