

MATHEMATICAL REASONING

The following six California mathematics academic content standards from the Mathematical Reasoning strand are assessed on the CAHSEE by eight test questions and are represented in this booklet by 24 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

NOTE: Each question in this strand also addresses a standard in one of the other five strands and is classified by that strand for purposes of reporting student scores. For example, the first question in the following set is classified as 7MR1.1 and also 7MG1.3.

GRADE 7 — MATHEMATICAL REASONING	
Standard Set 1.0	Students make decisions about how to approach problems:
1.1	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
1.2	Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
Standard Set 2.0	Students use strategies, skills, and concepts in finding solutions:
2.1	Use estimation to verify the reasonableness of calculated results.
2.3	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
2.4	Make and test conjectures by using both inductive and deductive reasoning.
Standard Set 3.0	Students determine a solution is complete and move beyond a particular problem by generalizing to other situations:
3.3	Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.

Mathematical Reasoning

154. Chris drove 100 kilometers from San Francisco to Santa Cruz in 2 hours and 30 minutes. What computation will give Chris' average speed, in kilometers per hour?

A Divide 100 by 2.5.
 B Divide 100 by 2.3.
 C Multiply 100 by 2.5.
 D Multiply 100 by 2.3.

M03164

A flower shop delivery van traveled these distances during one week: 104.4, 117.8, 92.3, 168.7, and 225.6 miles. How many gallons of gas were used by the delivery van during this week?

155. What other information is needed in order to solve this problem?

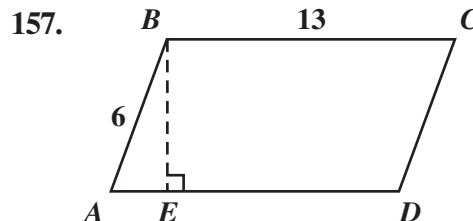
A The average speed traveled in miles per hour
 B The cost of gasoline per gallon
 C The average number of miles per gallon for the van
 D The number of different deliveries the van made

M00138

156. A shipping company has 25 offices that shipped 60,000 packages last week. The offices were open 6 days and used 80,000 kilowatt-hours of electricity. Which pieces of information given above are necessary to find the average number of packages shipped per day last week?

A the number of offices and the number of packages
 B the number of packages and the amount of electricity used
 C the number of packages and the number of days open during the week
 D the number of days open during the week and the amount of electricity used

M10538



What additional information is needed to find the area of parallelogram $ABCD$? ($A = bh$)

A Length of \overline{CD}
 B Length of \overline{AD}
 C Length of \overline{BE}
 D Perimeter of the parallelogram

M00204

158. If n is any odd number, which of the following is true about $n + 1$?

A It is an odd number.
 B It is an even number.
 C It is a prime number.
 D It is the same number as $n - 1$.

M00155

Mathematical Reasoning

159. The table below shows the flight times from San Francisco (S.F.) to New York (N.Y.).

Leave S.F. Time	Arrive N.Y. Time
8:30 A.M.	4:50 P.M.
12:00 noon	8:25 P.M.
3:30 P.M.	11:40 P.M.
9:45 P.M.	5:50 A.M.

Which flight takes the longest?

- A The flight leaving at 8:30 A.M.
- B The flight leaving at 12:00 noon
- C The flight leaving at 3:30 P.M.
- D The flight leaving at 9:45 P.M.

M00376

160. If a is a positive number and b is a negative number, which expression is always positive?

- A $a - b$
- B $a + b$
- C $a \times b$
- D $a \div b$

M10683

161. Use the addition problems below to answer the question.

$$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{7}{8}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} = \frac{15}{16}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} = \frac{31}{32}$$

Based on this pattern, what is the sum of

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots + \frac{1}{1024}?$$

- A $\frac{1001}{1024}$
- B $\frac{1010}{1024}$
- C $\frac{1023}{1024}$
- D $\frac{1025}{1024}$

M21115

Mathematical Reasoning

162. The table below shows the number of visitors to a natural history museum during a 4-day period.

Day	Number of Visitors
Friday	597
Saturday	1115
Sunday	1346
Monday	365

Which expression would give the BEST estimate of the total number of visitors during this period?

- A $500 + 1100 + 1300 + 300$
 B $600 + 1100 + 1300 + 300$
 C $600 + 1100 + 1300 + 400$
 D $600 + 1100 + 1400 + 400$

M11112

163. Which is the BEST estimate of $326 \cdot 279$?

- A 900
 B 9,000
 C 90,000
 D 900,000

M00277

164. Marcus plans to buy a Compact Disc (CD) that has a regular price of \$13.99. It is on sale for 10% off, but Marcus will have to pay 7% sales tax. Which is the MOST reasonable estimate of the total cost of the CD including tax?

- A \$12.50
 B \$13.50
 C \$14.50
 D \$15.50

M11869

165. The temperature on a mountain peak was 7 degrees Fahrenheit ($^{\circ}\text{F}$) at 6:00 p.m. By 8:00 p.m., the temperature had dropped to 0°F . If the temperature continued to drop at about the same rate, which is the BEST estimate of the temperature at 11:00 p.m.?

