**Grade 7**

**INTEGERS**

**Add**: **Subtract: Multiply: Divide:**

**6 ÷ 3 = 2**

**8 ÷ 2 = 4**

**1 ÷ (-1) = -1**

**-4 ÷ 2 = -2**

**7÷ (-1) = -7**

**-8 ÷ (4) = -2**

**9÷ (-3) = -3**

**-5 ÷ (-1) = 5**

**-4 ÷ (-2) = 8**

**-8 ÷ (-2) = 16**

**5 – 3 = 2**

**9 – 4 = 5**

**8 – 2 = 6**

**0 – (-8) = 8**

**5 – (-5) = 10**

**-7 – (-9) = 2**

**-6 – 0 = -6**

**-1 – 8 = -9**

**-3 – 6 = -9**

**9 – (-7) = 16**

Score:

Score:

Score:

Score:

**7 + 4 = 11**

**-9 + 9 = 0**

**-6 + 5 = -1**

**-5 + 0 = -5**

**-2 + 9 = 7**

**-6 + (-1) = -7**

**3+(-6) = -3**

**-3+(-6) = -9**

**-5+(-7) = -12**

**-8+(-5) = -13**

**3 (7) = 21**

**-2 (3) = -6**

**7 (-1) = -7**

**8 (-6) = -48**

**-5 (9) = -45**

**-6 (8) = -48**

**-3 (-3) = 9**

**-2 (-5) = 10**

**0 (-4) = 0**

**-9 (-6) = 54**

**BASIC ALGEBRA**

**1) Simplify: 7x + 4x – 3x Answer = 8x**

**2) Evaluate: 2x + 5 when x = 4 Answer = 13**

**3) Simplify: 5 (a – 3) + 2a Answer = 7a – 15**

**4) Evaluate: 3x – 2y when x = 5 and y = 3 Answer = 9**

**5) Simplify: 4 (2x + 3) – 5x Answer = 3x + 12**

**6) Evaluate: 6a – 4b + 2c when a = 3, b = 2, c = 5 Answer = 20**

**7) Simplify: 9y – 3(2y + 4) Answer = 3y – 12**

**8) Evaluate: when x = 9 Answer = 8**

**9) Simplify: 5(2m – 1) – 3(m + 4) Answer = 7m – 17**

**10) Evaluate: 10 – 3p + 2q when p = 4 and q = 2 Answer = 2**

**GEOMETRY OF SHAPES AND GEOMETRIC RELATIONSHIPS**

**1) Find the perimeter of a rectangle with a length of 12 cm and a width of 8 cm.**

**Answer = 40 cm**

**2) A triangle has sides measuring 7 cm, 9 cm, and 10 cm. Find its perimeter.**

**Answer = 26 cm**

**3) Find the area of a square with a side length of 5 cm.**

**Answer =**

**4) The base of a triangle is 10 cm, and its height is 6 cm. Find its area.**

**Answer =**

**5) A circle has a radius of 7 cm. Find its circumference.**

**Answer = 43.96 cm**

**6) The area of a rectangle is 48 cm². If the width is 6 cm, find its length.**

**Answer = 8 cm**

**7) A square has a perimeter of 32 cm. Find the length of one side.**

**Answer = 8 cm**

**8) A rectangular garden has a length twice its width. If its perimeter is 36 meters, find the dimensions of the garden.**

**Answer = length : 12 m and width: 6 cm**

**9) A triangle has an area of 24 cm². If its base is 8 cm, find its height.**

**Answer = 6 cm**

**10) A circle has a diameter of 14 cm. Find its area.**

**Answer =**

**Grade 8**

**LOGIC AND REASONING**

**1) Find the next number in the pattern: 5, 10, 17, 26, 37, ?**

**Answer: 50**

**2) Write the converse of the statement: "If it is a square, then it has four equal sides."**

**Answer: If a shape has four equal sides, then it is a square.**

**3) A teacher says, "All students in this class passed the exam." Sarah is a student in the class. What can you conclude?**

**Answer: Sarah passed the exam**

**4) A basket has 25 apples. If you take away 7, how many do you have?**

**Answer: 7 apples (You took them away, so you have them.)**

**5) What is the missing number in the pattern? 2, 6, 12, 20, \_\_?, 42**

**Answer: 30**

**6) A farmer has pigs and chickens. Together, they have 20 heads and 56 legs. How many pigs and chickens does he have?**

**Answer: 8 pigs and 12 chickens**

**7) A father gives his son and daughter a puzzle: "I am thinking of a two-digit number. The sum of its digits is 10, and the difference between the digits is 2. What is the number?**

**Answer: 64**

**8) Find the next two numbers in the sequence: 1, 4, 9, 16, 25, \_\_?, \_\_?**

**Answer: 36, 49**

**9) A clock strikes once at 1 o’clock, twice at 2 o’clock, three times at 3 o’clock, and so on. How many times does it strike in a day (24 hours)?**

