Dear Sir

I have to acknowledge the receipt of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensible as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.
Integrated Algebra Regents Exam Questions by Performance Indicator: Topic
Answer Section

1 ANS: 1
\[-3(-4)^2(2) + 4(-4) = -96 - 16 = -112\]

PTS: 2 REF: 081113ia STA: A.N.6 TOP: Evaluating Expressions

2 ANS: 2 PTS: 2 REF: 011110ia STA: A.N.6
TOP: Evaluating Expressions

3 ANS: 3
\[|-5(5) + 12| = |-13| = 13\]

PTS: 2 REF: 080923ia STA: A.N.6 TOP: Evaluating Expressions

4 ANS: 1
\[-|a - b| = -|7 - (-3)| = -|-10| = -10\]

PTS: 2 REF: 011010ia STA: A.N.6 TOP: Evaluating Expressions

5 ANS: 3 PTS: 2 REF: fall0705ia STA: A.N.1
TOP: Identifying Properties

6 ANS: 2 PTS: 2 REF: 080802ia STA: A.N.1
TOP: Identifying Properties

7 ANS: (1) Distributive; (2) Commutative

PTS: 2 REF: 061132ia STA: A.N.1 TOP: Identifying Properties

8 ANS: 3 PTS: 2 REF: 060926ia STA: A.N.1
TOP: Properties of Reals

9 ANS: 4 PTS: 2 REF: 011114ia STA: A.N.1
TOP: Properties of Reals

10 ANS: \(-6a + 42\). distributive

PTS: 2 REF: 061032ia STA: A.N.1 TOP: Properties of Reals

11 ANS: 4 PTS: 2 REF: fall0704ia STA: A.A.29
TOP: Set Theory

12 ANS: 1 PTS: 2 REF: 061021ia STA: A.A.29
TOP: Set Theory

13 ANS: 2 PTS: 2 REF: 011119ia STA: A.A.29
TOP: Set Theory

14 ANS: 3 PTS: 2 REF: 081117ia STA: A.A.29
TOP: Set Theory

15 ANS: 3 PTS: 2 REF: 010917ia STA: A.A.29
TOP: Set Theory

16 ANS: 4 PTS: 2 REF: 060930ia STA: A.A.29
TOP: Set Theory
22 ANS: 4
\[ A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \]

PTS: 2  REF: 080912ia  STA: A.A.30  TOP: Set Theory

23 ANS: 2
The set of integers greater than -2 and less than 6 is \{-1, 0, 1, 2, 3, 4, 5\}. The subset of this set that is the positive factors of 5 is \{1, 5\}. The complement of this subset is \{-1, 0, 2, 3, 4\}.

PTS: 2  REF: 060818ia  STA: A.A.30  TOP: Set Theory

24 ANS: \{1, 2, 4, 5, 9, 10, 12\}

PTS: 2  REF: 080833ia  STA: A.A.30  TOP: Set Theory

25 ANS: 2

PTS: 2  REF: 081003ia  STA: A.A.31  TOP: Set Theory

26 ANS: 3

PTS: 2  REF: fall0710ia  STA: A.A.31  TOP: Set Theory

27 ANS: 1

PTS: 2  REF: 011101ia  STA: A.A.31  TOP: Set Theory

28 ANS: 1

PTS: 2  REF: 011004ia  STA: A.A.31  TOP: Set Theory

29 ANS: \[ 0 \leq t \leq 40 \]

PTS: 2  REF: 060833ia  STA: A.A.31  TOP: Set Theory

30 ANS: 4

PTS: 2  REF: 061123ia  STA: A.A.31  TOP: Set Theory
31 ANS:

![Frequency Histogram](image)

**TOP:** Frequency Histograms, Bar Graphs and Tables  
**KEY:** frequency histograms

32 ANS:

![Bar Graph](image)

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>51–60</td>
<td>II</td>
<td>2</td>
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<tr>
<td>61–70</td>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>71–80</td>
<td>III</td>
<td>4</td>
</tr>
<tr>
<td>81–90</td>
<td>IIII</td>
<td>6</td>
</tr>
<tr>
<td>91–100</td>
<td>III</td>
<td>4</td>
</tr>
</tbody>
</table>

**TOP:** Frequency Histograms, Bar Graphs and Tables  
**KEY:** frequency histograms
33 ANS:

![Frequency Histogram](image)

