LESSON MAKER PRO

Model the Moment

Choose quantities that describe real situations.

HIGH SCHOOL · HSN-Q.A.2

CCSS.Math.Content.HSN-Q.A.2 "Define appropriate quantities for the purpose of descriptive modeling."

NAME _____ DATE _____

NAME WHAT MATTERS

A useful model begins by deciding what amount matters, then giving it a variable and units. Use the situation to connect that quantity to known amounts, rates, or limits, and check that the units fit.

WORKED EXAMPLE

A music festival charges $18 per ticket. If n tickets are sold, define a quantity for total ticket revenue and write a model.

1. Let R be the total ticket revenue in dollars.
2. Each ticket adds $18 to R.
3. Multiply ticket price by number sold: R = 18n.

Answer: R = 18n, where R is measured in dollars.

PRACTICE 6 problems

1 A game store sells h hoodies for $14 each. Define R as total hoodie revenue. Write R in terms of h.

ANSWER _____

2 A student has $65 and spends $8 each week on lunch. Let w be the number of weeks. Define B as the money remaining and write a model.

ANSWER _____

3 A dance team practices 4 days for p minutes each day. Define T as total practice time and write a model.

ANSWER _____

4 A phone plan user uses g GB of data each day for 6 days. Define U as total data used and write a model.

ANSWER _____

5 A cyclist travels 45 miles in 5 hours. Define r as the cyclist's average speed and calculate r.

ANSWER _____

6 A fundraiser sells x raffle tickets for $2 each and has an expense of $11. Define P as the profit and write a model.

ANSWER _____

APPLY IT Show your work

1 You want to buy headphones that cost $96. You already saved $24 and save $12 each week. Let S be your savings after w weeks. Write a model for S, then find how many weeks you need to save enough.

WORK SPACE

ANSWER _____

2 A video project has a total storage budget of 10 GB, including 4 GB of intro footage and files already chosen. Each added minute of video uses 1/2 GB. Let m be the number of added whole minutes. Write an inequality and find the greatest possible value of m.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two fitness plans charge monthly fees. Plan A costs $15 per month plus $4 per class, and Plan B costs $27 per month plus $2 per class. Let x be the number of classes in one month. Define a total-cost quantity for each plan, then state when Plan B is cheaper. Explain your reasoning in one or two sentences.

_____

_____

ANSWER KEY

Model the Moment

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A game store sells h hoodies for $14 each. Define R as total hoodie revenue. Write R in terms of h.	**R = 14h, where R is measured in dollars.**
2	A student has $65 and spends $8 each week on lunch. Let w be the number of weeks. Define B as the money remaining and write a model.	**B = 65 - 8w, where B is measured in dollars.**
3	A dance team practices 4 days for p minutes each day. Define T as total practice time and write a model.	**T = 4p, where T is measured in minutes.**
4	A phone plan user uses g GB of data each day for 6 days. Define U as total data used and write a model.	**U = 6g, where U is measured in GB.**
5	A cyclist travels 45 miles in 5 hours. Define r as the cyclist's average speed and calculate r.	**r = 45/5 = 9 miles per hour.**
6	A fundraiser sells x raffle tickets for $2 each and has an expense of $11. Define P as the profit and write a model.	**P = 2x - 11, where P is measured in dollars.**

PART 2 · APPLY IT

1. **S = 24 + 12w. Setting S = 96 gives w = 6 weeks.** Set 24 + 12w equal to 96 because that is the headphone cost. Subtract 24, then divide by 12 to get w = 6.
2. **4 + (1/2)m <= 10, so m <= 12. The greatest possible value is 12 whole minutes.** The existing files and added video must stay within the total project budget. Subtract 4 GB, then multiply by 2 to get m <= 12.

CHALLENGE

Let A = 15 + 4x and B = 27 + 2x, where x is the number of classes; Plan B is cheaper for 7 or more whole classes. The inequality 27 + 2x < 15 + 4x simplifies to x > 6.

Accept equivalent variable names and equivalent expressions with correct units. For the challenge, accept x > 6 along with the interpretation that whole numbers of classes begin at 7.