Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25 A teacher wrote the following set of numbers on the board:

irrational: $a = \sqrt{20}$ = 4.472135... rational: $b = 2.5$ rational: $c = \sqrt{225}$ = 15

Explain why $a + b$ is irrational, but $b + c$ is rational.

$a+b = \sqrt{20} + 2.5 = 6.9721359....$

· $a+b$ is irrational because the sum is a number that continues forever with no pattern.

$b+c = 2.5 + \sqrt{225} = 17.5$

· $b+c$ is rational because the sum is a number that stops.

Definitions

· rational # is:
- a number that has an end. (like -5, 2.5, 3.75)
- a number that has a repeating decimal. (like $2.333\overline{3}$, $4.161616\overline{16}$)

· irrational # is:
- a number that has a decimal that continues forever with no repeating pattern. (like $\pi \rightarrow 3.14159...$)

26 Determine and state whether the sequence 1, 3, 9, 27,... displays exponential behavior. Explain how you arrived at your decision.

1, 3, 9, 27 . . . .

×3 ×3 ×3

yes this sequence displays exponential behavior because the values are changing by a factor of 3 (multiplying by 3 each time).

Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33 Loretta and her family are going on vacation. Their destination is 610 miles (total) from their home. Loretta is going to share some of the driving with her dad. Her average speed while driving is 55 mph (Loretta) and her dad's average speed while driving is 65 mph (Dad).

The plan is for Loretta to drive for the first 4 hours of the trip and her dad to drive for the remainder of the trip. Determine the number of hours it will take her family to reach their destination.

Loretta: 55 mph × 4 hours = 220 miles

610 − 220 = 390 miles remaining

Dad: 390 ÷ 65 mph = 6 hours

Total: 4 + 6 = 10

It will take the family a total of 10 hours to reach their destination.

After Loretta has been driving for 2 hours, she gets tired and asks her dad to take over. Determine, to the *nearest tenth of an hour*, how much time the family will save by having Loretta's dad drive for the remainder of the trip.

Loretta: 55 mph × 2 hours = 110 miles

610 − 110 = 500 miles remaining

Dad: 500 ÷ 65 mph = 7.692

round → 7.7 hours

Total: 2 + 7.7 = 9.7

10 − 9.7 = 0.3

The family saves 0.3 hour by having Loretta's dad drive the remainder of the trip.