

LIST OF QUESTIONS

Part 1: Arithmetic

1. $-9 - (-6) =$

- a) -54 b) -15 c) 3 d) -3 e) 54

2. $\frac{16}{-4} - 2 =$

- a) -6 b) $-14/4$ c) -2 d) 2 e) -8

3. $4^2 + 3(-1)(3) + (-3)^2 =$

- a) -20 b) -16 c) 16 d) -8 e) -34

4. $\frac{2}{5} + \frac{3}{4} - \frac{3}{2} =$

- a) $-1/10$ b) $-1/5$ c) $-23/20$ d) $53/20$ e) $-7/20$

Part 2: Decimal Notation and Percentages

1. Which of the following numbers is the largest?

- a) 0.4 b) 0.51 c) 0.052 d) 0.501 e) 0.0752

2. $(0.033)(0.0003) =$

- a) 0.0099 b) 0.00099 c) 0.000099
d) 0.0000099 e) 0.00000099

3. 110% of $120 =$

- a) 120 b) 13.2 c) 130 d) 132 e) 232

4. 3 grams is what percent of 120 grams?

- a) 2.5% b) 4% c) 25% d) 0.4% e) 0.25%

5. Out of $100,000$ school children, 840 were reported to have contracted measles.
What percentage of the children developed measles?

- a) 0.0084% b) 8.4% c) 0.84% d) 0.084% e) 0.8%

Part 3: Algebraic Expressions

- If $\frac{8}{x} = \frac{5}{8}$ then $x =$
a) 5 b) 11 c) $12\frac{4}{5}$ d) $\frac{5}{64}$ e) $\frac{5}{8}$
- If $3 = \frac{ab}{\sqrt{N}}$, then $N =$
a) $\sqrt{ab/3}$ b) $\frac{a^2b^2}{3}$ c) $ab/3$ d) $\frac{a^2b^2}{9}$ e) $ab/9$
- $3(a - b) - (3a - 4b) =$
a) $-7b$ b) 0 c) $-a + b$ d) b e) $a + b$
- $(2x + y)(x + 2y) =$
a) $2x^2 + 2y^2$ b) $3x + 3y$ c) $3xy$
d) $2x^2 + 4xy + 2y^2$ e) $2x^2 + 5xy + 2y^2$
- If $y = \frac{x-1}{x+1}$, $x =$
a) $-y$ b) -1 c) $\frac{1+y}{1-y}$
d) $\frac{1-y}{1+y}$ e) $\frac{y+1}{y-1}$
- $(x + y) + (x + y)^2 =$
a) $3x + 3y$ b) $x^3 + y^3$ c) $(x + y)^3$
d) $2x + 3y$ e) $x^2 + y^2 + x + y + 2xy$
- $a^b a^d =$
a) a^{bd} b) a^{b+d} c) $a^{b/d}$ d) a^{b-d}
- If $x > 1$, then $\frac{x-1}{\sqrt{x-1}} =$
a) $\frac{1}{\sqrt{x-1}}$ b) $\sqrt{x-1}$ c) x d) 1

Perform the indicated operations:

- $(x^4 + 6)^2 + x^4 - 6 =$
- If $x \neq 0$ and $y \neq 0$, then $\frac{15x^2}{12xy} =$
- $2x^2 - 3xy + 5y^2$ subtracted from $10x^2 - 2xy - 3y^2 =$

Part 4: Solving for One Unknown

Solve each equation for x :

- $\frac{x}{2} + \frac{x}{3} = 10$
- $2(5x + 3) = 3(x - 1)4$
- $(2x + 1)^2 + (2x - 1)^2 = 34$

Part 5: Graphics

- Plot the following data:

Year	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950
Cases of Whooping Cough per 1000	58.9	53.0	49.4	42.6	37.5	31.0	27.0	21.4	18.0	12.8

- Over the range of $x : -5$ to 5 , graph the function $f(x) = 4 - 3x - x^2$

3. The time taken for an object to fall freely from rest through various heights is given below:

$t(\text{sec})$	1	2	3	4	5	6
$h(\text{ft})$	16	64	144	256	400	576

(a) Graph h against t .

(b) How long, to the nearest second, will it take an object to fall from 300 ft.?

Part 6: Verbal Problems

1. Central Hospital has twice as many beds as Maryknoll Hospital and Maryknoll Hospital has three times as many beds as Brookside Hospital. If Brookside Hospital has 100 beds, how many beds does Central Hospital have?
2. A hospital with 40 beds receives \$180 for each occupied bed, but loses \$30 for each empty bed. If the hospital's net receipts were \$5310, how many beds were empty?

