

PROBLEM OF THE WEEK - 4

JENNY SAVES THE DAY

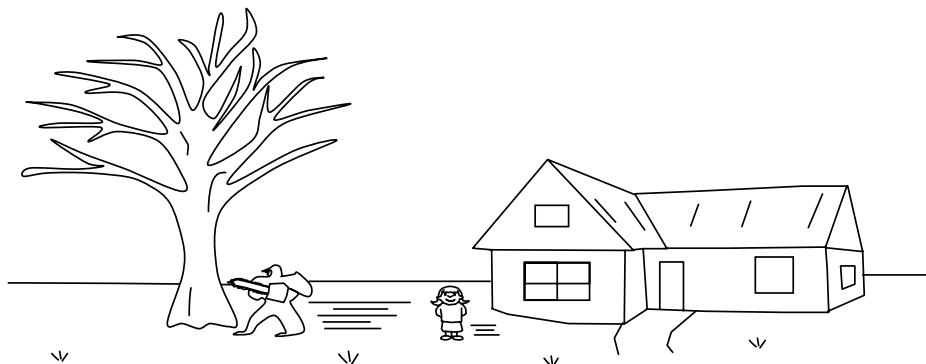
JENNY WALKED UP HER DRIVEWAY TO THE SOUND OF GRINDING AND ROARING COMING FROM HER BACKYARD. SHE OPENED THE GATE AND SAW HER FATHER CUTTING INTO THE OLD DEAD WILLOW TREE. HER FATHER SAW HER AND SHUT OFF THE CHAINSAW. JENNY LOOKED AT HER FATHER AND THEN AT THE TREE. "DAD, HOW DO YOU KNOW THE TREE WON'T HIT THE HOUSE WHEN IT FALLS?" HER DAD SMILED AND SAID, "WELL, THE SHADOW IS NOT TOUCHING THE HOUSE, SO I THINK THAT MEANS THE TREE WON'T HIT THE HOUSE EITHER."

JENNY WAS ABOUT 4 FEET TALL AND HER SHADOW WAS ABOUT 2 AND 1/2 FEET LONG. JENNY WALKED OVER TO THE TREE. "DAD, LET ME CHECK SOMETHING OUT."

SHE MEASURED THE TREE'S SHADOW, WHICH WAS APPROXIMATELY 60 FEET LONG. SHE ALREADY KNEW THE TREE WAS 80 FEET FROM THE HOUSE. BEFORE HER DAD COULD START THE CHAINSAW AGAIN, JENNY YELLED, "MOM, DAD IS ABOUT TO CRUSH THE HOUSE!"

1. HOW DID JENNY KNOW THAT HER FATHER WAS ABOUT TO MAKE A BIG MISTAKE?
2. HOW MUCH OF THE TREE WOULD HAVE HIT THE HOUSE?

PROBLEM OF THE WEEK - ANSWER AND HELP



1. HOW DID JENNY KNOW THAT HER FATHER WAS ABOUT TO MAKE A BIG MISTAKE?

IF YOU QUICKLY ESTIMATE THE RATIO BETWEEN JENNY'S HEIGHT AND HER SHADOW, YOU CAN SEE THAT HER HEIGHT IS ABOUT TWICE THE LENGTH OF HER SHADOW. THIS TELLS US THAT THE TREE IS ABOUT TWICE AS HIGH AS ITS SHADOW. SINCE THE TREE'S SHADOW IS APPROXIMATELY 60 FEET LONG THEN ITS HEIGHT WILL BE 2×60 , WHICH EQUALS 120 FEET. THE DISTANCE BETWEEN THE TREE AND THE HOUSE IS ONLY 80 FEET.

2. HOW MUCH OF THE TREE WOULD HAVE HIT THE HOUSE?

2. IF YOU USE THE AMOUNTS FOR THE SHADOWS AND THE HEIGHTS YOU CAN WRITE THEM AS A PROPORTION AND SOLVE FOR THE UNKNOWN HEIGHT OF THE TREE

$$\frac{\text{SHADOW}}{\text{HEIGHT}} \quad \frac{2.5}{4} = \frac{60}{?} \quad \text{CROSS MULTIPLY} \quad \frac{2.5}{4} \times \frac{60}{n} \Rightarrow 2.5n = 4(60)$$

$$2.5n = 240$$

THE TREE IS ABOUT 96 FEET HIGH.

$$n = \frac{240}{2.5}$$
$$n = 96$$

THE HOUSE IS 80 FEET FROM THE TREE, SO $96 - 80 = 16$ FEET. THIS TELLS US ABOUT 16 FEET OF TREE WILL HIT THE HOUSE.