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>40-44</td>
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<td>9</td>
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<tr>
<td>45-49</td>
<td>III</td>
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<td>50-54</td>
<td>III</td>
<td>4</td>
</tr>
<tr>
<td>55-59</td>
<td>II</td>
<td>7</td>
</tr>
<tr>
<td>60-64</td>
<td>III</td>
<td>3</td>
</tr>
<tr>
<td>65-69</td>
<td>II</td>
<td>2</td>
</tr>
</tbody>
</table>

PTS: 4 REF: 060938ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables KEY: frequency histograms

34 ANS:

![Bar Chart](image)

<table>
<thead>
<tr>
<th>Number of Days Outside</th>
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<tbody>
<tr>
<td>Interval</td>
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<tr>
<td>2-3</td>
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<tr>
<td>4-5</td>
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</table>

<table>
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<tbody>
<tr>
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</tr>
<tr>
<td>0-5</td>
</tr>
<tr>
<td>0-7</td>
</tr>
</tbody>
</table>

PTS: 4 REF: 080838ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables KEY: cumulative frequency histograms

35 ANS: 3

25 − 18 = 7

PTS: 2 REF: 060822ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables

36 ANS: 3

30, 20, 71-80, 81-90 and 91-100

PTS: 4 REF: 061038ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables

37 ANS: 2

The median score, 10, is the vertical line in the center of the box.

PTS: 2 REF: fall0709ia STA: A.S.5 TOP: Box-and-Whisker Plots
38 ANS:

![Box-and-Whisker Plot Image]

PTS: 4  REF: 080939ia  STA: A.S.5  TOP: Box-and-Whisker Plots

39 ANS:

minimum is 120, 1st quartile is 145, median is 292, 3rd quartile is 407, and maximum is 452

PTS: 3  REF: 081034ia  STA: A.S.5  TOP: Box-and-Whisker Plots

40 ANS: 3

The value of the third quartile is the last vertical line of the box.

PTS: 2  REF: 080818ia  STA: A.S.6  TOP: Box-and-Whisker Plots

41 ANS: 3

The value of the upper quartile is the last vertical line of the box.

PTS: 2  REF: 060915ia  STA: A.S.6  TOP: Box-and-Whisker Plots

42 ANS: 3

\[75 - 15 = 60\]

PTS: 2  REF: 011113ia  STA: A.S.6  TOP: Box-and-Whisker Plots

43 ANS: 1

PTS: 2  REF: 011001ia  STA: A.S.6  TOP: Box-and-Whisker Plots

44 ANS: 2

PTS: 2  REF: 081106ia  STA: A.S.6  TOP: Box-and-Whisker Plots

45 ANS: 4

PTS: 2  REF: 010929ia  STA: A.S.6  TOP: Box-and-Whisker Plots

46 ANS: 3

PTS: 2  REF: 061017ia  STA: A.S.11  TOP: Quartiles and Percentiles

47 ANS: 3

PTS: 2  REF: 081001ia  STA: A.S.7  TOP: Scatter Plots

48 ANS: 2

PTS: 2  REF: fall0701ia  STA: A.S.7  TOP: Scatter Plots

49 ANS: 2

PTS: 2  REF: 061115ia  STA: A.S.7  TOP: Scatter Plots

50 ANS: 4

![Scatter Plot Image]

PTS: 2  REF: 080822ia  STA: A.S.8  TOP: Scatter Plots
They will not reach their goal in 18 months.

mean = 6, median = 6 and mode = 7

mean = $81 \frac{7}{1}$, median = 81 and mode = 76
The mean is 80.6, the median is 84.5 and the mode is 87.

PTS: 2 REF: 010907ia STA: A.S.4 TOP: Central Tendency

225000, 175000, the median better represents the value since it is closer to more values than the mean.

PTS: 4 REF: fall0737ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables

315,000, 180,000, the median better represents value since it is closer to more prices than the mean.

PTS: 4 REF: 060839ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables

81.3, 80, both increase

PTS: 3 REF: 011035ia STA: A.S.16 TOP: Central Tendency

12, 7. Both the median and the mode will increase.

PTS: 3 REF: 061134ia STA: A.S.16 TOP: Central Tendency

\[
\frac{2 + 3 + 0 + 1 + 3 + 2 + 4 + 0 + 2 + 3}{10} = \frac{20}{10} = 2 + \frac{2}{10} = 2 + 0.5
\]

\[x = 25\]

PTS: 2 REF: 081020ia STA: A.S.16 TOP: Average Known with Missing Data

The other situations are quantitative.

