

KEY

For full credit, show your work. This may include a picture, table, diagram, your 'guess and check' work, or an equation(s).

1. Nancy is 13 years older than Molly. Their ages combined total 95. How old is each person?

$$\begin{aligned} \rightarrow N &= M + 13 \\ \rightarrow M + N &= 95 \end{aligned}$$

$$\begin{aligned} M + M + 13 &= 95 \\ 2M + 13 &= 95 \end{aligned}$$

$$\begin{array}{r} 2M + 13 = 95 \\ -13 \quad -13 \\ \hline 2M = 82 \end{array}$$

$$2M = 82$$

$$M = 41$$

So Molly = 41 years old  
Nancy = 54 years old

OR, guess + check by making a chart

2. Alan weighs 150 pounds and plans on gaining 2 pounds a month to get ready for football season. Michael weighs 198 pounds and is going to lose 4 pounds a month to get in better shape. How many months until they weigh the same?

$$\begin{aligned} A &= 150 + 2x \\ M &= 198 - 4x \end{aligned}$$

x = # of months

$$\begin{array}{r} 150 + 2x = 198 - 4x \\ +4x \quad +4x \\ \hline 150 + 6x = 198 \end{array}$$

$$\begin{array}{r} 150 + 6x = 198 \\ -150 \quad -150 \\ \hline 6x = 48 \end{array}$$

$$6x = 48$$

$$x = 8 \text{ months}$$

OR, guess + check

3. Tracy makes \$20 per hour as a tutor and \$14 per hour in a shoe store. Last week she worked 40 hours total and made \$620. How many hours of each job did she work?

Example of Guess + Check Table/Chart

Hours @ Shoe	\$ at shoe	Hours @ tutor	\$ Tutoring	Total \$	
20	\$280	20	\$400	\$680	Too High
25	\$350	15	\$300	\$650	Too High
30	\$420	10	\$200	\$620	Correct

4. An ice cream truck owner has average costs of \$120 per day to run his business. His average sales per day are 200 cones at \$1.50 apiece and 120 Ice Cream Bars at \$1.25 apiece. What is his profit in a 30 day period?

$$\text{Cones} \rightarrow 200 (\$1.50) = \$300$$

$$\text{Bars} \rightarrow 120 (\$1.25) = \$150$$

Revenue is \$450 per day

Cost is \$120 per day

$$\text{Profit is } \$330 \text{ per day, so } 30 (\$330) = \boxed{\$9,900 \text{ profit in 30 days}}$$

5. Given the sequence: 20, 23, 26, ...

a. Is it a geometric sequence or arithmetic sequence? What is the common difference or common ratio?

Common difference is 3

b. What are the next 2 terms in the sequence? 29, 32

c. What is the 15<sup>th</sup> term in the sequence.  $a_n = a_1 + d(n-1)$   
 $a_{15} = 20 + 3(15-1) = 20 + 3(14) = \underline{\underline{62}}$

d. Find the sum of the first 15 terms of this sequence.

$$S_n = \frac{n}{2} (a_1 + a_n)$$
$$S_{15} = \frac{15}{2} (20 + 62) = \underline{\underline{615}}$$

6. Given the sequence: 6, 24, 96, ...

a. Is it a geometric sequence or arithmetic sequence? What is the common difference or common ratio? Common ratio is 4

b. What are the next 2 terms in the sequence? 384, 1536

c. Find the 10<sup>th</sup> term of the sequence.  $a_n = a_1 r^{n-1} \Rightarrow a_{10} = 6(4)^9 = \underline{\underline{1,572,864}}$

d. Find the sum of the first 10 terms of the sequence.

$$S_n = \frac{a_1(1-r^n)}{1-r} = \frac{6(1-4^{10})}{-3} = \underline{\underline{2097,150}}$$

7. For a Fibonacci sequence, the 16th term is 610 and the 18th term is 1597.

Find the 17th term. 987

Find the 19th term. 2,584

$$19^{\text{th}} \text{ term is } \rightarrow 17^{\text{th}} + 18^{\text{th}}$$
$$= 987 + 1597$$

$$\begin{array}{r} 1597 \\ - 610 \\ \hline 987 \end{array} \quad (\text{Notice: } 610 + 987 = 1597)$$

↑            ↑            ↑  
16<sup>th</sup> term    17<sup>th</sup> term    18<sup>th</sup> term