Sample Questions for AKCSE National Math Competition

Grade 4

Level 1

1. What is the correct number in the blank?

$1 + 3 + 5 + 7 + 9 = 2 + 4 + 6 + 8 + \_$

A) 3 B) 5 C) 7 D) 9 E) 10

2. Which of the following is the greatest?

A) 3.6 B) $\frac{8}{3}$ C) 4-0.7 D) $\frac{8}{2} - 2$ E) $\frac{5}{2} + \frac{2}{3}$

3. Which number has a remainder of 3, when divided by 7?

A) 301 B) 441 C) 553 D) 607 E) 787

Level 2

4. Heejung had $2000 in her bank account. If she spent $\frac{3}{4}$ of total deposit, how much does she have now?

Level 3

5. The perimeter of a hexagon measures 1.80 meters. If you draw a pentagon having the same side as that of the hexagon, what is the perimeter of this pentagon?

Grade 5

Level 1

1. $7\frac{1}{4} - 4\frac{3}{4} = ?$

A) $2\frac{1}{2}$ B) $\frac{7}{2}$ C) $3\frac{3}{4}$ D) 3 E) $4\frac{1}{4}$

2. Liam needs 3.20 meters of pinewood for a craft project. Pinewood cost $2.55 per meter. How much will he spend?

A) $5.75 B) $7.50 C) $8.16 D) $9.20 E) $10.00

3. The sum of five consecutive even numbers is 90. What is the greatest of these numbers?

A) 18 B) 20 C) 22 D) 25 E) 30

Level 2

4. Dongsoo drinks $3\frac{3}{4}$ cups of milk each day and his brother drinks $2\frac{1}{4}$ cups each day. How many cups of milk do they drink per week?

Level 3

5. Sohee rolls red and blue dice and adds the the numbers that come up. What number is most likely to come up as the sum? (For example, there are 3 ways of getting the sum of 4 (1 red + 3 blue, 2 red + 2 blue, and 3 red + 1 blue) and only 1 way to get 2 (1 red + 1 blue), etc.)

Grade 6

Level 1

1. How many prime numbers are there between 1 and 30?

A) 7 B) 8 C) 9 D) 10 E) 11

2. What is 80% of $120?

A) $76 B) $106 C) $86 D) $96 E) $116

3. A family has 3 children. What is the probability that all 3 children are boy?

A) 1/9 B) 1/8 C) 1/4 D) 1/3 E) 1/7

Level 2

4. What is the least common multiple of 24, 40, and 48?

A) 96 B) 120 C) 160 D) 240 E) 480

5. Ethel made a list of all the whole numbers between 1 to 100. How many times did she write the number 2?

Level 3

6. Imagine a real number. Double it, subtract 160, and then divide the result by 8. Add 24 to the above result, and multiply that result by four. Now subtract the original number. What number do you have?

Grade 7

Level 1

1. What is the average of $\frac{1}{3}$ and $\frac{3}{5}$?

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{7}{15}$ D) $\frac{8}{15}$ E) $\frac{14}{15}$

2. In a parking lot, $\frac{1}{3}$ of the cars are white, $\frac{1}{4}$ black and $\frac{1}{5}$ red. What fraction of the cars are neither white, black nor red?

A) $\frac{7}{12}$ B) $\frac{9}{20}$ C) $\frac{11}{20}$ D) $\frac{37}{60}$ E) $\frac{13}{60}$

3. How many integers from 0 to 99 contain the digit 5?

A) 8 B) 9 C) 10 D) 19 E) 20

Level 2

4. A rectangle has a perimeter of 20cm. One side is 4cm. What is the area of the rectangle?

A) $20cm^2$ B) $24cm^2$ C) $25cm^2$ D) $36cm^2$ E) $38cm^2$

5. How many dice, each measuring 2cm by 2cm by2cm, can be placed in a box of 10cm by 10cm by 10cm?

Level 3

6. The dimensions of John's shop are 18m by 10m, but it will be 10% longer and 10% wider after the renovations. How much bigger “in areas" will John's shop be after the renovations?

Grade 8

Level 1

1. Which of the following equals $\sqrt{0.04}$?

A) 0.4 B) 0.04 C) 2 D) 0.2 E) 0.02

2. What is the value of h which satisfies $13 - \frac{h}{4} = 5$?

A) 0 B) 8 C) 20 D) 28 E) 32

3. Lee’s mother was 3 times Lee’s age six years ago. Now Lee’s mother is 28 years older than Lee. What is Lee’s age now?

A) 17 B) 20 C) 25 D) 28 E) 30

Level 2

4. Canada has a population of about 33 million. If, on average, each Canadian buys 2.35 books per year, how many books are sold each year in millions?

A) 33.5 B) 66.1 C) 66.7 D) 72.4 E) 77.6

5. What is the value of $\frac{1}{\frac{1}{1+\frac{1}{2}}-\frac{1}{3}}$?

Level 3

6. It is observed that the population of a small town in Ontario grows by 10% every year. If the current population is 1,000, what will be the town's population after 3 years?

Grade 9

Level 1

1. If $27^{2t} = 64$, then what is the value of 9^{2t-2}? (new)

A) 11/21 B) 0.04 C) 24/89 D) 16/81 E) 0.02

2. An equilateral triangle is inscribed in a circle with circumference 12π. What is the area of the inscribed equilateral triangle?