PTS: 2 REF: 060819ia STA: A.S.1 TOP: Analysis of Data

The other situations are quantitative.

PTS: 2 REF: 060905ia STA: A.S.1 TOP: Analysis of Data

The other situations are quantitative.

PTS: 2 REF: 081122ia STA: A.S.1 TOP: Analysis of Data

TOP: Analysis of Data

The two values are shoe size and height.

PTS: 2 REF: fall0714ia STA: A.S.2 TOP: Analysis of Data
71 ANS: 3
Frequency is not a variable.

PTS: 2     REF: 011014ia STA: A.S.2 TOP: Analysis of Data
72 ANS: 3     PTS: 2     REF: 061011ia STA: A.S.2 TOP: Analysis of Data
73 ANS: 1
To determine student interest, survey the widest range of students.

PTS: 2     REF: 060803ia STA: A.S.3 TOP: Analysis of Data
74 ANS: 1
Asking school district employees about a school board candidate produces the most bias.

PTS: 2     REF: 061107ia STA: A.S.3 TOP: Analysis of Data
75 ANS: 1
Everyone eats, can shop in malls and wear clothes. People who work in a sporting goods store probably watch more sports television than most.

PTS: 2     REF: 010923ia STA: A.S.3 TOP: Analysis of Data
76 ANS: 4
Surveying persons leaving a football game about a sports budget contains the most bias.

PTS: 2     REF: 080910ia STA: A.S.3 TOP: Analysis of Data
77 ANS: 4     PTS: 2     REF: 061022ia STA: A.S.3 TOP: Analysis of Data
78 ANS: 3
The number of correct answers on a test causes the test score.

PTS: 2     REF: 080908ia STA: A.S.13 TOP: Analysis of Data
79 ANS: 1
A rooster crows before sunrise, not because of the sun.

PTS: 2     REF: fall0707ia STA: A.S.14 TOP: Analysis of Data
80 ANS: 3
The age of a child does not cause the number of siblings he has, or vice versa.

PTS: 2     REF: 011030ia STA: A.S.14 TOP: Analysis of Data
81 ANS: 2     PTS: 2     REF: 081104ia STA: A.S.14 TOP: Analysis of Data
82 ANS: 3     PTS: 2     REF: 081017a STA: A.S.14 TOP: Analysis of Data
83 ANS: 2     PTS: 2     REF: 061122ia STA: A.S.14 TOP: Analysis of Data
84 ANS: 1     PTS: 2     REF: fall0723ia STA: A.M.3 TOP: Error KEY: area
85 ANS: 2
\[
\frac{55.42 - 50.27}{55.42} \approx 0.093
\]

PTS: 2  REF: 081023ia  STA: A.M.3  TOP: Error
KEY: area

86 ANS: 2
\[
\frac{13.5 - 12.8}{13.5} \approx 0.093
\]

PTS: 2  REF: 081123ia  STA: A.M.3  TOP: Error
KEY: area

87 ANS: 2
\[
\frac{149.6 - 174.2}{149.6} \approx 0.1644
\]

PTS: 2  REF: 080926ia  STA: A.M.3  TOP: Error
KEY: area

88 ANS: 3
\[
\frac{(12.3 \times 11.9) - (12.2 \times 11.8)}{12.3 \times 11.9} \approx 0.0165
\]

PTS: 2  REF: 061120ia  STA: A.M.3  TOP: Error
KEY: area

89 ANS:
\[
618.45, 613.44, 0.008. \quad 21.7 \times 28.5 = 618.45. \quad 21.6 \times 28.4 = 613.44. \quad \left| \frac{618.45 - 613.44}{613.44} \right| \approx 0.008. \quad \text{An error of less than 1% would seem to be insignificant.}
\]

PTS: 4  REF: 060838ia  STA: A.M.3  TOP: Error
KEY: area

90 ANS:
\[
1,512, 1,551.25, 0.025. \quad 36 \times 42 = 1512. \quad 36.5 \times 42.5 = 1551.25. \quad RE = \left| \frac{1512 - 1551.25}{1551.25} \right| \approx 0.025.
\]

PTS: 3  REF: 010934ia  STA: A.M.3  TOP: Error
KEY: area

91 ANS: 1
\[
\frac{289 - 282}{289} \approx 0.024
\]

PTS: 2  REF: 080828ia  STA: A.M.3  TOP: Error
KEY: volume and surface area
The volume of the cube using Ezra’s measurements is \(8\) \((2^3)\). The actual volume is \(9.261\) \((2.13)\). The relative error is \(\frac{9.261 - 8}{9.261} \approx 0.14\).