Part 7: Natural Logarithms and Exponentials

Write an equivalent algebraic expression for the following:

1. $\log(ab) =$
2. $\log(a^n) =$
3. If b does not equal zero, $\log(a/b) =$
4. $\log(e^{a+b}) =$
5. $e^a \cdot e^b =$

Part 8: Sigma Notation

Expand the following:

1. $\sum_{k=1}^5 k =$
2. $\sum_{i=1}^3 x_i =$
3. $\sum_{j=0}^4 r^j =$

LIST OF ANSWERS

Part 1: Arithmetic

1. d 2. a 3. c 4. e

Part 2: Decimal Notation and Percentages

1. b 2. d 3. d 4. a 5. c

Part 3: Algebraic Expressions

1. c 2. d 3. d 4. e 5. c 6. e 7. b 8. b

9. $x^8 + 13x^4 + 30$

10. $\frac{5x}{4y}$

11. $8x^2 + xy - 8y^2$

Part 4: Solving for One Unknown

1. $x = 12$

2. $x = 9$

3. $x = 2$ or $x = -2$

Part 5: Graphs (See separate page)

Part 6: Verbal Problems

1. Central Hospital has 600 beds.
2. 9 beds were empty.

Part 7: Natural Logarithms and Exponentials

1. $\log a + \log b$

2. $n \log a$

3. $\log a - \log b$

4. $a + b$

5. e^{a+b}

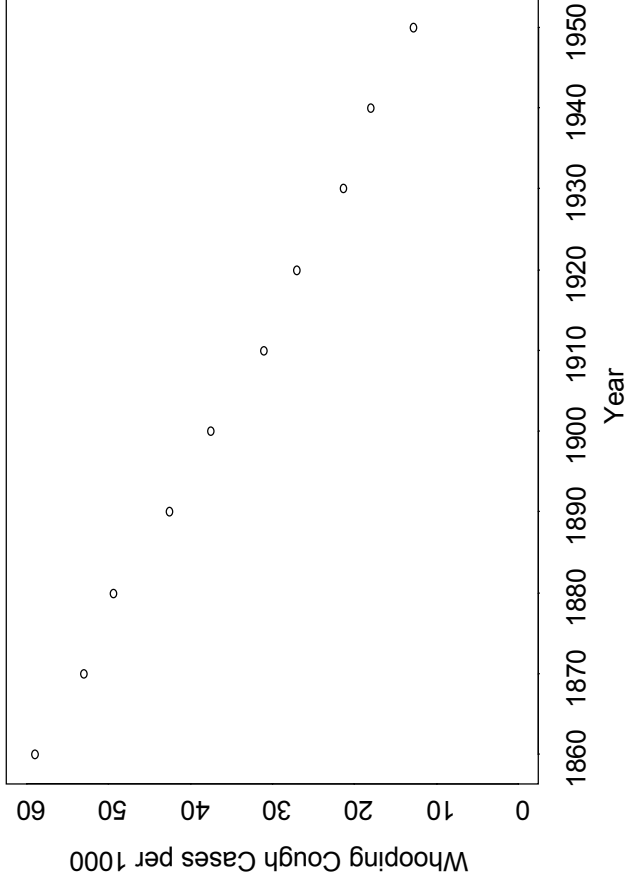
Part 8: Sigma Notation

1. $1 + 2 + 3 + 4 + 5$

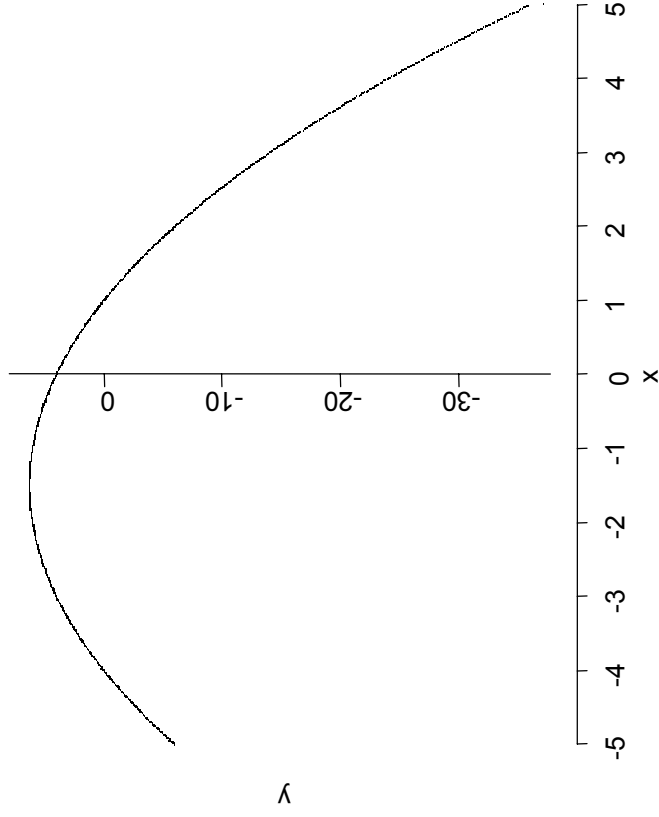
2. $x_1 + x_2 + x_3$

3. $1 + r + r^2 + r^3 + r^4$

Answer to Question 1



Answer to Question 2



Answer to Question 3

