Name:_________________________ Date:____________________

M8H HW CH2 Lesson 4: Using Equations to Model Problems

Write an equation for each of the questions below, indicate what your variables are and then solve:

1. Six times a number increased by 7 is 103. Find the number

2. Two consecutive numbers have a sum of 47. Find the two numbers

3. When 13 is subtracted from three-eighths of a number, the result is 11. Find the numbers.

4. Bruce is 10 years older than Cindy. The sum of their ages is 52. How old is each person?

5. For two consecutive numbers, the sum of the smaller and twice the larger is 38. Find the two numbers.

6. Three consecutive numbers have a sum of 159. Find the numbers.

7. Three consecutive even numbers have a sum of 672. Find the three numbers.

8. Mike ran twice as far as Brad. They ran a total of 18km. How far did each person run?

9. The difference of two numbers is 96. One number is nine time the other. What are the two numbers?

10. The sum of two numbers is 36. Four times the smaller is 1 less than the larger. What are the two numbers?

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11. Tom has equal number of nickels, dimes, and quarters. Their total value is $2.00. How many of each kind of coin does she have?

12. A collection of nickels and dimes has a total value of $8.50. How many coins are there if there are 3 times as many nickels as dimes?

13. James has 91 coins which are nickels, dimes, and quarters. There are twice as many quarters as dimes, and half as many nickels as dimes. How much money does James have?

14. Mike is four times as old as Ivy. The sum of their ages is 55 years. How old are they?

15. Bob is twice as old as his brother Dave. In 7 years from now, Bob will be only one and one-half times as old as Dave. How old are they each now?

16. Robbie is three younger than Richard. Eight years ago, Robbie was one half of Richard's age. How old is each person now?

17. Sandy is four years less than twice Brad's age. In two years, Brad's age will be three-quarters of Sandy's age. How old is each person now?

18. The sum of three numbers is 33. The second number is 7 less than the first, and the third number is three times the second. What are the numbers?

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19. A BMW 325i travelled 1.2 times as fast as a Mercedes Benz. The difference in their speeds was 24km/h. Find the speeds of each car.

20. The least o three consecutive integers is divided by 10, the next is is divided by 17, the greatest is divided by 26. What are the numbers if the sum of the quotients is 10?

21. A stick is 60cm long and is cut into three pieces. The middle piece is 2cm longer than the shortest and 2cm shorter than the longest. How long is each piece?

22. Explain why every integer can be expressed in exactly one of the four forms:

$$6n,\ 6n+1,\ 6n+2,\ 6n+3,\ 6n+4,\ 6n+5$$

b) In which of these 5 forms can the prime numbers be expressed? Explain.

c) Show that all prime numbers (except 2 and 3)when divided by 6 leave a remainder of either 1 or 5.

23. Ray has a box of candy bars. He gave Mike half of what he had plus half a bar. Then he gave Chris half of what he had left plus half a bar. After which he gave Larry half of what he had left plus a bar. Then finally again, he gave Andy half of what he had left plus half a bar. Then he had no bars left. How many candy bars did Ray have in the beginning?

24. Suppose "m" and "n" are positive odd integers. Which of the following must also be an odd integer?

(A) $m+3n$ **(B)** $3m-n$ **(C)** $3m^2+3n^2$ **(D)** $(nm+3)^2$ **(E)** $3mn$

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25. Let “a’, “b”, and “c” be numbers with 0 < a < b < c. Which of the following is impossible?

(A) $a+c<b$ **(B)** $a\cdot b<c$ **(C)** $a+b<c$ **(D)** $a\cdot c<b$ **(E)** $\frac{b}{c}=a$

26. What is the least positive integer “n” such that “n” is a multiple of 6 and neither *“n - 1” or “n + 1”* is a prime number?

27. Assume that weights of coins as follows:

1 Cent coin (penny) – 3grams; 5 cent coin (nickel) 5 grams; 10 cent coin (dime) 2 grams;
25 cent coin (quarter) - 9 grams; 1 dollar coin (loonie) - 13 grams; 2 dollar coin (toonie) – 17 grams.

Dan holds as least one of each of the above coins, which a total weight of exactly 220 grams. What is the maximum possible total value of his coins? Give your answer in dollars to the nearest cent.

28. In the multiplication problem below, A, B, C, and D are different digits. What is the value of *A + B*?

$$\begin{array}{r} ABA \\ \times\ \ CD \\ \hline CDCD \end{array}$$

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 9

29. In the multiplication problem below, the letters G, M, A, T, and H represent different digits. What is the value of G + M + A + T + H?

$$\begin{array}{r} 2008 \\ \times\ \ \ HT \\ \hline GMATH \end{array}$$

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30. Mr. Young divided $45 among four students: Andy, Bob, Chris, and Dianna. When the students complained that the shares were not equal, he instructed Bob to give Andy $2. Then he doubled Chris' share and cut Dianna's share in half. Now all the students have the same amount. How much money do they have in total?

31. Suppose that

$$ab = 6, \qquad bc = 8, \qquad cd = 10, \qquad \text{and} \qquad de = 12.$$

Wat is the value of $\frac{a}{e}$? Express your answer as a common fraction

32. Challenge:

King Charles the Short-Sighted rode all the way around the boundary of his kingdom, which is a circle with diameter 100 kilometres. While he rode along, he could see only 20 metres in any direction. What is the total area (both inside and outside his kingdom) of the region that he saw? Assume the world is flat. Express your answer in terms of π.

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