Warm Up

Check your ACE #4 with the answer key and your group.

Remember Answer Keys can be found on my website.
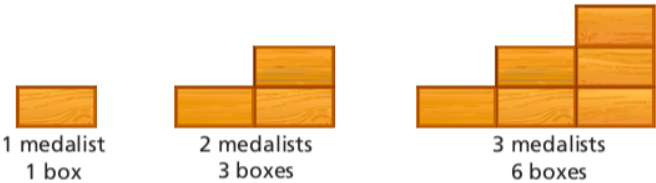

Do you have any questions?

4. During the medal ceremonies at a track meet, the top athletes stand on platforms made from stacked wooden boxes. The number of boxes depends on the number of medal winners.

1 medalist
1 box

2 medalists
3 boxes

3 medalists
6 boxes

a. Copy and complete the table below.

Medal Platforms

Number of Medalists	1	2	3	4	5	6	7	8
Number of Boxes	1	3	6	■	■	■	■	■

b. Make a graph of the (number of medalists, number of boxes) data.

c. Describe the pattern of change shown in the table and graph.

d. Each box is 1 foot high and 2 feet wide. A red carpet starts 10 feet from the base of the platform and covers all the risers and steps.
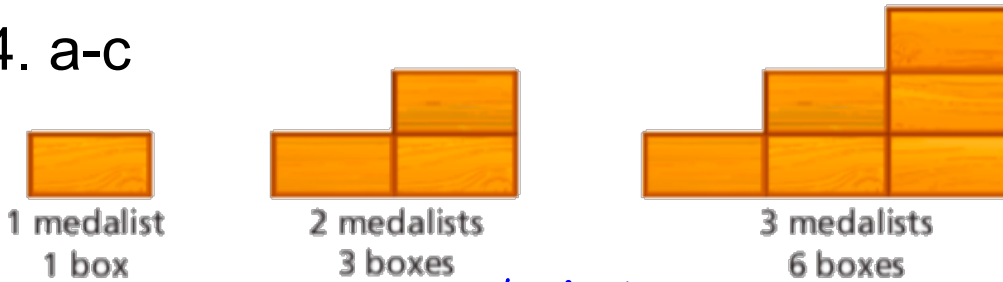
2 ft

1 ft
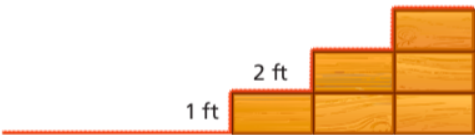
Copy and complete the table below.

Carpet for Platforms

Number of Steps	1	2	3	4	5	6	7	8
Carpet Length (ft)	■	■	■	■	■	■	■	■

e. Make a graph of the (number of steps, carpet length) data.

f. Describe the pattern of change in the carpet length as the number of steps increases. Compare this pattern to the pattern in the (number of medalists, number of boxes) data.
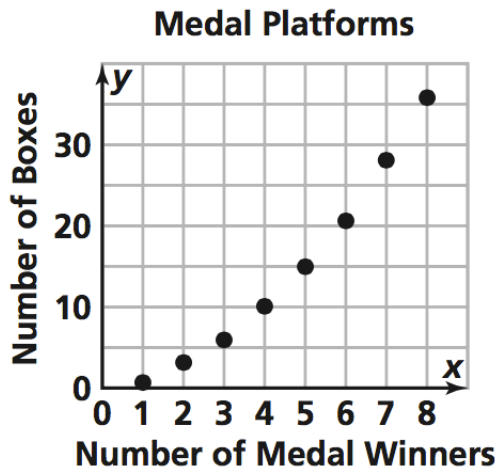
4. a-c

1 medalist
1 box

2 medalists
3 boxes

3 medalists
6 boxes

Medal Platforms

+1 +1 +1 +1 +1 +1 +1

Number of Medalists	1	2	3	4	5	6	7	8
Number of Boxes	1	3	6	10	15	21	28	36

+2 +3 +4 +5 +6 +7 +8

Medal Platforms

Number of Boxes

30

20

10

0

0 1 2 3 4 5 6 7 8

Number of Medal Winners

Nonlinear because
as the # of medalists increases
by 1 the number of boxes
does not increase by a constant
amount.

