Linear Equations: Expressions and Diagrams

Video Script

Scene		Full Transcript
1	**Mia:**	You're right. You did the math correctly. They will meet in three hours at mile twenty-two. Oh, be sure to take them plenty of water because they'll be thirsty, and don't forget to give them the cookies I baked. Well, I'm about to go on a run for myself, so I'll talk to you later. Bye! Hi, it's Mia, and I just got finished talking to my friend Justin who is getting ready to take supplies out to two guys in his unit who are doing a training run this weekend.
2	**Voice-Over Mia:**	Justin needed to determine where and when to meet up. He had done his calculations but he called me just to double check.
	Mia:	It's a good example of writing algebraic expressions and equations. Why don't we review our work so you can see how we got another problem solved.
	Voice-Over Mia:	Justin told me that Scott and Shawn each set up camp last night in two different places along the trail. Scott at checkpoint A, and Shawn, one mile down the trail at checkpoint B. By drawing a line to represent the trail, we can see where each runner is at on the trail, when Shawn starts out. This morning, Scott broke camp early and started before Shawn. In fact, Scott ran ten miles before Shawn left checkpoint B. Justin told me that Scott has a heavy pack and is running at an average of four miles per hour. Shawn is a fast runner and isn't carrying a pack. He will be running at an average of seven miles per hour.
	Mia:	What Justin needed to determine, was how long it will take Shawn to catch up with Scott, and where they will meet, so he can deliver supplies.
3	**Voice-Over Mia:**	Since we know Scott has already run ten miles, we put a mark here. We also put a mark at checkpoint B to represent where Shawn is starting. Lets see where they will be after one hour of running. Scott will run another four miles, putting him at mile marker fourteen. Since Shawn started at mile marker one, he will be at mile marker eight in one hour. After two hours of running, Scott will be at mile marker eighteen or fourteen miles plus four miles. Shawn is really starting to close the gap. He was at mile marker eight and ran seven miles in the last hour, getting him to the fifteen-mile marker. When Scott runs a third hour at four miles per hour, we will arrive at mile marker twenty-two. Twenty-two miles? That's quite a run! Look what happens, if Shawn continues his seven miles per hour pace, in hour

number three, he will travel from mile marker fifteen to mile marker twenty-two and arrive at the same time as Scott. Therefore, Justin need to link up with the guys in three hours at mile marker twenty-two.

Justin thought he figured it correctly using a number line model, but asked me to build algebraic expressions to check his work. I will show you what I came up with.

Scott travels four miles every hour. In one hour, he travels four miles per hour, times one hour. For two hours, four miles per hour, times two hours. So for an unknown number of hours, we use the expression four times "h", where "h" equals the number of hours. We also know that he was ten miles from checkpoint A down the trail when Shawn started out. So the distance, "d", equals, four "h" plus ten (d= 4h +10), where "d" is the distance Scott has run from checkpoint A.

Shawn travels seven miles every hour. In one hour he travels seven miles per hour times one hour. For two hours, seven miles per hour times two hours. And for an unknown number of hours, we use the expression seven times "h". Where "h" equals the number of hours. Finally, we know that Shawn's starting spot was one mile down the trail, so the total distance he will travel from checkpoint A, is "d" equals seven "h" plus one (d=7h+1).

Since we want to know when the two will meet. We set the expressions for the distance each is from Checkpoint A equal to each other. 7h + 1= 4h + 10. We can check our answer by substituting three hours for "h". Seven times three plus one is twenty-two and four times three plus ten is twenty-two. Since it checks, three hours is correct.

So if Justin arrives at mile marker twenty-two in three hours, he will be able to give the guys the supplies for the next leg of their journey. See, creating algebraic expressions and equations for problems can be a useful strategy to quickly solve or check a problems solution.

Mia: You can use algebra to solve lots of problems!

Well, it's time for me to go on my run. I don't think I'll be running twenty-two miles but I'm working my way up to that. That's another problem solved!