

These draft test specifications and sample items and other materials are just that — drafts. As such, they will systematically evolve over time. These sample items are meant to illustrate the shifts in the redesigned SAT® and are not a full reflection of what will be tested. Actual items used on the exam are going through extensive reviews and pretesting to help ensure that they are clear and fair, and that they measure what is intended. The test specifications as well as the research foundation defining what is measured on the test will continue to be refined based on ongoing research.

Problems Grounded in Real-World Contexts

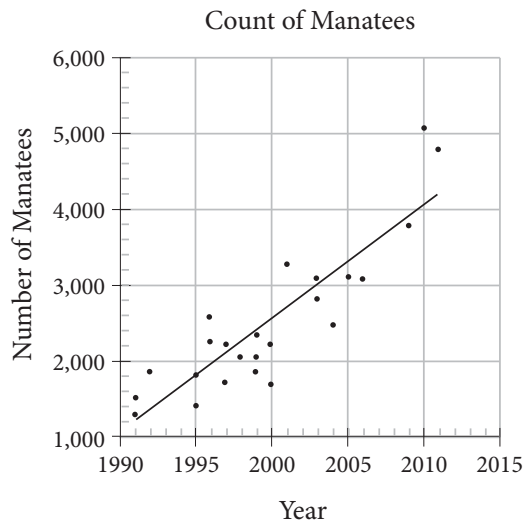
In response to evidence about essential prerequisites for college and career readiness and success, the redesigned SAT's Math Test requires students to apply their mathematics knowledge, skills, and understandings in challenging, authentic contexts. Students taking the Math Test will encounter a range of disciplines and will be asked to address real-world problems drawn from science, social studies, and careers and demonstrate a capacity for sustained reasoning over the multiple steps required to answer many of the questions on the exam. In these ways, the Math Test also rewards and incentivizes valuable work in the classroom.

Applications on the redesigned SAT's Math Test require students to demonstrate the ability to analyze a situation, determine the essential elements required to solve the problem, represent the problem mathematically, and carry out a solution. These applications often also require linking topics within the mathematics domain (e.g., functions and statistics) and across disciplines (e.g., math and science). Learning to model and problem solve is enhanced when students use the same mathematics (e.g., linear equations) to solve problems in different contexts (e.g., science, social studies, or careers).

The following questions help illustrate two important ways in which students are asked to demonstrate skill in working within real-world contexts on the redesigned SAT®.

The first question is set in a science context, based on real-world methods (synoptic counts, or aerial observations of wintering spots) used by the U.S. Fish and Wildlife Service to count manatees, a type of sea mammal.

EXAMPLE 1



The scatterplot above shows counts of Florida manatees, a type of sea mammal, from 1991 to 2011. Based on the line of best fit to the data shown, which of the following values is closest to the average yearly increase in the number of manatees?

- A) 0.75
- B) 75
- C) 150
- D) 750

This question is an excellent way of connecting linear functions to statistics and using math within a science context. In this question, students are not required to model the line of best fit completely, but they are required to analyze the question to understand that they must compute the slope of the line of best fit to get the correct answer, 150 (choice C).

The second example helps show how students might be asked to demonstrate algebraic, proportional, and quantitative reasoning while solving real-world problems on the redesigned SAT.

EXAMPLE 2

An international bank issues its Traveler credit cards worldwide. When a customer makes a purchase using a Traveler card in a currency different from the customer's home currency, the bank converts the purchase price at the daily foreign exchange rate and then charges a 4% fee on the converted cost.

Sara lives in the United States, but is on vacation in India. She used her Traveler card for a purchase that cost 602 rupees (Indian currency). The bank posted a charge of \$9.88 to her account that included the 4% fee.

PART 1

What foreign exchange rate, in Indian rupees per one U.S. dollar, did the bank use for Sara's charge? Round your answer to the nearest whole number.

PART 2

A bank in India sells a prepaid credit card worth 7,500 rupees. Sara can buy the prepaid card using dollars at the daily exchange rate with no fee, but she will lose any money left unspent on the prepaid card. What is the least number of the 7,500 rupees on the prepaid card Sara must spend for the prepaid card to be cheaper than charging all her purchases on the Traveler card? Round your answer to the nearest whole number of rupees.

SOLUTION

Part 1: \$9.88 represents the conversion of 602 rupees plus a 4% fee on the converted cost.

To calculate the original cost of the item in dollars, x :

$$\begin{aligned}1.04x &= 9.88 \\ x &= 9.5\end{aligned}$$

Since the original cost is \$9.50, to calculate the exchange rate r , in Indian rupees per one U.S. dollar:

$$9.50 \text{ dollars} \times \frac{r \text{ rupees}}{1 \text{ dollar}} = 602 \text{ rupees}$$

$$r = \frac{602}{9.50}$$

$$\approx 63 \text{ rupees}$$

ANSWER: 63

PART 2:

Let d dollars be the cost of the 7,500-rupee prepaid card. This implies that the exchange rate on this particular day is $\frac{d}{7,500}$ dollar per rupee. Suppose Sara's total purchases on the prepaid card were r rupees. The value of the r rupees in dollars is $\left(\frac{d}{7,500}\right)r$ dollars. If Sara spent the r rupees on the Traveler card instead, she would be charged $(1.04)\left(\frac{d}{7,500}\right)r$ dollars. To answer the question about how many rupees Sara must spend in order to make the Traveler card a cheaper option (in dollars) for spending the r rupees, we set up the inequality $1.04\left(\frac{d}{7,500}\right)r \geq d$. Rewriting both sides reveals $1.04\left(\frac{r}{7,500}\right)d \geq (1)d$, from which we can infer $1.04\left(\frac{r}{7,500}\right) \geq 1$. Dividing on both sides by 1.04 and multiplying on both sides by 7,500, finally yields $r \geq 7,212$. Hence the least number of rupees Sara must spend for the prepaid card to be cheaper than the Traveler card is 7,212.

ANSWER: 7,212

Example 2 is an extended-thinking question that requires students to go through multiple steps to produce the solution. Such extended-thinking questions on the redesigned SAT require students to deeply think through the process of solving problems. Set within a range of real-world contexts, extended-thinking questions require students to make sense of problems and persevere in solving them; make connections between and among the different parts of a stimulus; plan a solution approach, as no scaffolding is provided to suggest a solution strategy; abstract, analyze, and refine an approach as needed; and produce and validate a response. These types of questions require the application of complex cognitive skills and will require a little more thinking time for students. Students will generally be seeing longer problems in their postsecondary work. By including extended-thinking questions, the redesigned SAT rewards and incentivizes aligned, productive work in classrooms.