



**UNIVERSITY OF
WATERLOO**

University of Waterloo
Faculty of Mathematics

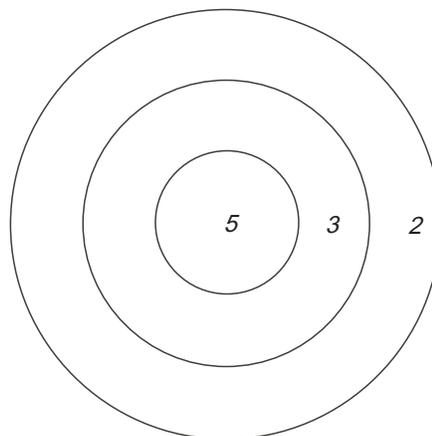
Centre for Education in
Mathematics and Computing

**Grade 6 Math Circles
November 23, 2011
End of Year Exercises**

1. If $9m = 60$, then the value of $3m$ is
(A) 5 (B) 3 (C) 20 (D) $\frac{20}{9}$ (E) 15
2. The average of two numbers is 5. If one of the numbers is -8 , then the other number is
(A) 26 (B) 18 (C) 9 (D) 2 (E) 13
3. If the area of a square is 484cm^2 , then its perimeter, in centimetres, is
(A) 22 (B) 44 (C) 88 (D) 484 (E) 968
4. If p is chosen from the set $\{1,3,5\}$ and q is chosen from the set $\{2,4,6,8\}$, then the number of ways that p and q can be chosen so that $p + q \leq 10$ is
(A) 8 (B) 7 (C) 10 (D) 9 (E) 12
5. In a recent election with three candidates, Mrs. Jones received 10575 votes, Mr. Smith received 7990 votes and Mr. Green received 2585 votes. If 90% of those eligible to vote did so, the number of eligible voters was
(A) 19035 (B) 49572 (C) 23265 (D) 21150 (E) 23500

6. A dart board consists of three circles as shown. The inner circle is worth 5 points, the middle ring is worth 3 points, and the outer ring is worth 2 points. The smallest number of darts that can be thrown to earn a score of exactly 21 is

(A) 8 (B) 6 (C) 4
 (D) 7 (E) 5



7. The five expressions $2x + 1$, $2x - 3$, $x + 2$, $x + 5$, and $x - 3$ can be arranged in a different order so that the first three have the sum $4x + 3$ and the last three have the sum $4x + 4$. The middle expression would then be

(A) $2x+1$ (B) $2x-3$ (C) $x+2$ (D) $x+5$ (E) $x-3$

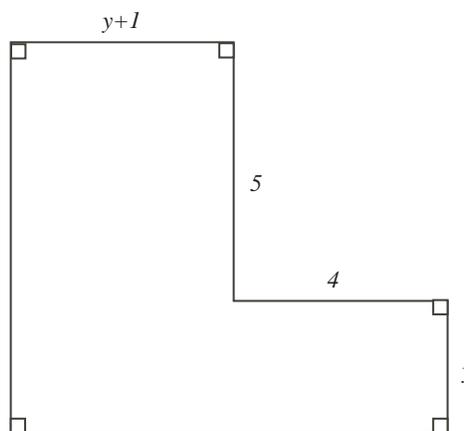
8. If $a = 1$, $b = 2$, and $c = 3$, then determine the value of $(a + b - c) + (a - b + c) + (-a + b + c)$.

9. If $m = 3k - 6$ then the value of k when $m = 18$ is

(A) 48 (B) -4 (C) 24 (D) 8 (E) 4

10. The figure has a perimeter of 32. Its area is

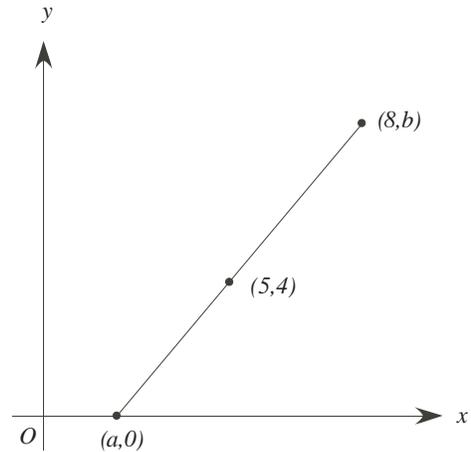
(A) 32 (B) 44 (C) 61
 (D) 64 (E) 236



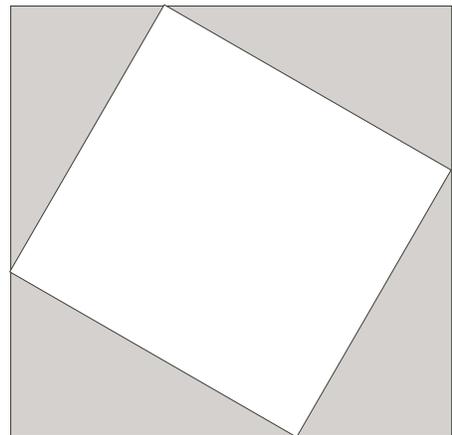
11. A tennis player won 10 of her first 15 matches. She then won her next five matches. What percent of the 20 matches did she win?

12. If $a + b + c = 42$ and $a = 2b = 4c$, then b equals

13. In the diagram, the line segment with endpoints $(a, 0)$ and $(8, b)$ has midpoint $(5, 4)$. What are the values of a and b ?



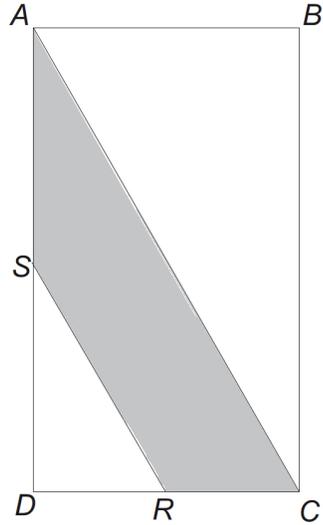
14. If $x = 10$ and $y = 6$, the value of $\frac{x-y}{x+y}$ is
15. If six is subtracted from N , the result is 47. The value of N is
16. If 24 is added to a number, the number is tripled. What is the original number?
17. A bowl contains 40g of white rice and 60g of brown rice. If 100g of white rice is added to the mixture, then the percentage of the new mixture that is white rice is
18. A square with perimeter 20 is contained within a larger square of perimeter 28. The area of the shaded region is



19. Each of the numbers 2, 5, 11, and 13 is substituted, in some order, for p, q, r , and s . The greatest possible value of $pq + pr + ps$ is
20. If $px = 20$, $6x - 3q = 30$ and $x = 4$. then the value of $p - q$ is

21. In rectangle $ABCD$, S and R are midpoints of sides AD and CD respectively. If $AB = 4$ and $BC = 8$, what is the area of the shaded region $ASRC$?

(A) 8 (B) 12 (C) 14
 (D) 16 (E) 20



22. The length of a large rectangular room is 7 metres more than its width. If the perimeter is 34 metres, the length of the room, in metres, is

(A) 4 (B) 13.5 (C) 19 (D) 12 (E) 6.75

23. The area of a square $ACEG$ is 121. The area of square $ABJH$ is 81. The area of square $DEFL$ is 36. The area of square $KJIL$ is

(A) 4 (B) 12 (C) 20
 (D) 25 (E) 16

