Zillions of Practice Problems

Pre-Algebra 0 with Physics

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How This Book Is Organized

Life of Fred: Pre-Algebra 0 with Physics has 37 chapters before the final bridge. So does this book.

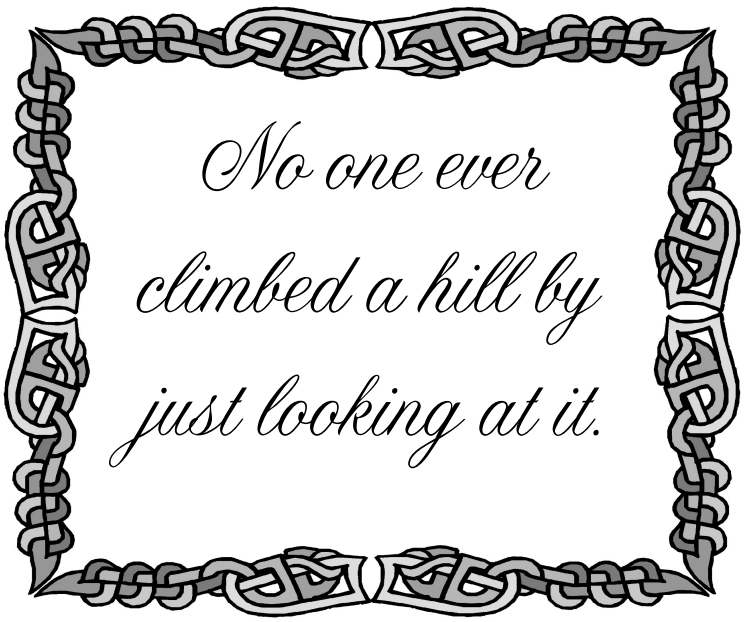
As you work through each chapter in *Life of Fred: Pre-Algebra 0 with Physics* you can do the problems in the corresponding chapter in this book.

Each chapter in this book is divided into two parts.

✯ The first part takes each topic and offers a zillion problems.

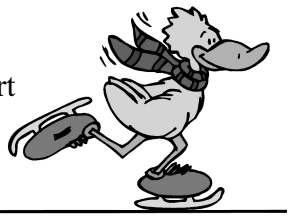
✯ The second part is called the Mixed Bag. It consists of a variety of problems from the chapter and review problems from the beginning of the book up to that point.

Please write down your answers before turning to the back of the book to look at my answers. If you just read the questions and then read my answers you will learn very little. As my mother used to tell me,



Second part: the Mixed Bag: a variety of problems from this chapter and previous chapters

494. Consider your average ice-skating duck. If you are pushing him, does it take more effort if he has one foot in the air or if he has both feet on the ice?



640. If it takes 25 pounds of force to keep the duck moving at 5 mph (miles per hour), how many pounds of force will it take to move him at a constant 15 mph?

715. You never see a duck go ice skating on a carpet. It's just too much work. That illustrates the fact that friction is dependent on which of these?

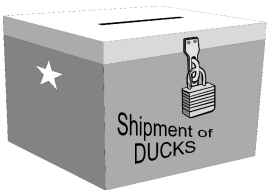
A) the area of contact between the surfaces or

B) the speed at which he's skating or

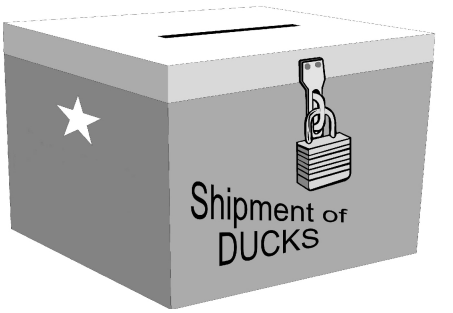
C) which surfaces are involved (in this case, between the bottom of his skates and the carpet)

840. Our duck decides to go out ice skating on the big lake. Is the distance he skates a discrete or a continuous variable?

905. You order a crate of ducks. Two days later the 40-pound box of ducks is sitting on your living room floor. It takes 28 pounds of force to slide it into the dining room.



Next week a 120-pound box of ducks arrives. How much force will be needed to slide it from the living room into the dining room?

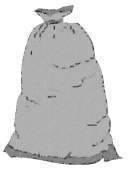


Chapter Five
Finding Mu

First part: Problems from this chapter

160. Simplify $\frac{73\mu}{73}$

214. The formula for the coefficient of friction is $F = \mu N$.



You have this large sack of carrots that you want to bring home to feed to your bunny. It weighs 240 pounds so you have to drag it rather than carry it.

Here is a picture of your situation.

sack on the sidewalk

You know that N is 240 pounds.

If* you knew the value of μ, you could find F, which the amount of force needed to drag that sack along the sidewalk.

For example, if μ were equal to 0.2, what would F equal?

