

PROVINCIAL 2010 FACE-OFF
QUESTIONS AND ANSWERS

1. What is the value of $\frac{\frac{1}{2} - \frac{1}{5}}{\frac{1}{10}}$?

1. **Answer:** 3

2. How many perfect squares are there between 11 and 111?

2. **Answer:** 7 (perfect squares)

3. It is late afternoon, and a 1.2 metre tall child casts a 3 metre shadow. The child is standing next to an upright telephone pole, which casts a 40 metre shadow. What is the height, in metres, of the telephone pole?

3. **Answer:** 16 (metres)

4. What is the integer nearest to $(8.5)^2$?

4. **Answer:** 72

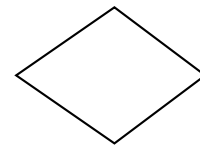
5. If $5x - 4x + 3x - 2x + x = 180$, what is the value of x ?

5. **Answer:** 60

6. Today, sunrise in Burnaby is at 7 : 00 AM, and sunset is at 7 : 36 PM. At what time is it exactly halfway between sunrise and sunset? Express the answer in hour:minute format. A spoken answer like “twelve forty-two” is of the right shape.

6. **Answer:** 1 : 18 (PM)

7. The diagonals of a rhombus have lengths 16 and 12. What is the perimeter of the rhombus?



7. **Answer:** 40 (units)

8. What common fraction is halfway between $\frac{1}{3}$ and 3?

8. **Answer:** $\frac{5}{3}$

9. How many positive integers less than 61 are divisible by 2 or 3 (or both)?

9. **Answer:** 40

10. One dozen scarlet splendour roses cost \$98. At the same price per rose, what the cost in dollars of 2.5 dozen scarlet splendour roses?

10. **Answer:** 245 (dollars)

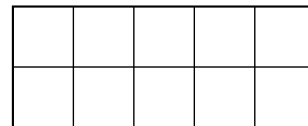
11. If $x^{2010} = 9$, what is the value of x^{3015} ?

11. **Answer:** 27

12. Among the three-letter “words” that only use the letters A and/or B and/or C, how many have exactly one C?

12. **Answer:** 12 (“words”)

13. The rectangle below has perimeter 70 cm, and is split into 10 congruent squares as shown. What is the area, in cm^2 , of the full rectangle?



13. **Answer:** 250 (cm^2)

14. Evaluate $\frac{7.2}{0.018}$

14. **Answer:** 400

15. When the radius of a circle is increased by 50%, the new circle has circumference 99. What is the circumference of the old circle?

15. Answer: 66 (units)

16. What is the value of the sum

$$1000 - 999 + 998 - 997 + \cdots + 4 - 3 + 2 - 1?$$

16. Answer: 500

17. A very long test has 108 questions, numbered 1 to 108. The test is 9 pages long, and each page has 12 questions. What is the number of the fifth question on the fifth page?

17. Answer: 53

18. Alphonse's auto repair bill is \$3000, of which \$1200 is for parts and the rest for labour. If labour is billed at \$45 per hour, how many hours of labour were billed?

18. Answer: 40 (hours)

19. What is the largest prime which is less than 190?

19. Answer: 181

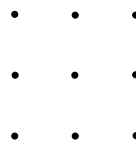
20. Let $\mu(a, b)$ be the mean of the numbers a and b . What is the value of $\mu(\mu(64, 32), 16)$?

20. Answer: 32

21. The sum of 4 consecutive integers is 90. What is the smallest of the 4 integers?

21. Answer: 21

22. In the 3×3 grid below, every grid point is 1 unit from its nearest horizontal or vertical neighbours. How many lines pass through *exactly* two grid points?

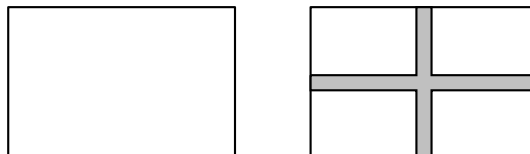


22. Answer: 12 (lines)

23. Evaluate $\frac{2^{10} - 1}{2^5 - 1}$.

23. Answer: 33

24. Alicia had a rectangular 20 feet by 30 feet garden (left-hand picture). She decided to make a 2 foot wide path in the garden as in the right-hand picture. How many percent of the area of the original garden is lost to the path?



24. Answer: 16 (percent)

25. Evaluate $\frac{7! - 6! - 5!}{6! - 5!}$.

25. Answer: 7

26. The sum of two consecutive primes is divisible by 2 but not by 4. What is the smallest possible value of this sum?

26. Answer: 18

27. Of the 30 marbles in a bag, 10 are red, 10 are green, and the remaining 10 are white. Two marbles are removed from the bag. What is the probability that these two marbles are of different colours? Express the answer as a common fraction.

27. Answer: $\frac{20}{29}$

28. How many minutes are there in two and a half days?

28. Answer: 3600 (minutes)

29. The average class size in the year 2000 was 27. Now the average class size is 30. By how many percent has the average class size increased from the year 2000 to now? Round the answer to the nearest integer. Thus an answer like 17 is of the right shape.

29. Answer: 11 (percent)

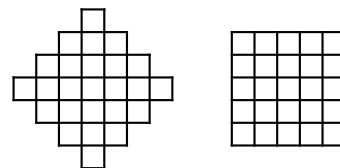
30. If $9^2 \times 27^3 = 3^n$, what is the value of n ?

30. Answer: 13

31. The sum of three consecutive even integers is 30. What is the product of the three integers?

31. Answer: 960

32. Each figure below is made up using twenty-five 1×1 squares. What is the positive difference between the perimeters of the two figures?



32. Answer: 8 (units)

33. If $x^2 = \frac{9}{256}$, what is the value of $|x|$? Express the answer as a common fraction.

33. Answer: $\frac{3}{16}$

34. Last week, Alan read every second page of his 200 page textbook, starting with page 1. This week, Alan read every third page of the textbook, again starting with page 1. How many pages did Alan read twice?

34. Answer: 34 (pages)

35. A *rod* is 5.5 yards, and a *furlong* is 220 yards. How many rods are there in 6 furlongs?

35. Answer: 240 (rods)

36. Alicia and Beth differ in weight by 20 pounds. Beth and Gamal differ in weight by 30 pounds. And Gamal and Delbert differ in weight by 6 pounds. What is the least possible weight difference between Alicia and Delbert?

36. Answer: 4 (pounds)

37. Given that the least common multiple of the numbers 8, 10, and n is 80, what is the smallest possible positive value of n ?

37. Answer: 16

38. Alphonse has three-sevenths as much money as Beti, and between them they have 400 dollars. How many dollars does Beti have?

38. Answer: 280 (dollars)

39. The mean of 20, 21, x , and $2x$ is 35. What is the value of x ?

39. Answer: 33

40. The operation \otimes is defined by the rule

$$x \otimes y = x^2 - 2xy + y^2.$$

What is the value of $6 \otimes (-4)$?

40. Answer: 100

41. The three cans of cola that Alphonse drinks every day together supply 20% of Alphonse's daily caloric requirements, which are 2100 calories. How many calories are in a can of cola?

41. Answer: 140 (calories)

42. Given that $x^2 = 0.2$, what is the value of x^{-4} ?

42. Answer: 25