A2.A.5: Use direct and inverse variation to solve for unknown values

1. 010221b, P.I. A2.A.5
    Explain how a person can determine if a set of data represents inverse variation and give an example using a table of values.

2. 010503b, P.I. A2.A.5
    If *R* varies inversely as *S*, when *S* is doubled, *R* is multiplied by

    [A] $\dfrac{1}{4}$ [B] 2   [C] $\dfrac{1}{2}$ [D] 4

3. 060508b, P.I. A2.A.5
    In a given rectangle, the length varies inversely as the width. If the length is doubled, the width will

    [A] remain the same

    [B] be multiplied by 2

    [C] be divided by 2   [D] increase by 2

4. 080402b, P.I. A2.A.5
    The speed of a laundry truck varies inversely with the time it takes to reach its destination. If the truck takes 3 hours to reach its destination traveling at a constant speed of 50 miles per hour, how long will it take to reach the same location when it travels at a constant speed of 60 miles per hour?

    [A] $2\dfrac{1}{3}$ hours   [B] 2 hours

    [C] $2\dfrac{1}{2}$ hours   [D] $2\dfrac{2}{3}$ hours

5. 060618b, P.I. A2.A.5
    According to Boyle's Law, the pressure, *p*, of a compressed gas is inversely proportional to the volume, *v*. If a pressure of 20 pounds per square inch exists when the volume of the gas is 500 cubic inches, what is the pressure when the gas is compressed to 400 cubic inches?

    [A] $16 \text{ lb}/\text{in}^2$ [B] $50 \text{ lb}/\text{in}^2$

    [C] $25 \text{ lb}/\text{in}^2$ [D] $40 \text{ lb}/\text{in}^2$

6. 080207b, P.I. A2.A.5
    To balance a seesaw, the distance, in feet, a person is from the fulcrum is inversely proportional to the person's weight, in pounds. Bill, who weighs 150 pounds, is sitting 4 feet away from the fulcrum. If Dan weighs 120 pounds, how far from the fulcrum should he sit to balance the seesaw?

    [A] 4.5 ft   [B] 3.5 ft   [C] 5 ft   [D] 3 ft

7. 060918b, P.I. A2.A.5
    The manager of Stuart Siding Company found that the number of workers used to side a house varies inversely with the number of hours needed to finish the job. If four workers can side the house in 48 hours, how many hours will it take six workers working at the same speed to do the same job?

    [A] 36   [B] 72   [C] 32   [D] 42

8.   010913b, P.I. A2.A.5
Carol notices that the number of customers who visit her coffee shop varies inversely with the average daily temperature. Yesterday, the average temperature was 40° and she had 160 customers. If today's average temperature is 25°, how many customers should she expect?

[A] 145   [B] 256   [C] 1,000   [D] 100

9.   010624b, P.I. A2.A.5
The time it takes to travel to a location varies inversely to the speed traveled. It takes 4 hours driving at an average speed of 55 miles per hour to reach a location. To the *nearest tenth of an hour*, how long will it take to reach the same location driving at an average speed of 50 miles per hour?

10.   060323b, P.I. A2.A.5
When air is pumped into an automobile tire, the pressure is inversely proportional to the volume. If the pressure is 35 pounds when the volume is 120 cubic inches, what is the pressure, in pounds, when the volume is 140 cubic inches?

11.   080523b, P.I. A2.A.5
Boyle's Law states that the pressure of compressed gas is inversely proportional to its volume. The pressure of a certain sample of a gas is 16 kilopascals when its volume is 1,800 liters. What is the pressure, in kilopascals, when its volume is 900 liters?

12.   010423b, P.I. A2.A.5
A pulley that has a diameter of 8 inches is belted to a pulley that has a diameter of 12 inches. The 8-inch-diameter pulley is running at 1,548 revolutions per minute. If the speeds of the pulleys vary inversely to their diameters, how many revolutions per minute does the larger pulley make?

13.   010823b, P.I. A2.A.5
The amount of money each member of a band earns playing at a graduation party varies inversely as the number of members in the band. If the band has five members, each member earns $70. Write an equation that models the relationship between the number of members in a band, n, and the amount each member earns, d. Use the equation to calculate the amount each member earns if there are four members in the band.

14.   080123b, P.I. A2.A.5
The price per person to rent a limousine for a prom varies inversely as the number of passengers. If five people rent the limousine, the cost is $70 each. How many people are renting the limousine when the cost *per couple* is $87.50?

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[2] An explanation is given that indicates that a set of data can represent inverse variation if the product of two variables is constant, and a correct table of values is shown.
[1] The rule for direct rather than inverse variation is stated, but an appropriate equation and table of values are shown.
or [1] An example of inverse variation is shown, but no explanation of why it is an inverse variation is given.
or [1] An explanation is given that indicates that a set of data can represent inverse variation, but no table of values is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[1]   incorrect procedure.

[2]   C____

[3]   C____

[4]   C____

[5]   C____

[6]   C____

[7]   C____

[8]   B____

[2] 4.4, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] Only the constant of variation, 220, is found.
or [1] 4.4, but no work is shown.
[0] Direct variation is used.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[9]   obviously incorrect procedure.

[2] 30, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] 30, but no work is shown.
[0] Direct variation is used to find a solution.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[10] obviously incorrect procedure.

[2] 32, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Only the constant of variation, 28,800, is found.
or [1] 32, but no work is shown.
[0] Direct variation is used.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[11] obviously incorrect procedure.

[2] 1,032, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 1,032, but no work is shown.
[0] Direct variation is used instead of inverse variation.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[12] obviously incorrect procedure.

[2] *nd* = 350 or an equivalent equation and
$87.50, and appropriate work is shown, such
as the equation 350 = 4*d*.
[1] Appropriate work is shown, but one
computational error is made.
or [1] Appropriate work is shown, but one
conceptual error is made,
or [1] A correct equation is written, but no
further correct work is shown.
or [1] $87.50, but no work is shown.
[0] A zero response is completely incorrect,
irrelevant, or incoherent or is a correct
response that was obtained by an obviously
[13] incorrect procedure.

[2] 8, and appropriate work is shown, such as
5(70) = 43.75*x*.
[1] 4, and $87.50 is used instead of $43.75 per
person.
or [1] Appropriate work is shown, but one
computational error is made.
or [1] 8, but no work is shown.
[0] A zero response is completely incorrect,
irrelevant, or incoherent or is a correct
response that was obtained by an obviously
[14] incorrect procedure.