395. But you don't know μ. There is no book or Internet site that will tell you the value of μ, the coefficient of friction between a sack of carrots and a sidewalk. Such a book would have to be a zillion pages long to list the coefficient of friction for every possible pair of surfaces in the world.

Instead, you do the experiment. You drag your 240-pound sack of carrots and find that it takes 80 pounds of force to pull it at a constant speed. What is the value of μ?

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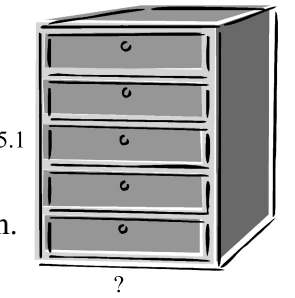
* That's a big "if."

Second part: the Mixed Bag: a variety of problems from this chapter and previous chapters

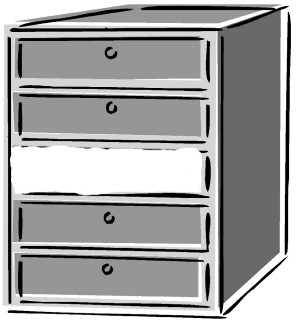
288. You have a chest of drawers. It is 5.1 feet tall. The area of the front is 14.28 square feet. What is the width?



457. It takes 10.8 pounds to slide your chest of drawers at 4 mph across the carpet in your bedroom. Your chest of drawers weighs 18 pounds. What is the coefficient of friction, μ?

555. If I slide your chest of drawers at 8 mph across the carpet in your bedroom, will the force needed be 5.4, 10.8, or 21.6 pounds?

601. Your kid sister removes one of the drawers from your chest of drawers.



She claims that she needed the drawer to hold her pet alligator. On her way to her bedroom she emptied the drawer in the hallway. "I want my 'gator to have lots of room to crawl around in the box," she said.

Your chest of drawers now weighs 13.5 pounds.

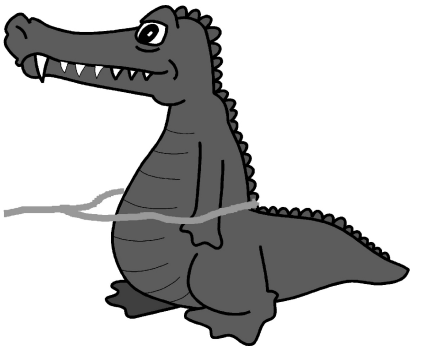
How much force will now be needed to slide it at 6 mph?

711. She drags her pet alligator into your bedroom and says, "I want you to apologize to my 'gator."

"Why?" you ask. "You stole a drawer out of *my* chest of drawers. Why do I have to apologize to your pet?"

"Because your drawer was too small for him."

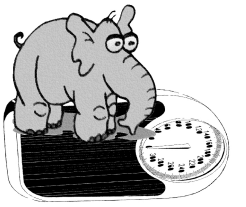
The alligator weighs 18 pounds. From all the information given on this page, can you find μ for the alligator and the carpet in your bedroom?



639. On Mars it is true that 1000 meters = 1 kilometer.
On earth 1 kilogram ≈ 2.205 pounds. Is that true on Mars?

Kilograms are a measure of mass. It is the amount of "stuff" in some object. If you kid sister has a mass of 15 kilograms on earth, she will have a mass of 15 kilograms on Mars.

Pounds are a measure of force. You put a 1 kilogram weight on a scale here on earth and it will weigh 2.205 pounds. You put that same 1 kilogram mass on a scale on Mars (which is a smaller planet than earth) and it will weigh less than 2.205 pounds.



If you put an elephant on a very small rock with very little gravity—small planets are not called planets—it might only weigh one ounce.

C. C. Coalback once ran a weight-reduction clinic. He guaranteed that anyone who paid their $6,250 entrance fee would lose half their weight in 2 weeks. He shipped his customers to the moon where they lost over half their weight, but didn't lose any of their mass.

640. If it takes 25 pounds of force to keep the duck moving at 5 mph, how many pounds of force will it take to move him at a constant 15 mph?

Friction and force are independent of speed. It will take 25 pounds of force to keep him going at any constant speed. (Of course, it takes more effort to get him up to that faster speed, but once he is there, 25 pounds of force will keep him going at any constant speed.)

641. You are given $8x = 7$. Find the value of x. Express your answer both as a fraction and as a decimal.

You start with $8x = 7$

Divide both sides by 8 $x = \frac{7}{8}$

To convert $\frac{7}{8}$ into a decimal, you divide.

$$\begin{array}{r} 0.875 \\ 8\overline{)\,7.000} \\ -\,64 \\ \hline 60 \\ -\,56 \\ \hline 40 \\ -\,40 \\ \hline \end{array}$$

$\frac{7}{8} = 0.875$ which as a percent is 87.5%

A free bonus!

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