# Prime CAT 01 2022 QA

**Q 1.** Find the number of distinct pairs of non-negative integers (x, y) satisfying $|3 - 2xy| < |3x - 2y| < 9$.

**1)** 4

**2)** 5

**3)** 8

**4)** 6

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**Q 2.** Jack earns Rs. 20 per hour. To increase the efficiency a bonus scheme is introduced wherein a bonus of 10% of the hourly rate is payable when 100% efficiency is reached and an additional bonus of 2% of the hourly rate is paid for each 1% in excess of 100% efficiency. Find the wages (in Rs.) earned by Jack if he saves 10 hours in a job for which the standard time is 60 hours.

**1)** 1,250

**2)** 1,300

**3)** 1,500

**4)** 1,750

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**Q 3.** Gopal bought a total of 96 face mask packets and hand sanitizer bottles. The price a packet of face mask was Rs. 40 less than that of a bottle of hand sanitizer. If he paid a total of Rs. 7,200 for bottles of hand sanitizers, and a total of Rs.2,880 for packets of face masks, then find the total price (in Rs.) paid for one bottle of hand sanitizer and one packet of face mask.

**1)** 160

**2)** 200

**3)** 220

**4)** 260

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**Q 4.** Ram distributed some gold coins amongst his three sons Lal, Tal, and Bal in the ratio of 4 : 9 : x. Bal made jewellery out of 45 gold coins. Tal sold 95 of his coins to his friend and Lal donated 20 coins to an NGO. The new ratio of the coins left with Lal, Tal and Bal was 38 : 73 : 64. What is the value of x?

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**Q 5.** The first three numbers in a series are in the ratio 2 : 3 : 5 and the sum of squares of these three numbers is 1368. If the 3rd, 4th and 5th numbers are in the ratio 5 : 7 : 11, then which of these can be the average of the first five numbers of the series?

**1)** −33.2

**2)** 41.4

**3)** 33.6

**4)** 34.8

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**Q 6.** The janitor steals five litres of pure liquid soap kept in a hotel store room from a container that is full of liquid soap. He then fills it with water to avoid detection. Unable to resist the temptation he steals 5 litres of the mixture again, and fills it with water. When the liquid soap is checked by the supervisor it is found that the new ratio of liquid soap to water is 64 : 17. What was the initial quantity of the liquid soap in the container if it is known that the liquid soap was not used by anybody else?

**1)** 36 litres

**2)** 48 litres

**3)** 54 litres

**4)** 45 litres

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**Q 7.** ABCD is a rectangle. Points E and F are on side AB such that they trisect AB. If the difference between the areas of trapezium CDEF and the triangle ADE is 12 sq. cm, then what is the area, in sq. cm, of rectangle ABCD?

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**Q 8.** If the equations $2|y| = 6 - 3x$ and $2|x| = 8 - 3y$, then the sum of all values of x and y is

**1)** $-2$

**2)** 0

**3)** 14/5

**4)** $-7/5$

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**Q 9.** P, Q, R run in the clockwise direction around a circular track that is 600 m long, with speeds of 9 km/hr, 18 km/hr and 27 km/hr respectively. They all start from point X, simultaneously. How much time after the start will they all meet again for the first time at X?

**1)** 6 minutes

**2)** 8 minutes

**3)** 4 minutes

**4)** 3 minutes

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**Q 10.** Triangle ABC is right angled at B. If AC = 12 cm and BD is perpendicular to AC, then what is the maximum length (in cm) of BD?

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**Q 11.** Let $t_1, t_2, t_3, \ldots$ be real numbers such that $t_{n+2} = t_{n+1} + 2n - 1$ for all $n \geq 1$. If $t_k - t_2 = 8100$, then k is equal to

**Q 12.** Neeta had Rs.3 lakh and she lent a part of it at 5% simple interest and the remaining at 20% simple interest. The total amount received by her after 5 years was Rs. 2,40,000. If the same amounts were lent at the same rates but at compound interest per annum for 3 years, then what would be the interest received by Neeta?

**1)** Rs.1,72,770

**2)** Rs.1,60,160

**3)** Rs.2,12,770

**4)** Rs.1,92,160

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**Q 13.** Kiran's project report on 'Survival and dignity', consists of 30 pages each of 75 lines with 80 characters in each line. In case the number of lines is reduced to 64 but the number of characters is increased to 90 per line, what is the percentage change in the number of pages? (Assume the number of pages to be a whole number.)

**1)** −3.33%

**2)** +6.67%

**3)** +3.33%

**4)** −5%

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**Q 14.** The perimeter of a field in the shape of a rhombus is equal to the perimeter of a square of area 225 sq. m. If the difference between the diagonals of the rhombus is 6 m, then the cost (in Rs.) of mowing it at the rate of Rs. 5 per sq. m is

**1)** 1080

**2)** 1000

**3)** 1125

**4)** 1296

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**Q 15.** In the year 2020, the laptop industry in the country had two major manufacturers – Dell and HP – with market shares of 30% and 70%, respectively. In 2021, the overall market for the product increased by 20% and a new player Asus also entered the market and captured 15% of the new market share. If we know that the market share of Dell increased to 50% in 2021, then the percentage decrease in market share of HP was

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**Q 16.** If repetition of digits is not allowed, then how many numbers between 3000 and 5000 can be formed using the digits 0 to 8?

**Q 17.** A chord AB is drawn inside a circle of radius OA with center O such that OA = AB = 4 cm. Now, two circles are drawn, one on each side of the chord AB, each touching the chord at its midpoint C and the original circle. The ratio of the areas of the bigger inscribed circle and the smaller inscribed circle is

**1)** $(5 + 3\sqrt{2}) : (5 - 3\sqrt{2})$

**2)** $(7 + 4\sqrt{3}) : (7 - 4\sqrt{3})$

**3)** $(3 + \sqrt{2}) : (3 - \sqrt{2})$

**4)** $(2 + \sqrt{3}) : (2 - \sqrt{3})$

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**Q 18.** Mohan, Rohan and Sohan can paint a room in 4, 6 and 9 hours, respectively. At the most only one person can work each hour and nobody can work for two consecutive hours. Find the minimum number of hours that they will be required to paint the room.

**1)** 5 hours 30 minutes

**2)** 5 hours

**3)** 4 hours 30 minutes

**4)** 4 hours 40 minutes

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**Q 19.** Let $2^{(x+y)} = 20$, $2^{(y+z)} = 40$ and $2^{(z+x)} = 80$ where x, y and z are any three real numbers. The value of $2^x - 2^z$ is:

**1)** $2\sqrt{10}$

**2)** $4\sqrt{10}$

**3)** $8\sqrt{10}$

**4)** $\sqrt{10}$

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**Q 20.** A trader of pulses marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a 900 gram weight instead of a 1 kilogram weight. Find his gain (in Rs.) after selling a 5 kg sack of pulses that cost him Rs.450.

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**Q 21.** For a real number k, $f(x) = 2^{kx} + 9$. If $3f(3) = f(6)$ and $f(9) - f(3) = N$, where N is a natural number. Find the sum of the digits of N.

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**Q 22.**

How many integral solutions are possible for $(x-1)^{(\log_{10} x)^2 - \log_{10} x^2} = (x-1)^3$.

**1)** 0

**2)** 1

**3)** 2

**4)** More than 2