Snow College Jr. Mathematics Contest

April 3, 2012 **Junior Division: Grades 7–9** **Form: T**

Bubble in the single best choice for each question you choose to answer.

1. Evaluate the expression.

$$\frac{\sqrt{36}+\sqrt{64}}{\sqrt{36+64}}$$

(A) 1/5
(B) 7/5
(C) 16/5
(D) 24/5
(E) 1

2. What is the sum of the units digits of all the multiples of 3 between 0 and 50?

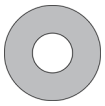
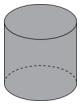
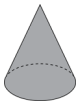
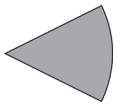
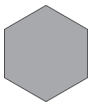
(A) 75
(B) 77
(C) 78
(D) 80
(E) 82

3. In shopping for a new calculator, Sue found an \$80 graphing calculator which was on sale for 15% off. How much did she pay?

(A) \$52
(B) \$56
(C) \$60
(D) \$64
(E) \$68

4. Which shaded region fits the area formula?

$$A = \pi(R^2 - r^2)$$

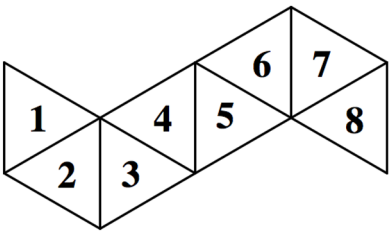
(A) 
(B) 
(C) 
(D) 
(E) 

5. What is the measure of the acute angle between the hour and minute hands of a correctly working analog clock at 4:18?

(A) 12°
(B) 15°
(C) 18°
(D) 21°
(E) 24°

6. A regular octahedron is folded from the net shown. What number shows on the top when the face numbered 1 is on bottom?

(A) 3
(B) 5
(C) 6
(D) 7
(E) 8



7. A farmer plans to build a fence around a rectangular pasture. He wants to place a post every 10 ft. If the pasture is 240 ft $\times$ 320 ft, how many posts will he need?

(A) 55
(B) 56
(C) 111
(D) 112
(E) 116

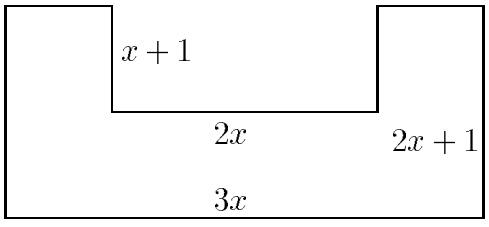
8. Find the equation of the line that goes through the points $(-2, 8)$ and $(6, -4)$.

(A) $3x + 2y = 10$
(B) $3x + 2y = 6$
(C) $-3x + 2y = -6$
(D) $-3x + 2y = -26$
(E) $3x + 2y = 26$

9. How many natural number factors does 2012 have?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 12

10. Write an expression for the area.



(A) $(2x + 1)(x + 1)$
(B) $6x(x + 1)$
(C) $4x(x + 1)$
(D) $4x(2x + 1)$
(E) $4x^2 + x$

11. If $(3, 8)$ and $(7, 2)$ are the coordinates of two opposite vertices of a square, what are the coordinates of the other two vertices?

(A) $(3, 7)$, $(2, 8)$
(B) $(3, 2)$, $(7, 8)$
(C) $(2, 3)$, $(8, 7)$
(D) $(2, 7)$, $(8, 3)$
(E) $(3, 3)$, $(8, 8)$

12. Find the 100th digit after the decimal point in $0.\overline{341729}$.

(A) 1
(B) 2
(C) 3
(D) 4
(E) 7

13. Uncle Bookworm eats two books a week; Aunt Bookworm eats one book every two months. In a year, how many more books does Uncle eat than Aunt?

(A) 17
(B) 20
(C) 40
(D) 80
(E) 98

14. Elaine and Dan want to install wall-to-wall carpeting in their family room. The floor of the rectangular room is 18 feet long and $13\frac{3}{5}$ feet wide. How much will it cost to carpet the room if carpet costs \$30/yd^2?

(A) \$816
(B) \$1237
(C) \$2171
(D) \$6514
(E) \$58,627

15. If my pet runs 300 cm/s and your rocket flies 300 m/s then how many times as fast is your rocket as my pet?

(A) 30000

(B) 1000

(C) 300

(D) 100

(E) 1

16. Find the probability of randomly choosing a dark caramel from a box that contains only light and dark caramels and has twice as many light as dark caramels.

(A) $\frac{2}{3}$

(B) $\frac{1}{2}$

(C) 2

(D) $\frac{1}{4}$

(E) $\frac{1}{3}$

17. My pet rabbit, Cotton, can hop up one step at a time or two steps at a time. The stairs in my house have ten steps. How many ways can Cotton get up my stairs?

(A) 20

(B) 32

(C) 89

(D) 117

(E) 1024

18. The sum of two numbers is 10; their product is 20. Find the sum of their reciprocals.

(A) $\frac{1}{10}$

(B) $\frac{1}{2}$

(C) 1

(D) 2

(E) 4

19. Say you place a 25 000-mile-long metal band snugly around the earth's equator. (Assume a smooth spherical earth.) Then you cut the band and splice another 50 feet to it, thus loosening it all around. What is the tallest object that could comfortably fit between the new-length band and the earth?

(A) a DNA molecule

(B) a grain of sand

(C) a golf ball

(D) a small dog

(E) a tall person

20. When 15 is added to a set of ten numbers, the median changes from 6 to 8. Find the median of the new set if 7 replaces 15.

(A) 4

(B) 5

(C) $5\frac{1}{2}$

(D) 6

(E) 7