PTS: 2  REF: 060928ia  STA: A.M.3  TOP: Error
KEY: volume and surface area

\[
0.102. \frac{(5.3 \times 8.2 \times 4.1) - (5 \times 8 \times 4)}{5.3 \times 8.2 \times 4.1} = \frac{178.16 - 160}{178.16} = 0.102
\]

PTS: 3  REF: 011036ia  STA: A.M.3  TOP: Error
KEY: volume and surface area

\[
\frac{600 - 592}{592} \approx 0.014
\]

PTS: 2  REF: 061031ia  STA: A.M.3  TOP: Error
KEY: volume and surface area

\[
0.029. \frac{[2\pi(5.1)^2 + 2\pi(5.1)(15.1)] - [2\pi(5)^2 + 2\pi(5)(15)]}{2\pi(5.1)^2 + 2\pi(5.1)(15.1)} \approx \frac{647.294 - 628.319}{647.294} \approx 0.029
\]

PTS: 4  REF: 011137ia  STA: A.M.3  TOP: Error
KEY: volume and surface area

\[
\]

PTS: 4  REF: 061138ia  STA: A.S.19  TOP: Sample Space

\[
(H,F,M), (H,F,J), (H,F,S), (H,A,M), (H,A,J), (H,A,S), (C,F,M), (C,F,J), (C,F,S), (C,A,M), (C,A,J), (C,A,S), (T,F,M), (T,F,J), (T,F,S), (T,A,M), (T,A,J), (T,A,S). \ There \ are \ 18 \ different \ kids’ \ meals, \ 12 \ do \ not \ include \ juice \ and \ 6 \ include \ chicken \ nuggets.
\]

PTS: 4  REF: 010939ia  STA: A.S.19  TOP: Sample Space

\[
(S,S), (S,K), (S,D), (K,S), (K,K), (K,D), (D,S), (D,K), (D,D), \frac{4}{9}
\]

PTS: 3  REF: fall0736ia  STA: A.S.19  TOP: Sample Space

\[
\frac{3}{8}, (H,H,H), (H,H,T), (H,T,H), (H,T,T), (T,H,H), (T,H,T), (T,T,H), (T,T,T)
\]

PTS: 2  REF: 080933ia  STA: A.S.19  TOP: Sample Space
ID: A

100 ANS: 2  PTS: 2  REF: 060908ia  STA: A.S.21
TOP: Empirical Probability

101 ANS: 3
\[
\frac{15}{15 + 13 + 12} = \frac{15}{40} = \frac{3}{8}
\]
PTS: 2  REF: 061006ia  STA: A.S.21  TOP: Experimental Probability

102 ANS: 3
\[
\frac{3 + 2 + 4 + 3}{20} = \frac{12}{20}
\]
PTS: 2  REF: 011129ia  STA: A.S.21  TOP: Experimental Probability

103 ANS: 2  PTS: 2  REF: 011002ia  STA: A.S.20
TOP: Theoretical Probability

104 ANS: 4
\[P(O) = \frac{3}{6}, P(E) = \frac{3}{6}, P(< 6) = \frac{5}{6}, P(> 4) = \frac{2}{6}\]
PTS: 2  REF: 010903ia  STA: A.S.22  TOP: Theoretical Probability

105 ANS: 3
\[P(O) = \frac{5}{10}, P(P) = \frac{4}{10}, P(\leq 5) = \frac{6}{10}, P(3) = \frac{4}{10}\]
PTS: 2  REF: 081125ia  STA: A.S.22  TOP: Theoretical Probability

106 ANS:
\[\text{orchestra: } \frac{3}{26} > \frac{4}{36}\]
PTS: 2  REF: 011033ia  STA: A.S.22  TOP: Theoretical Probability

