Get Ready!

CHAPTER 6

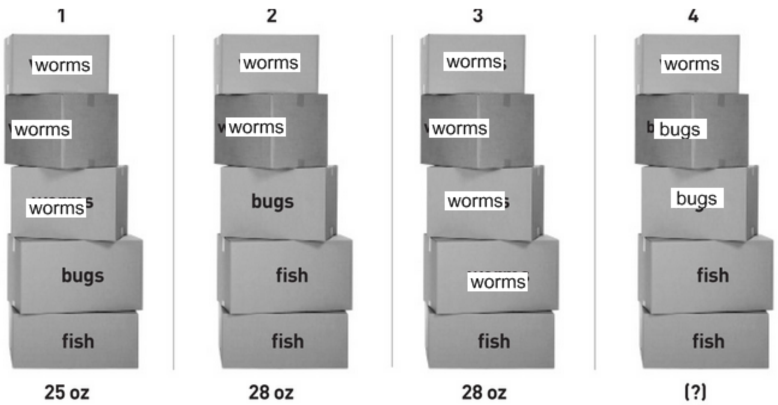
BIG idea Modeling

ESSENTIAL QUESTION Can systems of equations model real-world situations?

- Students will write equations and inequalities to represent situations.
- Students will examine constraints placed on real-world situations.

Can You Solve the Bait Box Puzzle?

What is the weight of the fourth order?



Solve each equation. If the equation is an identity, write *identity*. If it has no solution, write *no solution*.

1. $3(2 - 2x) = -6(x - 1)$

$2-2x=-2(x-1)$

$2-2x=-2x+2$

$-2x+2=-2x+2$

$2=2$

1. identity

2. $3p + 1 = -p + 5$

$4p=4$

$p=1$

2. 1

3. $4x - 1 = 3(x + 1) + x$

$3x-1=3(x+1)$

$3x-1=3x+1$

$-1=1$

3. no solution

4. $\frac{1}{2}(6c - 4) = 4 + c$

$3c-2=4+c$

$2c-2=4$

$2c=6$

$c=3$

4. 3

Solve each equation. If the equation is an identity, write *identity*. If it has no solution, write *no solution*.

5. $5x = 2 - (x - 7)$

$5x = 2 - x + 7$

$6x = 9$

$x = \frac{9}{6}$

6. $v + 5 = v - 5$

$-v \quad -v$

$5 = -5$

5. 1.5

6. no solution

Solving Inequalities

Solve each inequality.

7. $5x + 3 < 18$

$5x < 15$

7. $x < 3$

8. $-\frac{r}{5} + 1 \geq -6$

$-\frac{r}{5} \geq -7$

$7 \geq \frac{r}{5}$

$35 \geq r$

8. $r \leq 35$

9. $-3t - 5 < 34$

$-5 < 34 + 3t$

$-39 < 3t$

$-13 < t$

9. $t > -13$

10. $-(7f + 18) - 2f \leq 0$

$-7f - 18 - 2f \leq 0$

$-9f - 18 \leq 0$

$-18 \leq 9f$

$-2 \leq f$

10. $f \geq -2$

Solving Inequalities

Solve each inequality.

11. $8s + 7 > -3(5s - 4)$

$8s + 7 > -15s + 12$

$23s > 5$

$s > \frac{5}{23}$

12. $\frac{1}{2}(x + 6) + 1 \geq -5$

$\frac{1}{2}(x+6) \geq -6$

$x + 6 \geq -12$

$x \geq -18$

11. $s > \frac{5}{23}$

12. $x \geq -18$

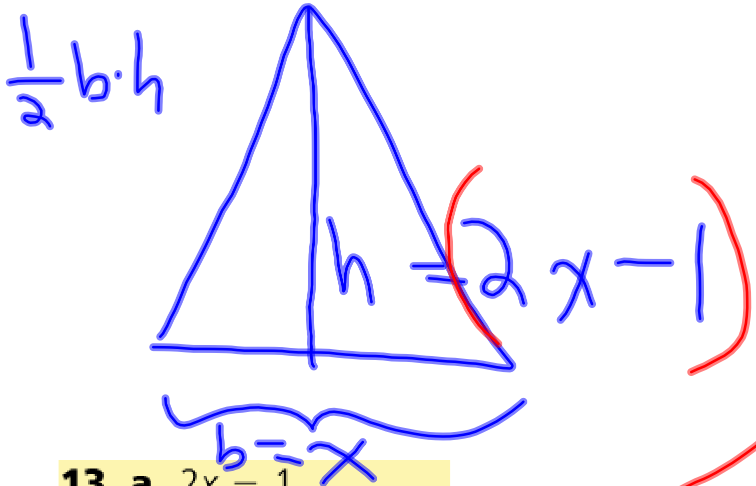
Writing Functions

13. The height of a triangle is 1 cm less than twice the length of the base. Let $x =$ the length of the base.

a. Write an expression for the height of the triangle.

b. Write a function rule for the area of the triangle.

c. What is the area of such a triangle if the length of its base is 16 cm?