Nonlinear

even though the y-values
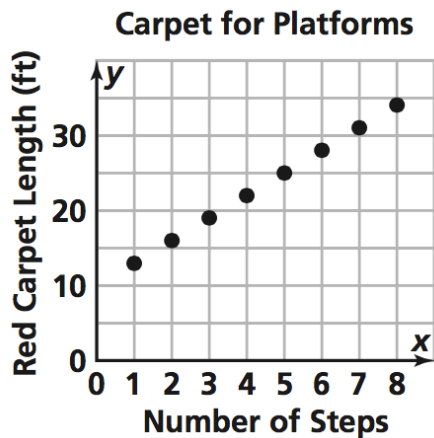change according to a pattern

4. d-f

2 ft

1 ft

Carpet for Platforms

Number of Steps	1	2	3	4	5	6	7	8
Carpet Length (ft)	13	16	19	22	25	28	31	34

+1 +1 +1 +1 +1 +1 +1

+3 +3 +3 +3 +3 +3 +3

Carpet for Platforms

Red Carpet Length (ft)

Number of Steps

How much carpet do we need per step?

Why doesn't this graph start at zero?

Solving Equations

Solving for x

The equation is a balance:

$$11 = 3x - 4$$

Our goal when solving for x is to:

get a single x on one side of the equal sign

and a number on the other.

How do we do this?

Inverse Operations:

What operation will undo the effects of another?

Addition - Subtraction

Subtraction - Addition

Multiplication - Division

Division - Multiplication

Solving for x - The ultimate goal is to have the variable on one side of the equal sign and a constant on the other.

We use inverse operations and properties of equality to undo what is happening to "x".

Variable: x, y, a, t, w

Constant: number

$$x + 7 = 15$$
$$\underline{-7 \quad\quad -7}$$
$$x = 8$$

We use transformation lines!

$$x - 10 = 4$$
$$\underline{+10 \quad +10}$$
$$x = 14$$

$$\frac{3x}{3} = \frac{15}{3}$$

Division bar

$$x = 5$$

Same thing though messier

$$3x = 15$$

$$\div 3 \qquad \div 3$$

$$x = 5$$

$$\frac{-2x}{-2} = \frac{14}{-2}$$

$$x = {}^-7$$

$$\frac{2}{1}\left(\frac{x}{2}\right) = (5)\,2$$

$$x = 10$$

$$x2 \quad \frac{x}{2} = 5 \quad x2$$

We don't want to introduce 'x' as a multiplication symbol because it looks the same as our variable!

$$\frac{1}{3}x = 10$$

$$\frac{\frac{1}{3}}{} \qquad \frac{\frac{1}{3}}{}$$

Did you know:

$$\frac{1}{3}x = \frac{1}{3}\left(\frac{x}{1}\right)$$
$$= \frac{x}{3}$$

So 1/3 x is really x divided by 3!

We undo that by multiplying by 3!

$$\frac{3}{1}\left(\frac{1}{3}x\right) = (10)\,3$$

$$x = 30$$

What if there are more operations involved?

$$5x + 3 = 13$$

Like before, we want to **UNDO** whatever is happening to "x" so we have only one "x" left.

Let's start "peeling things away" from x.

Remember: Whatever we do to one side of the equation we need to do the same to the other side to keep the balance even.

$$5x + 3 = 13$$
$$\underline{\quad -3 \quad -3 \quad}$$
$$\frac{5x}{5} = \frac{10}{5}$$
$$x = 2$$

What if we have x on BOTH sides?

$$5x + 3 = 13 - x$$

$$\underline{\quad -3 \quad\quad \cdot 3 \quad}$$

$$5x = 10 - x$$

$$\underline{+x \quad\quad\quad +x}$$

$$\frac{6x}{6} = \frac{10}{6}$$

$$x = \frac{10}{6}$$

$$x = \frac{5}{3}.$$

Doesn't matter what order you do things!

No wrong move as long as you do the same thing to both sides of the equation!

As things get more complicated, you will want to combine like terms as much as you can before using properties of equality.

1.

$$7 + 5r + 3 + 5 = 1 + 7r$$

$$5r + 15 = 1 + 7r$$

$$-7r \qquad\qquad -7r$$

$$-2r + 15 = 1$$

$$-15 \quad -15$$

$$\frac{-2r}{-2} = \frac{-14}{-2}$$

$$r = 7$$

2.

$$-4 + 6k + 8k = -4 - 7k$$

$$-4 + 14k = -4 - 7k$$
$$\underline{+4 \qquad\qquad +4}$$

$$\frac{14k}{-7} = \frac{-7k}{-7}$$

$$-2k = k$$
$$\underline{+2k \qquad +2k}$$

$$\frac{0}{3} = \frac{3k}{3}$$

$$0 = k$$

Procedure for solving for x (so far):

- Combine like terms (if any) on each side.

- Use properties of equality to isolate x.

Don't forget to:

  - Show all work

  - Use transformation lines.

Finish up the Practice Problems
in your notebook.