107 ANS:
Hat A, add 1 not green to Hat A, add 11 green to Hat B, and add none to Hat C.

PTS: 4  REF: 081038ia  STA: A.S.22  TOP: Theoretical Probability

108 ANS: 3  PTS: 2  REF: fall0702ia  STA: A.S.23
TOP: Theoretical Probability  KEY: mutually exclusive events

109 ANS: 2
The events are not mutually exclusive: \[P(\text{prime}) = \frac{3}{6}, P(\text{even}) = \frac{3}{6}, P(\text{prime AND even}) = \frac{1}{6}\]
\[P(\text{prime OR even}) = \frac{3}{6} + \frac{3}{6} - \frac{1}{6} = \frac{5}{6}\]
PTS: 2  REF: 080830ia  STA: A.S.23  TOP: Theoretical Probability
KEY: not mutually exclusive events
110 ANS: 3
\[ P(S) \cdot P(M) = P(S \text{ and } M) \]
\[ \frac{3}{5} \cdot P(M) = \frac{3}{10} \]
\[ P(M) = \frac{1}{2} \]

PTS: 2   REF: 081024ia   STA: A.S.23   TOP: Theoretical Probability
KEY: independent events

111 ANS:
\[ \frac{4}{12} \times \frac{2}{11} \times \frac{1}{10} = \frac{8}{1320} \]
\[ \frac{6}{12} \times \frac{5}{11} \times \frac{4}{10} + \frac{4}{12} \times \frac{3}{11} \times \frac{2}{10} = \frac{120}{1320} + \frac{24}{1320} = \frac{144}{1320} \]

PTS: 4   REF: 081137ia   STA: A.S.23   TOP: Theoretical Probability
KEY: dependent events

112 ANS: 3   PTS: 2   REF: 080907ia   STA: A.S.20
TOP: Geometric Probability

113 ANS:
\[ \frac{1375}{1600} - \frac{40^2 - 15^2}{40^2} = \frac{1375}{1600} \]

PTS: 2   REF: 011132ia   STA: A.S.20   TOP: Geometric Probability

114 ANS: 4
\[ P(G \text{ or } W) = \frac{4}{8}, \ P(G \text{ or } B) = \frac{3}{8}, \ P(Y \text{ or } B) = \frac{4}{8}, \ P(Y \text{ or } G) = \frac{5}{8} \]

PTS: 2   REF: 060802ia   STA: A.S.22   TOP: Geometric Probability

115 ANS: 3
\[ P(\text{odd}) = \frac{3}{6}, \ P(\text{prime}) = \frac{3}{6}, \ P(\text{perfect square}) = \frac{2}{6}, \ P(\text{even}) = \frac{3}{6} \]

PTS: 2   REF: 061104ia   STA: A.S.22   TOP: Geometric Probability

116 ANS:
\[ \frac{3}{8} \cdot P(s_1 < 4) \times P(s_2 = \text{back}) = \frac{3}{8} \times \frac{1}{2} = \frac{3}{8} \]

PTS: 2   REF: 080832ia   STA: A.S.23   TOP: Geometric Probability

117 ANS: 1
\[ \frac{1}{8} \times \frac{1}{8} = \frac{1}{64} \]

PTS: 2   REF: 010928ia   STA: A.S.23   TOP: Geometric Probability
118 ANS: \( \frac{1}{8} \). After the English and social studies books are taken, 8 books are left and 1 is an English book.

PTS: 2 REF: 060933ia STA: A.S.18 TOP: Conditional Probability

119 ANS: 4

\[ 5 \times 2 \times 3 = 30 \]

PTS: 2 REF: 061002ia STA: A.N.7 TOP: Multiplication Counting Principle

120 ANS: 3

\[ (3 - 1) \times 2 \times 3 = 12 \]

PTS: 2 REF: 080905ia STA: A.N.7 TOP: Conditional Probability

121 ANS: 3

PTS: 2 REF: 060808ia STA: A.N.8 TOP: Permutations

122 ANS: 1

\[ _4P_4 = 4 \times 3 \times 2 \times 1 = 24 \]

PTS: 2 REF: 080816ia STA: A.N.8 TOP: Permutations

123 ANS: 4

\[ _5P_5 = 5 \times 4 \times 3 \times 2 \times 1 = 120 \]

PTS: 2 REF: 061109ia STA: A.N.8 TOP: Permutations

124 ANS: 4

\[ _4P_3 = 336 \]

PTS: 2 REF: 061026ia STA: A.N.8 TOP: Permutations

125 ANS: 3

\[ _3P_4 = 360 \]