- A -20°F
 B -14°F
 C -10°F
 D -9°F

M20451

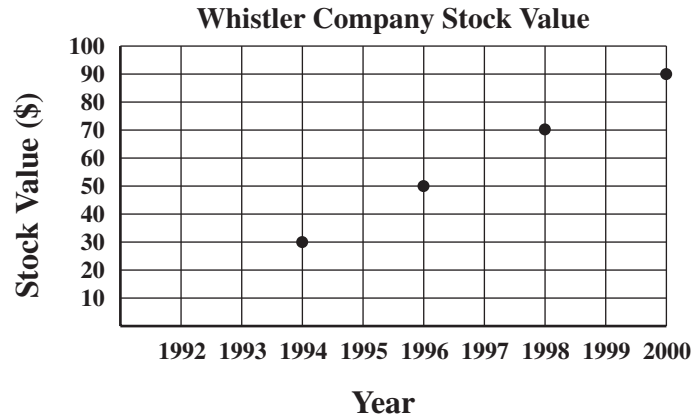
166. Sally paid \$1.89 for 5 plums. About how many plums would she get for \$10?

- A 4
 B 5
 C 10
 D 25

M25031

Mathematical Reasoning

167. The graph below shows the value of Whistler Company stock at the end of every other year from 1994 to 2000.

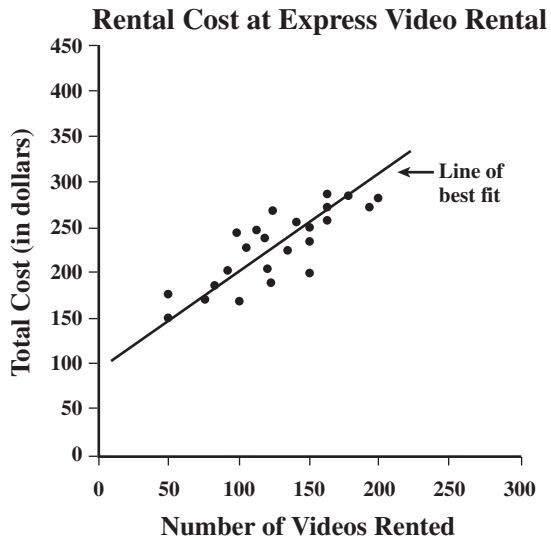


From this graph, which of the following was the most probable value of Whistler Company stock at the end of 1992?

- A -\$10
- B \$1
- C \$10
- D \$20

M02898

Mathematical Reasoning

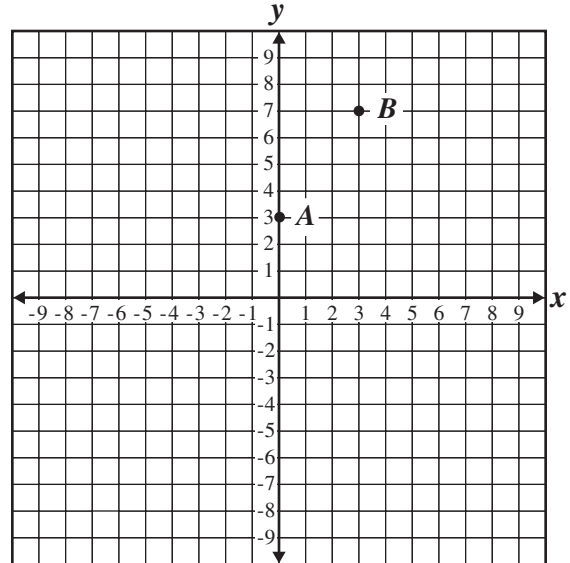


168. Using the line of best fit shown on the scatterplot above, which of the following best approximates the rental cost per video to rent 300 videos?

- A \$3.00
- B \$2.50
- C \$2.00
- D \$1.50

M02209

169. If a line passes through the points *A* and *B* shown below, approximately where does the line cross the *x*-axis?

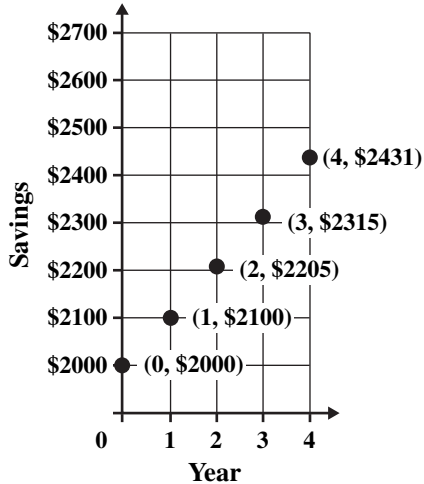


- A between -3 and -2
- B between 0 and -1
- C between 0 and 1
- D between 1 and 2

M10702

Mathematical Reasoning

170. The graph below shows the amount of money in one of Marie's savings accounts over several years.



If Marie's savings continue to grow at the same rate as shown in the graph, how much money will she have saved by year 5 in this account?

