NAEP Released Items Aligned to the Iowa Core

7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.

7.RP.2 Recognize and represent proportional relationships between quantities.

a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.
d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

If $\frac{10.3}{5.62} = \frac{n}{4.78}$, then, of the following, which is closest to n?

A. 2 .6 1
B. 3.83
C. 8.76
D. 8.82
E. 12.11

1990-8-9-18

Source: National Assessment of Educational Progress, 1990, Grade 8 Mathematics Assessment.

Roxanne plans to enlarge her photograph, which is 4 inches by 6 inches. Which of the following enlargements maintains the same proportions as the original photograph? Justify your answer.

5 inches by 7 inches 5 inches by $7\frac{1}{2}$ inches

2005-12-12-3

Source: National Assessment of Educational Progress, 2005, Grade 12 Mathematics Assessment.

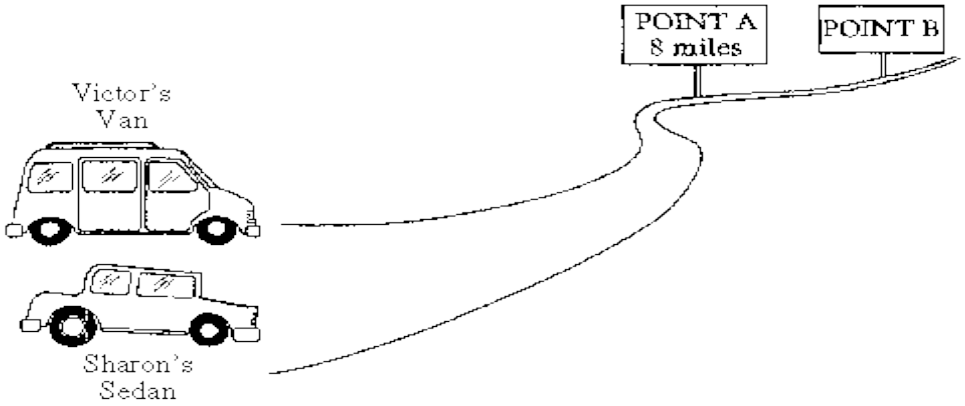
If $\frac{P}{41} = 64$, what does $\frac{P}{82}$ equal?

A. 32
B. 64
C. 128
D. 5248

2004-17-23-34

Source: National Assessment of Educational Progress, 2008, Age 17 Mathematics Assessment.

7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.



Victor's van travels at a rate of 8 miles every 10 minutes. Sharon's sedan travels at a rate of 20 miles every 25 minutes.

If both cars start at the same time, will Sharon's sedan reach point A, 8 miles away, before, at the same time, or after Victor's van?

Explain your reasoning.

If both cars start at the same time, will Sharon's sedan reach point B (at a distance further down the road) before, at the same time, or after Victor's van?

Explain your reasoning.

1996-8-12-5

Source: National Assessment of Educational Progress, 1996, Grade 8 Mathematics Assessment.

Ken bought a used car for $5,375. He had to pay an additional 15 percent of the purchase price to cover both sales tax and extra fees. Of the following, which is closest to the total amount Ken paid?

A. $806
B. $5,510
C. $5,760
D. $5,940
E. $6,180

1992-8-12-5
1992-12-12-5

Source: National Assessment of Educational Progress, 1992, Grade 8 and Grade 12 Mathematics Assessments.

Kate bought a book for $14.95, a record for $5.85, and a tape for $9.70. If the sales tax on these items is 6 percent and all 3 items are taxable, what is the total amount she must pay for the 3 items, including tax?

A. $32.33
B. $32.06
C. $30.56
D. $30.50
E. $ 1.83

1990-8-9-11

Source: National Assessment of Educational Progress, 1990, Grade 8 Mathematics Assessment.

If the price of a can of beans is raised from 50 cents to 60 cents, what is the percent increase in the price?