PTS: 2 REF: 081028ia STA: A.N.8 TOP: Permutations

126 ANS: 60

\[ _3P_3 = 60 \]

PTS: 2 REF: 060931ia STA: A.N.8 TOP: Permutations

127 ANS:

\[ 15,600,000, 4,368,000. \ 10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000. \ 10 \times 9 \times 8 \times 26 \times 25 \times 24 = 11,232,000. \ 15,600,000 - 11,232,000 = 4,368,000. \]

PTS: 4 REF: 011037ia STA: A.N.8 TOP: Permutations

128 ANS: 1

PTS: 2 REF: 081110ia STA: A.A.1 TOP: Expressions

129 ANS: 3

PTS: 2 REF: 011104ia STA: A.A.1 TOP: Expressions

130 ANS: 2

PTS: 2 REF: 060904ia STA: A.A.1 TOP: Expressions
131 ANS: 4
25(x – 3) = 25x – 75

PTS: 2 REF: 060823ia STA: A.A.1 TOP: Expressions

132 ANS: 4
5(x + 4) = 5x + 20

PTS: 2 REF: 081013ia STA: A.A.1 TOP: Expressions

133 ANS: 4
A = lw = (3w – 7)(w) = 3w^2 – 7w

PTS: 2 REF: 010924ia STA: A.A.1 TOP: Expressions

134 ANS: 4
PTS: 2 REF: fall0729ia STA: A.A.2 TOP: Expressions

135 ANS: 3
PTS: 2 REF: 061119ia STA: A.A.2 TOP: Expressions

136 ANS: 4
PTS: 2 REF: 061016ia STA: A.A.2 TOP: Expressions

137 ANS: 2
PTS: 2 REF: 011027ia STA: A.A.3 TOP: Expressions

138 ANS: 1
PTS: 2 REF: 081030ia STA: A.A.3 TOP: Expressions

139 ANS: 2
PTS: 2 REF: 061121ia STA: A.A.3 TOP: Expressions

140 ANS:
Not all of the homework problems are equations. The first problem is an expression.

PTS: 2 REF: 080931ia STA: A.A.3 TOP: Expressions

141 ANS: 4

\[5p - 1 = 2p + 20\]

\[3p = 21\]

\[p = 7\]

PTS: 2 REF: 080801ia STA: A.A.22 TOP: Solving Equations
142 ANS: 1
2(x - 4) = 4(2x + 1)
2x - 8 = 8x + 4
-12 = 6x
-2 = x

PTS: 2  REF: 011106ia  STA: A.A.22  TOP: Solving Equations

143 ANS: 2
Debbie failed to distribute the 3 properly.

PTS: 2  REF: 011009ia  STA: A.A.22  TOP: Solving Equations

144 ANS:

4. \[3 + 2g = 5g - 9\]
   
   12 = 3g
   
   \[g = 4\]

PTS: 2  REF: fall0732ia  STA: A.A.22  TOP: Solving Equations

145 ANS: 1

\[\frac{(2x \times 6) + (3 \times x)}{3 \times 6} = 5\]

\[\frac{12x + 3x}{18} = 5\]

15x = 90

x = 6

PTS: 2  REF: 060907ia  STA: A.A.25  TOP: Solving Equations with Fractional Expressions
146 ANS: 1
\[
\frac{2x}{3} + \frac{1}{2} = \frac{5}{6}
\]
\[
\frac{2x}{3} = \frac{1}{3}
\]
\[
x = \frac{1}{2}
\]

PTS: 2  REF: 011112ia  STA: A.A.25
TOP: Solving Equations with Fractional Expressions

147 ANS: 2
\[
\frac{3}{5} (x + 2) = x - 4
\]
\[
3(x + 2) = 5(x - 4)
\]
\[
3x + 6 = 5x - 20
\]
\[
26 = 2x
\]
\[
x = 13
\]

PTS: 2  REF: 080909ia  STA: A.A.25
TOP: Solving Equations with Fractional Expressions

148 ANS: 3
\[
\frac{x}{3} + \frac{x + 1}{2} = x
\]
\[
\frac{2x + 3(x + 1)}{6} = x
\]
\[
5x + 3 = 6x
\]
\[
3 = x
\]

PTS: 2  REF: 061019ia  STA: A.A.25
TOP: Solving Equations with Fractional Expressions
\[
\frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15}
\]
\[
\frac{(2x \times 3) + (5 \times 1)}{5 \times 3} = \frac{7x - 2}{15}
\]
\[
\frac{6x + 5}{15} = \frac{7x - 2}{15}
\]
\[
6x + 5 = 7x - 2
\]
\[
x = 7
\]

