

N.B: Calculators are allowed.

Exercise 1 (6pts)

Write the correct answer for each of the following questions and justify.

	Given	Answers			
		a	b	c	d
A	What is the half of the square of 10^{10} ?	5^{10}	5^{20}	5×10^{19}	5×10^{11}
B	What is the inverse of the double of the square of $x+y$?	$\frac{2}{(x+y)^2}$	$\frac{1}{2(x^2+y^2)}$	$2(x^2+y^2)$	$\frac{1}{2(x^2+2xy+y^2)}$
C	What is the probability that a number randomly picked from the range 1 through 1000 is divisible by both 7 and 10?	$\frac{1}{100}$	$\frac{7}{1000}$	$\frac{7}{500}$	$\frac{1}{10}$

Exercise 2 (5 pts)

Find the equal numbers among the following five numbers. Justify.

$$a = -\frac{4 \times 10^{-2} \times (-5) \times 10^7}{3 \times 10^5}; \quad b = \frac{(3 + \sqrt{10})^2 - 6\sqrt{10}}{5}; \quad c = \frac{2 + \frac{3}{1 + \frac{1}{2}}}{2 + \frac{1}{6}}; \quad d = \frac{7429}{1955}; \quad e = \frac{2 - \frac{1}{3}}{\left(\frac{1}{2}\right)^2}$$

Exercise 3 (3 pts)

Miriam's uncle donated 120 identical cans of juice and 90 identical packs of cheese for the class picnic. What is the greatest number of students to share them equally with no leftovers?

Exercise 4 (2 pts)

If $2^{3x-1} = 16$, then $x =$

Exercise 5 (1 pt)

If $x^2 + kx - 6 = (x - 2)(x + 3)$, then $k =$

Exercise 6 (3 pts)

Find the sum S knowing that
$$S = \sum_{k=1}^6 3^{k-1}$$

Exercise 7 (2 pts)

The circumference of a circle is equal to 72π . Find the radius of this circle.

Exercise 8 (4 pts)

A rectangular field has a length 10 m more than its width. If the area of the field is 264 m^2 , what is the perimeter of the field?

Exercise 9 (2 pts)

Six more than one fourth of a number is two fifth of the number. Find the number.

Exercise 10 (2 pts)

What is the value of y that verifies the equations simultaneously: $2x - y = 4$ and $x + y = 11$

Exercise 11 (2 pts)

Five friends share equally $3\frac{3}{4}$ liters of juice. Determine the amount of juice each friend gets.

Exercise 12 (3 pts)

If $|2x - 4|$ is equal to 2 and $(x - 3)^2$ is equal to 4, then what is the value of x ?

Exercise 13 (4 pts)

Let ABC be a right triangle in A. Find the length of its hypotenuse which is 2cm more than its side AB, which is in turn 7cm more than the side AC.

Exercise 14 (4 pts)

The price of an item changed from \$120 to \$100. Then later the price decreased again from \$100 to \$80. Which of the two decreases was larger in percentage terms?

Exercise 15 (4 pts)

A mother has 600 \$. She gives the half to her eldest son, then the third of the rest to her second son, and finally the fourth of the rest to the youngest one. How many dollars are left with the mother?

Exercise 16 (3 pts)

The dimensions of a room are 4 meters by 5 meters and the height is 3 meters. We want to increase its volume by 150 cubic meters. By how many meters should we increase the height?