**Answer: 156**

**10) A mother is 36 years old, and her daughter is 12 years old. In how many years will the mother be twice the age of her daughter?**

**Answer: 12**

**LINEAR EQUATIONS AND INEQUALITIES**

**1) Solve for x: 3x – 5 = 16**

**Answer: x = 7**

**2) Maria is 5 years older than twice her brother’s age. If Maria is 19 years old, how old is her brother?**

**Answer: 7 years old**

**3) Solve the inequality: 2x + 4 > 12**

**Answer: x > 4**

**4) A cellphone costs ₱12,500. A store offers a discount of ₱1,800. What is the final price of the cellphone?**

**Answer: ₱10,700**

**5) Find the value of x in: 5 (x -2 ) = 3x + 6**

**Answer: x = 8**

**6) A car travels 60 km per hour. How will it take to travel 240 km?**

**Answer: 4 hours**

**7) Solve for x:**

**Answer: x = 28**

**8) Jenny has ₱500. She buys 3 notebooks for ₱75 each and a pen for ₱60. How much money does she have left?**

**Answer: ₱215**

**9) Solve the inequality:**

**Answer: x**

**10) A number is decreased by 15 and then divided by 3 to get 10. What is the number?**

**Answer: 45**

**LINEAR EQUATIONS IN 2 VARIABLES**

**1) Solve for x and y in the system:**

**2x + 3y = 12**

**4x – y = 5**

**Answer: x = 3, y = 2**

**2) Find the equation of the line that passes through the points (2,5) and (4,9)**

**Answer: y = 2x + 1**

**3) The sum of two numbers is 25. One number is 7 more than twice the other. Find the numbers.**

**Answer: 6 and 19**

**4) A line passes through the point (−3,7) and has a slope of −2. Find its equation in slope-intercept form.**

**Answer: y = -2x + 1**

**5) Solve for x and y in the system:**

**x + 2y = 8**

**3x – y = 5**

**Answer: x = 3, y = 2.5 or 5/2**

**6) The perimeter of a rectangle is 48 cm. The length is twice the width. Find the dimensions of the rectangle.**

**Answer: width = 8 cm, length = 16 cm**

**7) A bookstore sells notebooks and pens. A notebook costs 20 pesos, and a pen costs 10 pesos. If a customer buys a total of 8 items for 130 pesos, how many notebooks and pens did they buy?**

**Answer: 5 notebooks and 3 pens**

**8) Find the equation of the line parallel to y=3x−4 that passes through (2,1).**

**Answer: y = 3x – 5**

**9) A taxi fare is computed as follows: The base fare is 40 pesos, and each kilometer adds 15 pesos. If a passenger paid 130 pesos, how far did they travel?**

**Answer: 6 km**

**10) The sum of the x- and y-intercepts of the equation 5x+4y=20 is?**

**Answer: 9**

**GRADE 9**

**QUADRATIC EQUATIONS**

**1) Solve for x using factoring:**

**Answer: x = 5, 2**

**2) Use the quadratic formula to solve:**

**Answer: x = 2, -1/3**

**3) A rectangular lot has an area of 180 square meters. If the length is 5 meters more than the width, find the dimensions of the lot.**

**Answer: width = 10m, length = 15m**

**4) The difference between a number's square and the number is 42. Find the number.**

**Answer: x = 7, -6**

**5) A water tank shaped like a rectangular prism has a height of x, a width of x+3, and a length of x+5. If the volume is 120 cubic meters, find the dimensions.**

**Answer: Height = 4m, Width = 7m, Length = 9m**

**6) The height of a thrown object is modeled by the equation: . When will the object reach the ground?**

**Answer: 5 seconds**

**7) A car’s speed is x km/h. If it travels 90 km, the time taken is ​. If the car had traveled 10 km/h faster, the journey would have taken 1 hour less. Find the car's speed.**

**Answer: 30km/hr**

**8) A person’s age is twice the square of another person’s age. If their total age is 34, find their ages.**

**Answer: 4 years old and 30 years old**

**9) The sum of a number and its square is 132. Find the number.**

**Answer: 11, -12**

**10) The product of a number and its double is 72. Find the number.**

**Answer: 6, -6**

**VARIATION AND RADICALS**

**1) If y varies directly as x and y=12 when x=4, find y when x=7.**

**Answer: y = 21**

**2) If y varies inversely as x nd y=6 when x=5, find y when x=10.**

**Answer: y = 3**

**3) The time t required to travel a certain distance varies inversely as the speed s. If it takes 4 hours to travel at 60 km/h, how long will it take at 80 km/h?**

**Answer: 3 hours**

**4) If z varies jointly as x and y, and z=30 when x=2 and y=5, find z when x=3 and y=4.**

**Answer: z = 36**

**5) The force F of gravity varies inversely as the square of the distance d. If the force is 16 N when the distance is 3 m, find the force when the distance is 6 m.**

