**FIGURE 2.1**    NAEP Mathematics Scoring Category Classifications for Extended Constructed-Response Questions

| 0 = | *No Response* | There is no response |
|---|---|---|
| 1 = | *Incorrect Response* | The work is completely incorrect or irrelevant. Or the response states, "I don't know." |
| 2 = | *Minimal* | The response demonstrates a minimal understanding of the problem posed but does not suggest a reasonable approach. Although there may or may not be some correct mathematical work, the response is incomplete, contains major mathematical errors, or reveals serious flaws in reasoning. Examples are absent. |
| 3 = | *Partial* | The response contains evidence of a conceptual understanding of the problem in that a reasonable approach is indicated. However, on the whole, the response is not well developed. Although there may be serious mathematical errors or flaws in the reasoning, the response does contain some correct mathematics. Examples provided are inappropriate. |
| 4 = | *Satisfactory* | The response demonstrates a clear understanding of the problem and provides an acceptable approach. The response also is generally well developed and coherent but contains minor weaknesses in the development. Examples provided are not fully developed. |
| 5 = | *Extended* | The response demonstrates a complete understanding of the problem, is correct, and the methods of solution are appropriate and fully developed. Responses scored 5 are logically sound, clearly written, and do not contain any significant mathematical errors. Examples are well chosen and fully developed. |

NOTE: In the partial-credit scaling used to summarize student achievement across questions for other analyses and reports, neither "blank" nor incorrect responses are given credit, and minimal through extended responses are assigned values 1-4. However, for the purposes of this report, it is interesting to distinguish between students who omitted questions and those who at least attempted to respond.
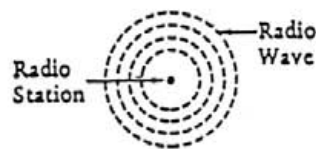
# Grade 8 Question: Radio Stations

## The Task

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

Radio station KMAT in Math City is 200 miles from radio station KGEO in Geometry City. Highway 7, a straight road, connects the two cities.
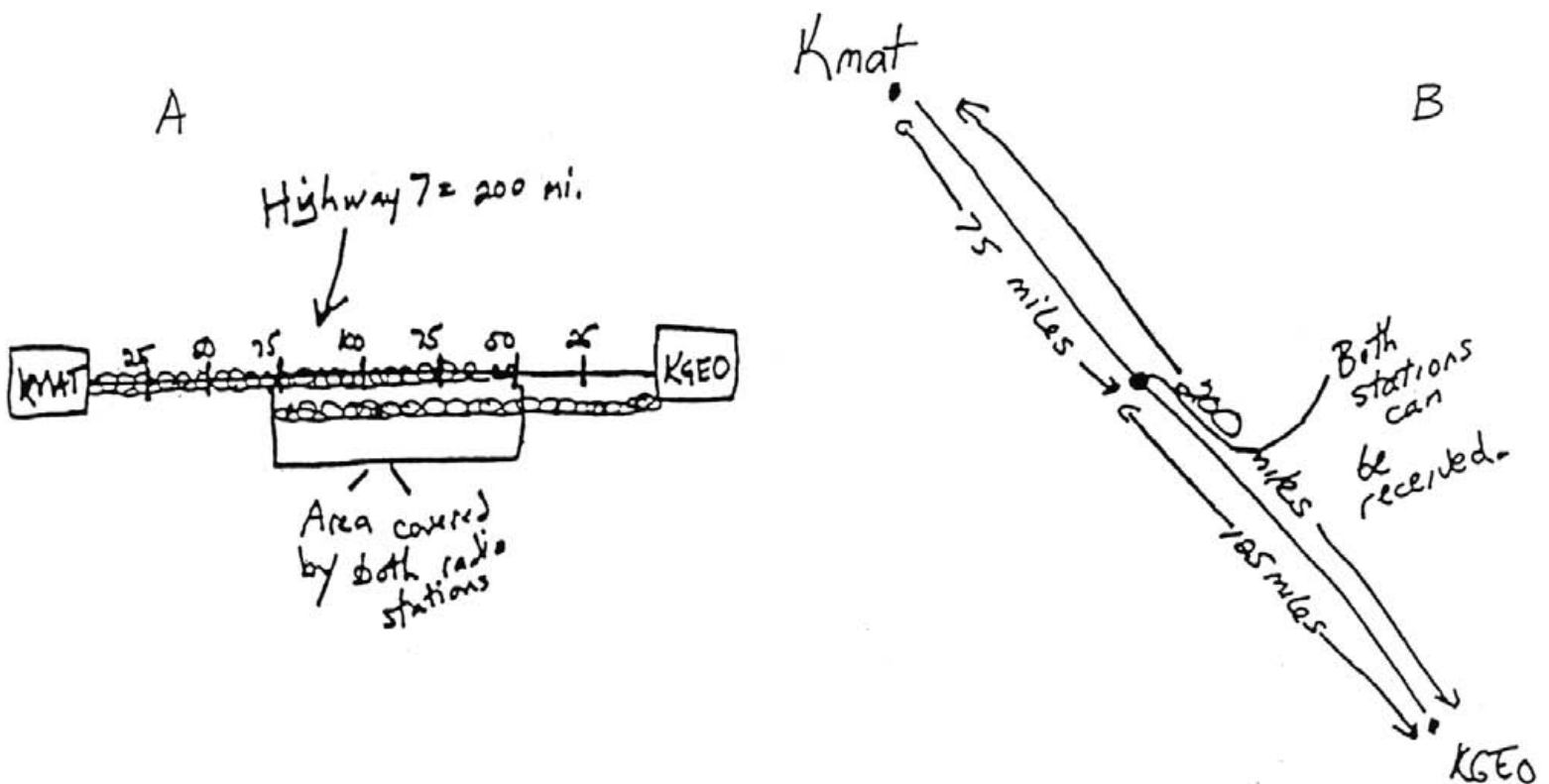
KMAT broadcasts can be received up to 150 miles in all directions from the station and KGEO broadcasts can be received up to 125 miles in all directions. Radio waves travel from each radio station through the air, as represented below.
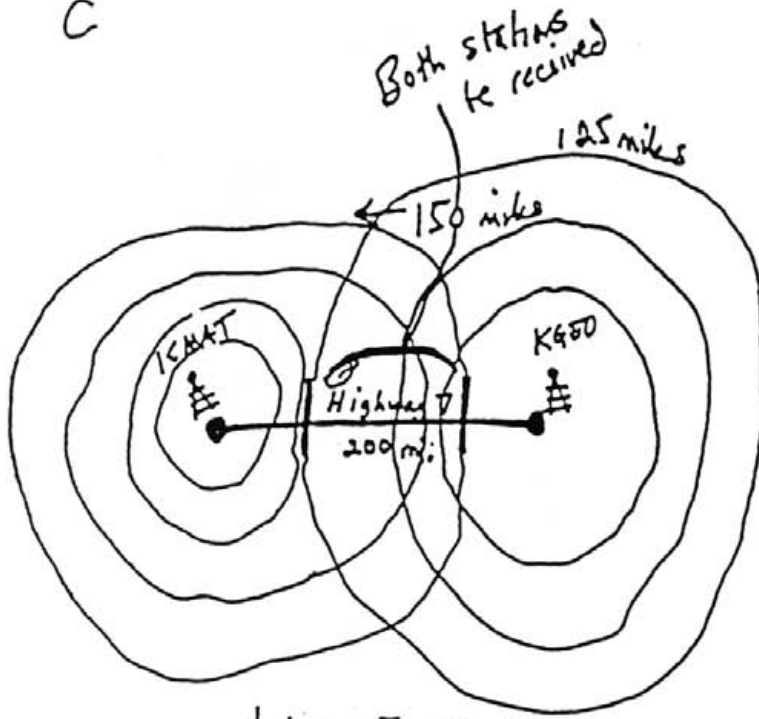