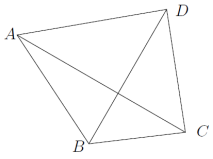
A) $18\sqrt{3}$ B) $27\sqrt{3}$ C) $36\sqrt{3}$ D) $54\sqrt{3}$ E) none of these

3. Which of the following is the largest but smaller than the value of $\sqrt{7+4\sqrt{\frac{1}{4}}}$?

A) 2 B) 3 C) 4 D) 5 E) 6

Level 2

4. In the figure, $\overline{AC}$ and $\overline{BD}$ are perpendicular, $\overline{AD} = 6$, and $\overline{BC} = 4$. Find $\overline{AB}^2 + \overline{CD}^2$. (new)



A) 2 B) 48 C)36 D)52 E) 12

5. How many distinct ways can one place 10 indistinguishable balls into three distinct boxes, with the restriction that each box must receive at least one ball?

A) 30 B) 36 C) 42 D) 56 E) none of these

Level 3

6. You tossed a fair die four times and recorded the numbers. When the six differences between pairs of numbers are sorted from smallest to largest as 0,2,2,2,2,4, what is the largest possible sum of all four numbers?

Grade 10

Level 1

1. If $x = 16$, then $x^2 - \sqrt[4]{x} =$

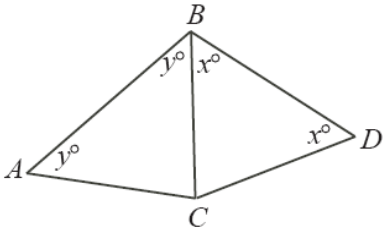
A) 0 B) 14 C) 96 D) 252 E) none of these

2. The product of two positive integers p and q is 100. What is the largest possible difference between p and q?

A) 66 B) 77 C) 88 D) 94 E) 99

3. In the diagram, triangles ABC and CBD are isosceles. The perimeter of $\triangle$CBD is 19, the perimeter of $\triangle$ABC is 20, and the length of $\overline{BD}$ is 7. What is the length of $\overline{AB}$?

A) 6.5 B) 7 C) 7.5 D) 8 E) 8.5

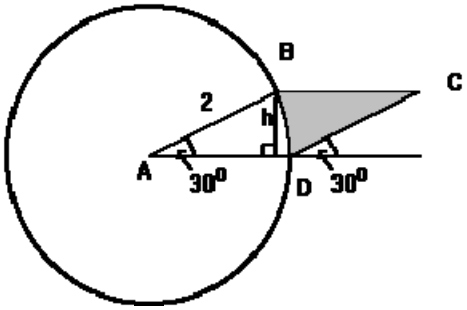


Level 2

4. If you roll two fair dice, what sum is most likely to appear?

A) 5 B) 6 C) 7 D) 8 E) 9

5. Given a circle with center A and radius 2. If ABCD is a parallelogram, find the area of the shaded region. Area parallelogram = b*h.



Level 3

6. Four balls with radius 10 are placed on a horizontal table such that their centers form a square whose perimeter is 80. A fifth ball with radius 10 is placed on the top of these balls so that it touches each of the four balls. How high above the table is the center of the fifth ball?

Grade 11

Level 1

1. Find the equation of the circle centered at (3, -2) passing through the point (6, 2).

A) $(x - 3)^2 + (y + 2)^2 = 5$

B) $(x - 3)^2 + (y + 2)^2 = 25$

C) $(x + 3)^2 + (y - 2)^2 = 5$

D) $(x + 3)^2 + (y - 2)^2 = 25$

E) none of these

2. There are 3 red balls, 2 blue balls, and 3 white balls in a bag. If James takes out three balls at once, then what is the probability that he takes out at least one red ball?

A) 1 B) $\frac{27}{28}$ C) $\frac{25}{28}$ D) $\frac{23}{28}$ E) none of these

3. If $\sin x - \cos x = \frac{3}{5}$, that what is the value of $\sin^3 x - \cos^3 x$?

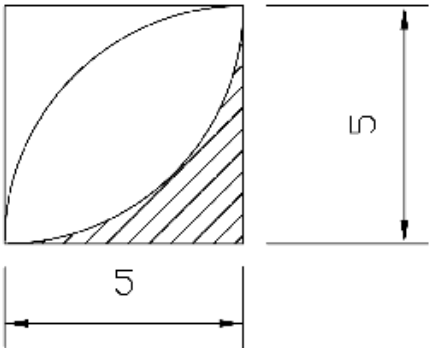
A) $\frac{4}{5}$ B) $\frac{33}{125}$ C) $\frac{66}{125}$ D) $\frac{99}{125}$ E) none of these

Level 2

4. The difference between the squares of two integers is 145, and the sum of the squares of these integers is 433. The integers are

A) 16, 13 B) 17, 13 C) 25, 22 D) 19, 13 E) 17, 12

5. Find the area of hatched part in the following diagram. Leave π as it is.



Level 3

6. Let n be a positive integer. The remainder when n is divided by k is k-1 for all k = 2, 3, 4, …, 10. What is the smallest such positive integer n?