**Answer: 4N**

**6) Simplify:**

**Answer:**

**7) Rationalize the denominator:**

**Answer:**

**8) Solve for x:**

**Answer: x = 11**

**9) Simplify:**

**Answer: 2**

**10) The area of a square is 75 cm². Find the length of one side in simplified radical form.**

**Answer:**

**TRIGONOMETRIC CONCEPTS**

**1) Find the exact value of: sin30° + cos60°**

**Answer: 1**

**2) Simplify: tan45° + sin60° - cos30°**

**Answer: 1**

**3) A right triangle has an angle of 30°. If the hypotenuse is 12 cm, find the length of the shorter leg.**

**Answer: 6 cm**

**4) A 10-meter ladder leans against a wall, forming a 60° angle with the ground. How high does the ladder reach?**

**Answer: 8.66 m**

**5) Find the exact value of:**

**Answer: 1**

**6) A flagpole casts a shadow 8 meters long. If the sun’s angle of elevation is 30°, find the height of the flagpole.**

**Answer: 4.62 m**

**7) A ramp is inclined at 45°. If its length is 6 meters, how high does it reach?**

**Answer: 4.24 m**

**8) A 15-meter pole is supported by a cable that makes a 60° angle with the ground. Find the length of the cable.**

**Answer: 17.32 m**

**9) A person looks up at the top of a tree at a 45° angle. If they are 10 meters away from the base, how tall is the tree?**

**Answer: 10 m**

**10) A triangle has angles 30°-60°-90°, with the shortest side measuring 5 cm. Find the hypotenuse.**

**Answer: 10 cm**

**GRADE 10**

**SEQUENCE**

**1) The sequence is 5, 9, 13, 17, …. What is the 7th term?**

**Answer: 29**

**2) The first term of an arithmetic sequence is 2, and the 5th term is 14. Find the common difference.**

**Answer: 3**

**3) Find the sum of the first 10 terms of the arithmetic sequence 3, 7, 11, 15, …**

**Answer: 190**

**4) The sequence is 2, 6, 18, 54, …. What is the 6th term?**

**Answer: 486**

**5) Find the sum of the first 5 terms of the geometric sequence 1, 2, 4, 8, …**

**Answer: 31**

**6) How many terms are in the arithmetic sequence 4, 10, 16, …, 88?**

**Answer: 15**

**7) Anna saves ₱500 in the first month, increasing her savings by ₱250 each month. How much will she save in the 8th month?**

**Answer: ₱2250**

**8) A ball is dropped from a height of 100 cm and bounces 80% of its previous height each time. How high will it reach on the 4th bounce?**

**Answer: 40.96 cm**

**9) The sum of the first 6 terms of an arithmetic sequence is 90, and the common difference is 5. Find the first term.**

**Answer: 5**

**10) A bacteria colony doubles every hour. If there are 5 bacteria at the start, how many bacteria will there be after 6 hours?**

**Answer: 320**

**POLYNOMIALS**

**1) Simplify:**

**Answer:**

**2) Simplify: (**

**Answer:**

**3) Expand: (x+3) (x-5)**

**Answer:**

**4) Divide:**

**Answer:**

**5) Factor completely:**

**Answer: (x – 3) (x – 4)**

**6) Factor completely:**

**Answer: (5x – 7) (5x + 7)**

**7) If P(x) = , find P(2)**

**Answer: 0**

**8) The length of a rectangle is (x + 5) and the width is (x - 2). Express the area as a polynomial.**

**Answer:**

**9) A shop sells items at a price of (50 - x) pesos per item, where x represents the discount given. If they sell x items, express the total revenue as a polynomial.**

**Answer:**

**10) The dimensions of a box are (x + 2), (x - 1), and (x + 3). Express the volume as a polynomial.**

**Answer:**

**COMBINATORICS AND PROBABILITY**

**1) A password consists of 3 letters followed by 2 digits (e.g., ABC12). If the letters can be any of the 26 letters of the alphabet and the digits can be any of the 10 digits (0-9), how many different passwords can be created?**

**Answer: 17, 576, 000**

**2) In how many ways can the letters in the word "MATH" be arranged?**

**Answer: 24**

**3) In how many ways can 5 students be seated in a row of 5 chairs?**

**Answer: 120**

**4) A school club has 10 members, and a committee of 4 members needs to be formed. In how many ways can the committee be selected?**

**Answer: 210**

**5) A standard deck has 52 cards. How many ways can you choose a 5-card poker hand from the deck?**

**Answer: 2, 598, 960**

**6) What is the probability of rolling a sum of 7 when rolling two fair six-sided dice?**

**Answer; 1/6**

**7) A card is drawn from a standard deck of 52 cards. What is the probability that it is either a King or a Heart?**

**Answer: 4/13**

**8) If you flip 3 fair coins, what is the probability of getting exactly 2 heads?**

**Answer: 3/8**

**9) In how many ways can 6 students be seated in a row if two specific students must sit together?**

**Answer: 240**

**10) A bag contains 5 red, 4 blue, and 3 green marbles. If two marbles are drawn without replacement, what is the probability that both are red?**

**Answer: 5/33**