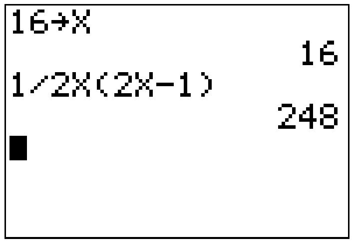
$$A = \frac{1}{2} b \cdot h$$

$$A = \frac{1}{2} x(2x-1)$$

13. a. $2x - 1$

b. $A = \frac{1}{2}x(2x - 1)$

c. 248 cm^2



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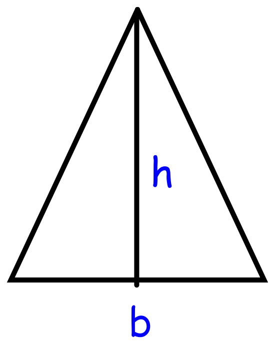
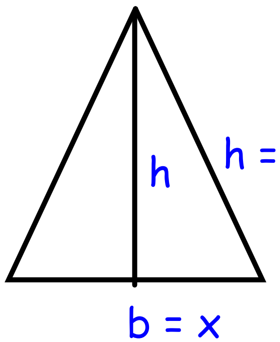


$A = 1/2(b)(h)$

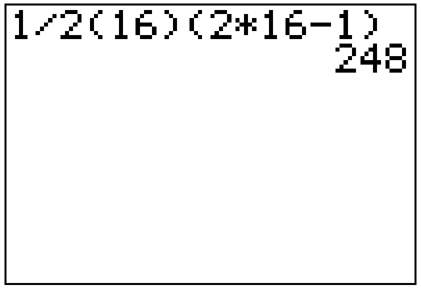


$A = 1/2(b)(h)$

$h = 2x - 1$

$A = 1/2(x)(2x - 1)$

If x = 16
A = 248 cm^2



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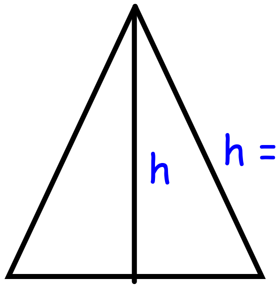

h = 2x -1

b = x

$A = 1/2(b)(h)$

$A = 1/2(x)(2x - 1)$

If x = 16

A = 248 cm^2

```
1/2(16)(2*16-1)
            248
```

Let's suppose that we were going to reuse the formula

$$A = 1/2(x)(2x - 1)$$

many times. There is a way to type in the formula once and then plug in a value for x.

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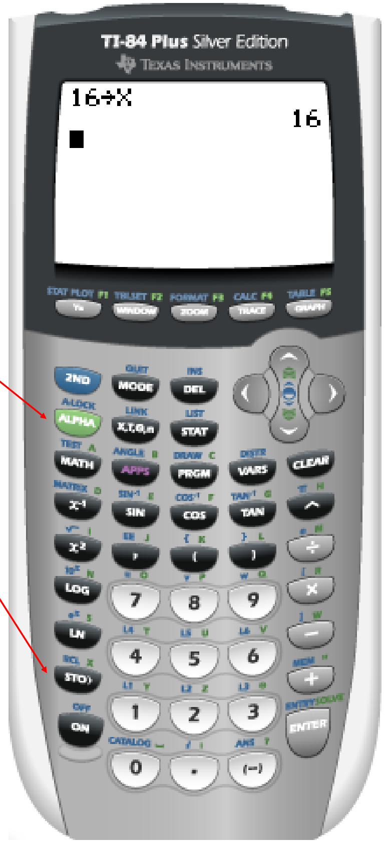
Above the STO▸ key is a way to access a variable we can call x

1 6 STO▸ ALPHA STO▸ ENTER

```
16→X
                16
```



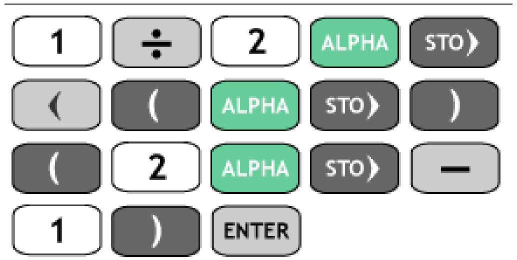
We can use x in any expressions we would like, for example here is the value of 2x:

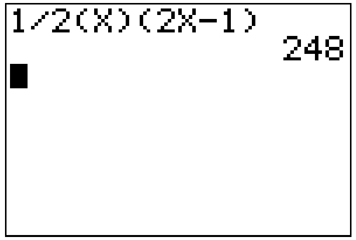
```
2X
                32
```

2 ALPHA STO▸ ENTER

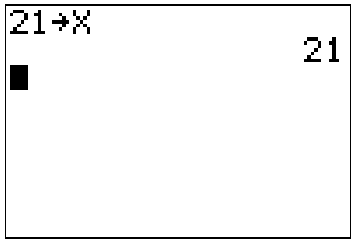
Since 16 is already stored in variable x, we can use the calculator and type in:

$$A = 1/2(x)(2x - 1)$$



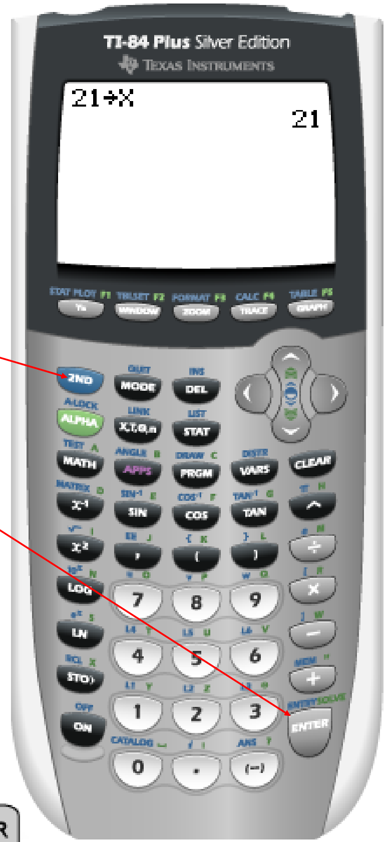


Now if we wanted to use a different value of x, suppose we wanted to know what the area of this particular triangle would be if the base is 21 cm, then we can store a new value of x, and re-use the same command without re-typing the formula.



You can access the commands that you have previously used, by using

2nd ENTER



This is handy when you want to edit previous commands, maybe to fix a mistake, or when you want to re-execute a command with a new value (like now, using 21 instead of 16)

```
21→X
                21
1/2(X)(2X-1)
             430.5
```

2nd ENTER 2nd ENTER ENTER

Notice that 2nd ENTER was used twice,

the first time recalls the command that set the value of x to 21, and the second time recalls the command that used the formula.

Graphing Linear Equations

Graph each equation.

14. $2x + 4y = -8$ **15.** $y = -\frac{2}{3}x + 3$ **16.** $y + 5 = -2(x - 2)$

$4(-2) = -8 = y$

$0\ (7) = -8 = x$

$y + 5 = -2x + 4$

$y = -2x - 1$

$2x + 4y = -8$

$2(2) + 4(y) = -8$

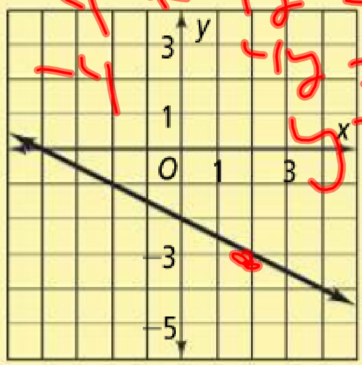
$4 + 4y = -8$

$-4 \quad -4$

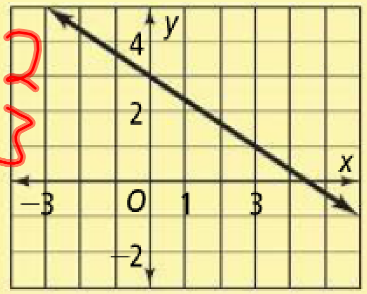
$4y = -12$

$y = -3$

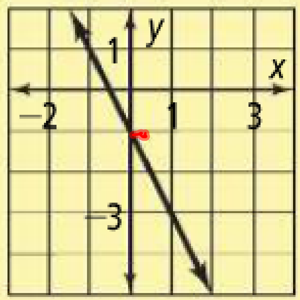
14.



15.



16.



Looking Ahead Vocabulary

17. Two answers to a question are said to be *inconsistent* if they could not both be true. Two answers to a question are said to be *consistent* if they could both be true. If there is no solution that makes both equations in a system of two linear equations true, do you think the system is *inconsistent* or *consistent*?

17. inconsistent