Sample Problems

Grade 4

1. A box of apple is $40 and there are exactly 80 apples in one box. How much is one apple?

2. What is the greatest common divisor (factor) of 24 and 64?
(a) 7 (b) 3 (c) 8 (d) 24 (e) 64

3. If Joon can type an average of 45 words per minute, in how many minutes will it take for him to type 315 words?

Grade 5

1. $-5-(-12)=?$

2. Find z if $z-39=46$.
a) 13 b) 7 c) 425 d) 85 e) 80

3. If $2^3+2^3+2^3+2^3+2^3+2^3+2^3+2^3=2^n$, what is n ?
(a) 3 (b) 4 (c) 5 (d) 6 (e) 7

Grade 6

(1) Which of the following is the largest number?
a) 0.1 b) $\frac{1}{5}$ c) $\frac{3}{16}$ d) $\frac{21}{101}$ e) 0.09

(2) The ratio of the number of boys and girls in a class is 5 : 6. There are a total of 33 students in this class. How many girls are there?
a) 21 b) 18 c) 17 d) 16 e) 12

(3) The angles of a triangle are in the ratio 2 : 3 : 4. The smallest angle in the triangle is
a) 15° b) 20° c) 30° d) 40° e) 50°

Grade 7

(1) Solve for z in the equation $z - 39 = 46$.
a) 13 b) 7 c) 42 d) 85 e) 80

(2) What is the area of the equilateral triangle whose 3 vertices lie on a circle whose radius is 2?

(3) Out of 30 cars, 18 have car stereos, and 9 have sunroofs. Suppose 5 have neither a car stereo nor a sunroof. How many cars have both a car stereo and a sunroof?
a) 25 b) 9 c) 2 d) 4 e) $x = 10$

Grade 8

1. A fair die is constructed by labelling the faces of a wooden cube with numbers 1, 2, 2, 3, 3, and 3. If this die is rolled once, the probability of rolling an odd number is
a) $\frac{5}{6}$ b) $\frac{2}{3}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$ e) $\frac{1}{6}$

2. In a class of 35 students, each student has at most one pet. Two-fifths of the students have dogs, 20 % have cats, three have birds, and the other students have no pets. How many students have no pets?
a)15 b) 13 c) 11 d) 9 e) 7

3. A rectangle has sides of integer length (when measured in cm) and an area of 49 cm^2. What is the maximum possible perimeter of the rectangle?

Grade 9

1. If $\sqrt{10 - \sqrt{x}} = 2$, what is x ?
(a) 1 (b) $\sqrt{6}$ (c) 6 (d) 8 (e) 36

2. Solve $\log_2 x = -3$ for x.
(a) 8 (b) -8 (c) 1 (d) $\frac{1}{8}$ (e) $-\frac{1}{8}$

3. Consider the point $P = (2, 7)$. If you first reflect P about the x-axis and then rotate it about the origin $(0, 0)$ by 90° counter-clockwise, what is the image of P (the new location of P)?

Grade 10

(1) Let r and s be the two solutions to the equation $x^2 - 3x + 1 = 0$. Find $r^3 + s^3$.
a) 10 b) 14 c) 18 d) 22 e) 26

(2) Solve $x^{\log_{10} x} = \dfrac{x^3}{100}$ for x:
a) 10 and 100 b) 1 and 10
c) 100 and 1000 d) 10 and 1000
e) 100 and 10000

(3) The greatest integer function, $f(x) = [x]$, is the greatest integer that is less than or equal to x. For example, $[4.6] = 4$, $[4] = 4$. Solve $[x]^2 - 4[x] + 3 = 0$ for x.

Grade 11

1. The polynomial $p(x) = 4x^3 - ax^2 - 41x + b$ has zeros at $x = -1/2, 3$, and $-7/2$. What is the product of a and b?
(a) -55 (b) 50 (c) 0 (d) 60 (e) 84

2. An ordered pair (n, m) of positive integers satisfies the following relation

$$\frac{1}{n} - \frac{1}{m} + \frac{1}{mn} = \frac{2}{5}.$$

What is mn?
(a) 40 (b) 20 (c) 10 (d) 5 (e) 1

3. Let α be a solution of $x^2 + x + 1 = 0$. Find $\alpha^{12} + \alpha^{11} + \cdots + \alpha^2 + \alpha + 1$?
(a) 4 (b) 2 (c) 1 (d) 3 (e) 0