On the next page, draw a diagram that shows the following.

- Highway 7
- The location of the two radio stations
- The part of Highway 7 where both radio stations can be received

Be sure to label the distances along the highway and the length in miles of the part of the highway where both stations can be received.
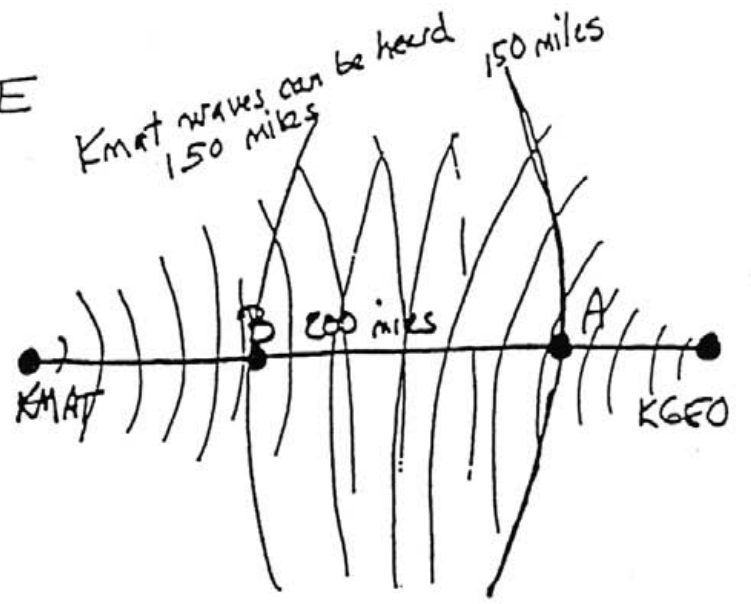
C

Both stations
be received

125 miles

←150 miles

KMAT

KGEO

Highway 7
200 mi.

Highway 7 250 miles
KMAT 150 mile radius
KGEO 125 mile radius
Part of Highway 7 where both
   radio stations can be
   received 75

D

Highway 7 - two radio stiations where
         highway 1 station reciev

right
Pact
highway
7

E

Kmat waves can be heard        150 miles
150 miles

B   200 miles        A

KMAT                          KGEO

The can both be heard
      between A & B