A. 83.3%
B. 20%
C. 18.2%
D. 16.7%
E. 10%

1990-8-9-18

Source: National Assessment of Educational Progress, 1990, Grade 8 Mathematics Assessment.

The town of Mayville taxes property at a rate of $42 for each $1,000 of estimated value. What is the estimated value of a property on which the owner owes $5,250 in property tax?

A. $42,000
B. $47,250
C. $125,000
D. $220,500
E. $5,250,000

2005-12-12-13

Source: National Assessment of Educational Progress, 2005, Grade 12 Mathematics Assessment.

Luis mixed 6 ounces of cherry syrup with 53 ounces of water to make a cherry-flavored drink. Martin mixed 5 ounces of the same cherry syrup with 42 ounces of water. Who made the drink with the stronger cherry flavor?

Give mathematical evidence to justify your answer.

1996-12-12-8

Source: National Assessment of Educational Progress, 1996, Grade 12 Mathematics Assessment.

A certain machine produces 300 nails per minute. At this rate, how long will it take the machine to produce enough nails to fill 5 boxes of nails if each box will contain 250 nails?

A. 4 min
B. 4 min 6 sec
C. 4 min 10 sec
D. 4 min 50 sec
E. 5 min

1996-12-13-3

Source: National Assessment of Educational Progress, 1996, Grade 12 Mathematics Assessment.

Pencils sell individually for $0.07 each or in packs of 12 for $0.79 per pack. How much is saved when 24 pencils are purchased by the pack instead of individually?

A. $0.01
B. $0.05
C. $0.10
D. $0.72
E. $1.44

1990-12-9-4

Source: National Assessment of Educational Progress, 1990, Grade 12 Mathematics Assessment.

A savings account earns 1 percent interest per month on the sum of the initial amount deposited plus any accumulated interest. If a savings account is opened with an initial deposit of $1,000 and no other deposits or withdrawals are made, what will be the amount in this account at the end of 6 months?

A. $1,060.00
B. $1,061.52
C. $1,072.14
D. $1,600.00
E. $6,000.00

1990-12-9-15

Source: National Assessment of Educational Progress, 1990, Grade 12 Mathematics Assessment.

Which of the following is true about 200% of 30?

A. It is $\frac{1}{2}$ times 30.
B. It is 2 times 30.
C. It is 200 times 30.
D. It is 200 times greater than 30.

2008-17-21-12

Source: National Assessment of Educational Progress, 2008, Age 17 Mathematics Assessment.

If $\frac{A}{40} = 120$, what does $\frac{A}{80}$ equal?

A. 60
B. 120
C. 240
D. 9,600

2008-17-21-22

Source: National Assessment of Educational Progress, 2008, Age 17 Mathematics Assessment.

Carlos' basketball team won 75% of its games last season. If they played 80 games, how many games did they win?

A. 20
B. 60
C. 68
D. 75

2004-17-23-14

Source: National Assessment of Educational Progress, 2004, Age 17 Mathematics Assessment.

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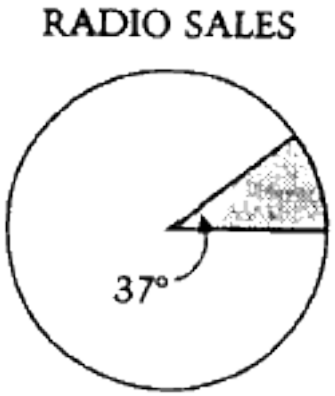
9 is 12% of what number?

A. .75
B. 1.08
C. 75
D. 108

2004-17-23-30

Source: National Assessment of Educational Progress, 2004, Age 17 Mathematics Assessment.



The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle?

A. 70
B. 275
C. 985
D. 25,880
E. 98,420

1992-8-12-4
1992-12-12-4

Source: National Assessment of Educational Progress, 1992, Grade 8 and Grade 12 Mathematics Assessments.