

SAT

On the last day of a one-week sale, customers numbered 149 through 201 were waited on.

How many customers were waited on that day?

53

Dec 11-1:12 PM

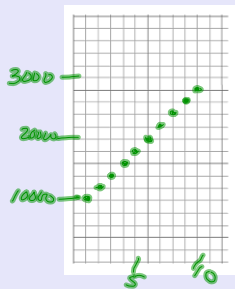
A small business sells \$10,000 worth of products during its first year. The owner of the business has set a goal of increasing annual sales by \$2000 each year for the next 9 years.

a) Find the sales in the 4th year and the 10th year.

$y_1 = 10000$ $y_5 = 18000$ $y_8 = 24000$
 $y_2 = 12000$ $y_6 = 20000$ $y_9 = 26000$
 $y_3 = 14000$ $y_7 = 22000$ $y_{10} = 28000$
 $y_4 = 16000$

Dec 11-1:12 PM

b) Graph the sales for each year



c) Find the total sales over all 10 years

\$190,000

Dec 11-1:12 PM

An arithmetic sequence is a list of numbers with a common difference between each successive term

-5, 7, 19, 31, 43, 55, ...

$r + 15$, $r + 8$, $r + 1$, $r - 6$, $r - 13$, $r - 20$, ...

Find the 20th term of -11, -2, 7, ...

Dec 11-1:12 PM

Do I really want to add 9 continually until I get there?

There is a formula for finding the nth term.

Let's figure it out: -11, -2, 7, ...

$a_1 = -11$, to get a_2 I just add 9 once. To get a_3 I add 9 to a_1 twice. To get a_4 I add 9 to a_1 three times.

$$a_n = a_1 + d(n-1)$$

What is the relationship between the term we are finding and the number of times I have to add d (the common diff.=9)?

• So if I wanted to find a_{50} then how many times would I have to add 9? 49

Jan 9-2:13 PM

The general, or nth, term of an arithmetic sequence is found by

$$a_n = a_1 + (n - 1)d$$

Why?

Dec 11-1:12 PM

Find the 68th term in the sequence 16, 7, -2...

$$a_n = a_1 + d(n-1)$$

$$a_{68} = 16 + -9(67)$$

$$a_{68} = -587$$

Dec 11-1:12 PM

Find the formula for the nth (general) term in the sequence 16, 7, -2...

$$a_n = 16 - 9(n-1)$$

What kind of function is this?

linear

Dec 11-1:12 PM

Find an arithmetic sequence that has 5 terms between -11 and 19.

$$-11, \overset{+5}{-6}, \overset{+5}{-1}, \overset{+5}{4}, \overset{+5}{9}, \overset{+5}{14}, 19$$

$$\frac{19 + (-11)}{6} = 5$$

Dec 11-1:12 PM

Verify the real life problem: How much will the business make in the 10th year?

$$a_{10} = 10,000 + 2000(10-1)$$

$$= 28,000$$

Dec 11-1:12 PM

An arithmetic series is the sum of terms in an arithmetic sequence.

Find the sum of the first 10 whole numbers...

$$0 + 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$$

$$= 45$$

Jan 9-2:29 PM

How do we find sum of first 100 whole numbers? This is how a guy named Gauss may have done it in the 18th century when he was in elementary school...

$$1 + 2 + 3 + \dots + 98 + 99 + 100$$

$$+ 100 + 99 + 98 + \dots + 3 + 2 + 1$$

$$\frac{101(100)}{2} = 5050$$

Dec 11-1:12 PM

The sum of the first n terms of an arithmetic sequence is found by

$$S_n = \frac{n}{2}(a_1 + a_n)$$

Dec 11-1:12 PM

Find the sum of the first 13 terms in the

sequence

$$S_n = \frac{n}{2}(2a_1 + (n-1)d)$$

$a_{13} = -5 + 4(12) = 47$

$-5 + 1 + 7 + \dots$

$$S_{13} = \frac{13}{2}(-5 + 47)$$

$$= 403$$

Dec 11-1:12 PM

Find the sum of the terms in the series

$+6 + 4$

$-14 - 8 - 2 - \dots + 142$

$$a_n = a_1 + d(n-1)$$

$$142 = -14 + 4(n-1)$$

$$156 = 4(n-1)$$

$$26 = n-1$$

$$(27 = n)$$

$$S_{27} = \frac{27}{2}(-14 + 142)$$

$$= 1728$$

Dec 11-1:12 PM

Verify the real life problem: How much will the business make over all 10 years?

$$S_{10} = \frac{10}{2}(10000 + 28000)$$

$$= \$190,000$$

Dec 11-1:12 PM

Homework Assignment:
WS on your notes (#1-9)

Jan 9-2:30 PM