PTS: 2
REF: 080820ia
STA: A.A.25
TOP: Solving Equations with Fractional Expressions

\[
\frac{m}{5} + \frac{3(m - 1)}{2} = 2(m - 3)
\]
\[
\frac{2m}{10} + \frac{15(m - 1)}{10} = 2m - 6
\]
\[
\frac{17m - 15}{10} = 2m - 6
\]
\[
17m - 15 = 20m - 60
\]
\[
45 = 3m
\]
\[
15 = m
\]

PTS: 4
REF: 081139ia
STA: A.A.25
TOP: Solving Equations with Fractional Expressions

\[
w(w + 5) = 36
\]
\[
w^2 + 5w - 36 = 0
\]

PTS: 2
REF: fall0726ia
STA: A.A.5
TOP: Modeling Equations
155 ANS: 4
Let \( x = \) youngest brother and \( x + 4 = \) oldest brother. \( 3x - (x + 4) = 48. \)
\[
2x - 4 = 48
\]
\[
x = 26
\]
PTS: 2 REF: 080928ia STA: A.A.6 TOP: Modeling Equations

156 ANS: 4 PTS: 2 REF: 011016ia STA: A.A.23
TOP: Transforming Formulas

157 ANS: 3
\[
3ax + b = c
\]
\[
3ax = c - b
\]
\[
x = \frac{c - b}{3a}
\]
PTS: 2 REF: 080808ia STA: A.A.23 TOP: Transforming Formulas

158 ANS: 2
\[
P = 2l + 2w
\]
\[
P - 2l = 2w
\]
\[
\frac{P - 2l}{2} = w
\]
PTS: 2 REF: 010911ia STA: A.A.23 TOP: Transforming Formulas

159 ANS: 2 PTS: 2 REF: 061023ia STA: A.A.23
TOP: Transforming Formulas

160 ANS: 4
\[
\frac{ey}{n} + k = t
\]
\[
\frac{ey}{n} = t - k
\]
\[
y = \frac{n(t - k)}{e}
\]
PTS: 2 REF: 011125ia STA: A.A.23 TOP: Transforming Formulas

161 ANS: 3
\[
a + ar = b + r
\]
\[
a(1 + r) = b + r
\]
\[
a = \frac{b + r}{1 + r}
\]
PTS: 2 REF: 060913ia STA: A.A.23 TOP: Transforming Formulas
ANS:

\[ bc + ac = ab \]

\[ c(b + a) = ab \]

\[ c = \frac{ab}{b + a} \]
Integrated Algebra Regents Exam Questions by Performance Indicator: Topic
Answer Section

163 ANS: 3
0.75 hours = 45 minutes. \( \frac{120}{1} = \frac{x}{45} \)
\[ x = 5400 \]

PTS: 2 REF: 080814ia STA: A.M.1 TOP: Using Rate

164 ANS:
\[ \frac{2,160}{25} \cdot \frac{1200}{25} = \frac{x}{45} \]
\[ 25x = 54,000 \]
\[ x = 2,160 \]

PTS: 2 REF: 081032ia STA: A.M.1 TOP: Using Rate

165 ANS:
Ann’s. \( \frac{225}{15} = 15 \text{ mpg} \) is greater than \( \frac{290}{23.2} = 12.5 \text{ mpg} \)

PTS: 2 REF: 060831ia STA: A.M.1 TOP: Using Rate

166 ANS: 4
\[ \frac{5}{45} = \frac{8}{x} \]
\[ 5x = 360 \]
\[ x = 72 \]

PTS: 2 REF: 060901ia STA: A.M.1 TOP: Speed

167 ANS: 4
\[ s = \frac{d}{t} = \frac{150 \text{ m}}{1.5 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 6,000 \frac{\text{m}}{\text{hr}} \]

PTS: 2 REF: 061025ia STA: A.M.1 TOP: Speed

168 ANS: 4
\[ \frac{\text{distance}}{\text{time}} = \frac{24}{6} = 4 \]

PTS: 2 REF: 061025ia STA: A.M.1 TOP: Speed

169 ANS: 1
\[ \frac{12.8 + 17.2}{3 + 5} = 3.75 \]

PTS: 2 REF: 061117ia STA: A.M.1 TOP: Speed
170 ANS:
\[
\frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25
\]

