# PROVINCIAL 2009 FACE-OFF QUESTIONS
ACTUALLY USED

1. Simplify: $\dfrac{2^{-2} + 5^{-2}}{10^{-2}}$

1. 29

2. The rectangle below has perimeter 3 cm, and is divided into 5 congruent squares. What is the number of cm^2 in the area of the rectangle? Express your answer as a common fraction.

2. $\dfrac{5}{16}$ (cm^2)

3. Suppose that $n^2 - 4 = 50(n - 2)$ and n is not equal to 2. What is the value of n?

3. 48 (cm^2)

4. Simplify: $\dfrac{16.8}{0.014}$

4. 1200

5. Alicia walked 1000 metres in 12 minutes. At this rate, how many metres can Alicia walk in 27 minutes?

5. 2250 (metres)

6. We have 7 Scrabble$^{\text{TM}}$ tiles. They have the letters B, U, R, N, A, B, and Y written on them, one letter per tile. How many 2-letter "words" can be formed using 2 of these tiles? For our purposes a word is any string of 2 letters—it does not have to be a word of English.

6. 31 (words)

7. If $f(x) = x^2 - 6x$, what is the value of $f(f(1))$?

7. 55

8. In the first quarter of the football game, Alphonse punted the ball 3 times. The average length of his 3 punts was 35 yards. His longest punt was 41 yards. What was the average length, in yards, of his other 2 punts?

8. 32 (yards)

9. Given that $\dfrac{1}{2x+1} = \dfrac{7}{15}$, what is the value of $\dfrac{1}{2x-1}$?

    9. 7

10. What is the sum of the x-coordinate and the y-coordinate of the point where the line $y = 2x$ meets the line $y = 7x - 30$?

    10. 18

11. The sum of 4 consecutive integers is 182. What is the largest of the 4 integers?

    11. 47

12. Alphonse wrote a 50 question true/false test. He never answered more than 5 questions in a row correctly. What is the largest number of questions he could have answered correctly?

    12. 42 (questions)

13. A $3 \times 3 \times 3$ cube has been assembled using twenty-seven $1 \times 1 \times 1$ cubes. Then the three $1 \times 1 \times 1$ cubes shaded in the diagram are removed. What is the surface area of the remaining solid?

    13. 60 (units^2)
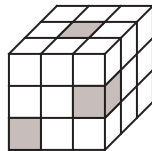
14. What is the sum of the roots of the equation $(x - 12)^2 = 100$?

    14. 24

15. A survey of 500 students showed that 300 have an MP3 player, 250 have a cell phone, and 200 have both. How many of the students have neither an MP3 player nor a cell phone?

    15. 150 (students)

16. What non-zero value of x satisfies the equation $(3x)^3 = (2x)^2$? Express the answer as a common fraction.

    16. $\dfrac{4}{27}$

17. Alicia is driving at 100 km per hour. At this speed, her SUV uses 12 litres of gas for every 100 km driven. Alicia's gas tank contains 7 litres of gas now. For how many minutes can she drive before running out of gas?

17. 35 (minutes)

18. Organic potatoes come in 2 kg bags and in 3 kg bags. A 2 kg bag costs \$2.99, and a 3 kg bag costs \$3.99. Alphonse wants to buy 6 kg of organic potatoes. How much money will he save by buying them in 3 kg bags over buying them in 2 kg bags? Give your answer in cents.

18. 99 (cents)

19. Two adjacent vertices of a square have coordinates $(7, 1)$ and $(4, 14)$. What is the number of units^2 in the area of the square?

19. 178 (units^2)

20. Alphonse bought $10,000$ shares of SureThing Gold for 50 cents a share. Later, he sold one-half of these shares for 65 cents a share. Then SureThing crashed, and Alphonse sold his remaining shares for 5 cents a share. How many dollars did lose on SureThing Gold?

20. 1500 (dollars)

21. What is the largest integer that is less than 2009 and is a multiple of 45?

21. 1980

22. Ninety-nine (99) people are arranged in 3 rows. If the back row has 7 more people than the middle row, and the middle row has 7 more people than the front row, how many people are in the front row?

22. 26 (people)

23. A certain number N of people were interviewed about their knowledge of eminent Americans. Of the N people interviewed, 400 had heard of Britney Spears, 300 had heard of Snoop Dogg, and 50 had heard of neither. What is the smallest possible value of N?

23. 450

24. The outer circle has area 72 cm². The inner small circles are congruent to each other, and their centres lie along two perpendicular diameters of the outer circle. Circles that appear tangent to each other *are* tangent to each other. What is the number of cm² in the shaded region?

24. 40 (cm²)
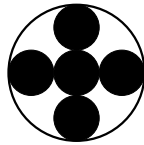
25. General admission tickets at a high school play were $10 each, and student tickets were $5 each. Equal numbers of general admission and student tickets were sold. Revenue from ticket sales was $3000. What was the total number of tickets sold?

25. 400 (tickets)

26. The point M is halfway between the points with coordinates $(1, 2)$ and $(8, 9)$. What is the sum of the x-coordinate and the y-coordinate of M?

26. 10
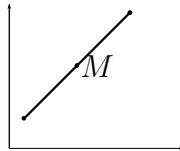
27. A 10 cent coin (dime) weighs 1.75 grams. What is the value, in dollars, of 3.5 kilograms of dimes?

27. 200 (dollars)

28. What is the smallest prime number that is one less than a multiple of 13?

28. 103

29. What is the sum of all the positive factors of 81?

29. 121

30. Suppose that you put numbers in the three empty boxes below, one number in each, so that the numbers in any three consecutive boxes add up to 200. (Note that two boxes already contain a number.) What number goes into the leftmost box?

		44		88

31. Evaluate $\dfrac{8!}{5!\,3!}$

32. Alicia and Beti walk side by side at the same speed. Alicia averages 120 steps per minute and each of her steps is 90 cm long. Beti's steps are 75 cm long. How many steps does Beti average per minute?