## Mathematics



From your punch-out tools, use the ruler to help you solve this problem.

Study the map below.

| - Craig | Fort Collins | Sterling • |
| :---: | :---: | :---: |
|  | Golden • ^ Denver |  |
| - Grand |  |  |
| - Montrose | - Pueblo |  |
| $\begin{array}{lllllllll}C & O & L & O & R & A & D & O\end{array}$ |  |  |
| -Cortez Trinidad • |  |  |
| Scale |  |  |
|  |  | $0{ }^{0} \quad 25 \quad 50 \mathrm{mi}$ |

What is the approximate straight-line distance between Cortez and Grand Junction?80 miles100 miles

- 130 miles170 miles

This item appeared at two adjacent grade levels.

## Grade 7

Standard 5.3a: Measurement
Subcontent Area: not assigned

## Grade 8

Standard 5.3a: Measurement
Subcontent Area: proportional thinking

20 Students are going on a field trip to the Colorado History Museum. They will ride on 3 buses. Each bus seats a maximum of 40 students. Study the table below, which shows the proportion of seats occupied on each bus.

| Bus | Seats Occupied |
| :---: | :---: |
| 1 | $60 \%$ |
| 2 | 0.85 |
| 3 | $\frac{7}{8}$ |

How many students are on each bus? In the space below, show your work and write your answers on the lines.

Bus 1 $\qquad$ Bus 2 $\qquad$ Bus 3 $\qquad$

## CSAP

## Mathematics

21 A tree frog is 10 feet ahead of a bullfrog. Every time the tree frog jumps 1 foot, the bullfrog jumps 3 feet. How many times will the bullfrog have to jump to catch up with the tree frog?

In the space below, explain or show how you found your answer and write your answer on the line. You may use charts, diagrams, or words in your explanation.


22 A bag contains 2 green cubes, 3 blue cubes, and 5 red cubes. Nick places his hand in the bag and picks a cube without looking. What is the probability that he picks either a blue or a red cube?$\frac{1}{5}$
$\bigcirc \quad \frac{1}{2}$
$\bigcirc \quad \frac{2}{3}$

- $\frac{4}{5}$

This item appeared at only one grade level.
Grade 8
Standard 3.6b: Data Analysis, Probability, and Statistics
Subcontent Area: not assigned

## 23

 From your punch-out tools, use the tangrams to help you solve this problem.

Study the square below.


Part A The area of triangle K is 9 square inches. Find the perimeter of square ABCD . In the space below, show your work and write your answer on the line.


Part B Triangles J and K are arranged into parallelogram LMNO shown below.


What is the ratio of the area of parallelogram LMNO to the area of square $A B C D$ ? In the space below, show your work and write your answer on the line.
$\square$

## CSAP

## Mathematics

24 Jerry is planning a rectangular garden with an area of 24 square feet.
Part A On the grid below, draw as many differently shaped rectangles as possible with areas of 24 square feet. Label the length and width of each rectangle you draw. Use only whole numbers for the length and width.



Page 44
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Part B Find the perimeter of each rectangle you drew for Part A on page 5. On the grid for Part A, record the perimeter inside each rectangle you drew.

Check your work on the grid.

- Did you label the length and width of each rectangle?
- Did you record the perimeter inside each rectangle?

Part C Jerry needs to purchase fencing materials for his rectangular garden. Around which rectangular garden would building a fence cost the least? In the space below, explain or show how you found your answers and write your answers on the lines. You may use charts, diagrams, or words in your explanation.
$\square$
record—write down

## CSAP <br> Mathematics

25 Study the information below.

- While exercising, a person should maintain a heart rate that ranges between $70 \%$ and $80 \%$ of his or her maximum heart rate.
- Maximum heart rate $=220$ - age, in years (of person exercising)
- Heart rate is measured in heartbeats per minute.

Part A Jennifer, who is 24 years old, is beginning an exercise program. Using the information, find the approximate range within which Jennifer should attempt to maintain her heart rate while exercising. In the space below, show your work and write your answer on the lines.
between $\qquad$ and $\qquad$ heartbeats per minute

Part B While exercising, Charlie should attempt to maintain a heart rate between 112 and 128 heartbeats per minute. Using the information, find Charlie's age. In the space below, show your work and write your answer on the line.
$\square$

## Mathematics

27 The pressure of salt water, in atmospheres, depends on the depth below the water's surface, in feet, as shown in the following equation.

$$
\text { Pressure }=1+\frac{\text { depth }}{33}
$$

Part A Complete the table below.

| Pressure <br> (in atmospheres) | Depth <br> (in feet) |
| :---: | :---: |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

Part B On the grid below, graph the data from the table.
Be sure to

- title the graph
- label each axis
- use appropriate scales


CSAP Mathematics Scoring Guide

## Rubric

## Exemplary Response

## Part A

| Pressure <br> (in atmospheres) | Depth <br> (in feet) |
| :---: | :---: |
| 1 | 0 |
| 2 | 33 |
| 3 | 66 |
| 4 | 99 |

## Part B



Score Points: Apply 2-point holistic rubric.
This item appeared at two adjacent grade levels.
Grade 8
Standard 2.2a: Patterns, Functions, and Algebra
Subcontent Area: linear pattern representation

## Grade 9

Standard 2.2a: Patterns, Functions, and Algebra
Subcontent Area: multiple representations of linear/nonlinear functions