- A \$2531
- B \$2553
- C \$2862
- D \$3645

M32339

171. The table below shows values for x and corresponding values for y .

x	y
21	3
14	2
28	4
7	1

Which of the following represents the relationship between x and y ?

- A $y = \frac{1}{7}x$
- B $y = 7x$
- C $y = x - 6$
- D $y = x - 18$

M00377

Mathematical Reasoning

172. Michelle read a book review and predicted that the number of girls who will like the book will be more than twice the number of boys who will like the book. Which table shows data that support her prediction?

A

	Number Who Liked the Book
Boys	35
Girls	40

C

	Number Who Liked the Book
Boys	70
Girls	25

B

	Number Who Liked the Book
Boys	35
Girls	80

D

	Number Who Liked the Book
Boys	40
Girls	40

M11882

Mathematical Reasoning

173. The winning number in a contest was less than 50. It was a multiple of 3, 5, and 6. What was the number?

A 14
 B 15
 C 30
 D It cannot be determined.

M00393

174. Lia used the following process to find the slope of the line described by the equation $3y + 5x = 12$.

Step 1: Subtract $5x$ from each side. $3y = -5x + 12$

Step 2: Divide each side by 3. $y = -\frac{5}{3}x + 4$

Step 3: The slope of $y = mx + b$ is m . Slope is $-\frac{5}{3}$

According to Lia's method, which expression gives the slope of the line described by the equation $ax + by = c$?

A $-\frac{a}{b}$
 B $\frac{a}{b}$
 C $-\frac{b}{a}$
 D $\frac{b}{a}$

M11892

Len runs a mile in 8 minutes. At this rate how long will it take him to run a 26-mile marathon?

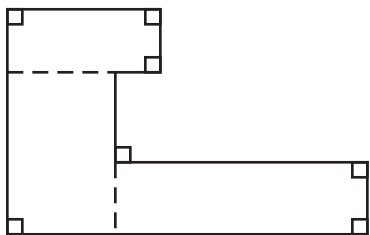
175. Which of the following problems can be solved using the same arithmetic operations that are used to solve the problem above?

A Len runs 26 miles in 220 minutes. How long does it take him to run each mile?
 B A librarian has 356 books to place on 18 shelves. Each shelf will contain the same number of books. How many books can the librarian place on each shelf?
 C A cracker box weighs 200 grams. What is the weight of 100 boxes?
 D Each basket of strawberries weighs 60 grams. How many baskets can be filled from 500 grams of strawberries?

M00137

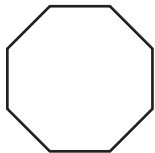
Mathematical Reasoning

176. Mia found the area of this shape by dividing it into rectangles as shown.

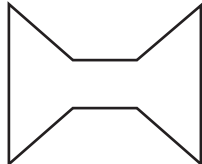


Mia could use the same method to find the area for which of these shapes?

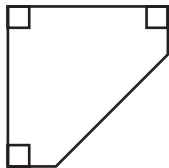
A



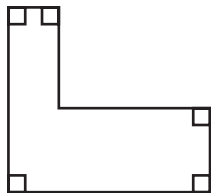
C



B



D



M25128

177. Read the problem and solution in the box below.

Problem: Find the value of $|6| + |-6|$.

Solution: $|6| + |-6| = 6 + 6 = 12$

Use the same method to solve the following problem.

If x is a positive real number, what is the value of $|x| + |-x|$?

- A $-2x$
- B $-x$
- C 0
- D $2x$

M30209

Mathematical Reasoning

Question Number	Correct Answer	Standard 1	Standard 2	School Year of Exam
154	A	7MR1.1	7MG1.3	2001–2002
155	C	7MR1.1	7NS1.2	2000–2001
156	C	7MR1.1	7MG1.3	2005–2006
157	C	7MR1.1	7MG2.1	2006–2007
158	B	7MR1.2	7AF1.1	2001–2002
159	B	7MR1.2	7MG1.1	2000–2001
160	A	7MR1.2	7AF1.1	2003–2004
161	C	7MR1.2	7NS1.2	2005–2006
162	C	7MR2.1	7NS1.2	2002–2003
163	C	7MR2.1	7NS1.2	2000–2001
164	B	7MR2.1	7NS1.7	2003–2004
165	C	7MR2.1	7AF4.2	2004–2005
166	D	7MR2.1	7AF4.2	2005–2006
167	C	7MR2.3	7AF1.5	2000–2001
168	D	7MR2.3	7PS1.2	2001–2002
169	A	7MR2.3	7AF3.3	2004–2005
170	B	7MR2.3	7AF3.4	2007–2008
171	A	7MR2.4	7AF1.1	2002–2003
172	B	7MR2.4	6PS2.5	2006–2007
173	C	7MR2.4	7NS1.2	2000–2001
174	A	7MR3.3	7AF4.1	2002–2003
175	C	7MR3.3	7NS1.2	2001–2002
176	D	7MR3.3	7MG2.2	2004–2005
177	D	7MR3.3	7NS2.5	2007–2008