PTS: 2  REF: 080831ia  STA: A.M.1  TOP: Speed

171 ANS:
Greg’s rate of 5.5 is faster than Dave’s rate of 5.3. \( \frac{\text{distance}}{\text{time}} = \frac{11}{2} = 5.5. \quad \frac{16}{3} = 5.3 \)

PTS: 3  REF: 080936ia  STA: A.M.1  TOP: Speed

172 ANS:
50, 1.5, 10. \( \frac{\text{distance}}{\text{time}} = \frac{60}{1.2} = 50. \quad \frac{\text{distance}}{\text{time}} = \frac{60}{40} = 1.5. \quad \text{speed} \times \text{time} = 55 \times 2 = 110. \quad 120 - 110 = 10 \)

PTS: 3  REF: fall0734ia  STA: A.M.1  TOP: Speed

173 ANS: 3
\[
F = \frac{9}{5}C + 32 = \frac{9}{5} (15) + 32 = 59
\]

PTS: 2  REF: 010901ia  STA: A.M.2  TOP: Conversions

174 ANS: 4
\[
\frac{344 \text{ m}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 1,238,400 \frac{\text{m}}{\text{hr}}
\]

PTS: 2  REF: 060911ia  STA: A.M.2  TOP: Conversions

175 ANS:
16. 12 feet equals 4 yards. 4 \( \times \) 4 = 16.

PTS: 2  REF: 011031ia  STA: A.M.2  TOP: Conversions

176 ANS:
5. 48 inches \( \times \) \( \frac{1 \text{ yard}}{36 \text{ inches}} \) = \( \frac{4}{3} \) yards \( \times \) $3.75 = $5.00

PTS: 2  REF: 011131ia  STA: A.M.2  TOP: Conversions

177 ANS:
\[
77120 + 33500 = 110620 \text{ sq. ft.} \times \frac{1 \text{ acre}}{43560 \text{ sq. ft.}} \approx 2.54 \text{ acres}
\]

PTS: 2  REF: 081133ia  STA: A.M.2  TOP: Conversions

178 ANS: 2
Candidate B received 45%. 45% \( \times \) 1860 = 837

PTS: 2  REF: 081007ia  STA: A.N.5  TOP: Percents
179 ANS:
\[
\frac{1}{6}, \quad 16.67\%, \quad \$13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}; \quad 18 \times 0.75 = 13.5
\]
PTS: 3  
REF: 060835ia  
STA: A.N.5  
TOP: Percents

180 ANS:
\[
30.4\%; \quad \text{no,} \quad 23.3\%. \quad \frac{7.50 - 5.75}{5.75} = 30.4\%. \quad \frac{7.50 - 5.75}{7.50} = 23.3\%
\]
PTS: 3  
REF: 080935ia  
STA: A.N.5  
TOP: Percents

181 ANS:
\[
d = 6.25h, \quad 250. \quad d = 6.25(40) = 250
\]
PTS: 2  
REF: 010933ia  
STA: A.N.5  
TOP: Direct Variation

182 ANS: 4
\[
\frac{150}{20} = \frac{x}{30} \quad \Rightarrow 20x = 4500 \quad \Rightarrow x = 225
\]
PTS: 2  
REF: 081101ia  
STA: A.N.5  
TOP: Direct Variation

183 ANS: 2  
PTS: 2  
REF: 080823ia  
STA: A.A.32  
TOP: Slope

184 ANS: 1  
PTS: 2  
REF: 081115ia  
STA: A.A.32  
TOP: Slope

185 ANS: 3
\[
m = \frac{4 - 10}{3 - (-6)} = \frac{2}{3}
\]
PTS: 2  
REF: fall0716ia  
STA: A.A.33  
TOP: Slope

186 ANS: 3
\[
m = \frac{1 - (-4)}{-6 - 4} = \frac{1}{2}
\]
PTS: 2  
REF: 060820ia  
STA: A.A.33  
TOP: Slope

187 ANS: 2
\[
m = \frac{5 - 3}{2 - 7} = \frac{2}{5}
\]
PTS: 2  
REF: 010913ia  
STA: A.A.33  
TOP: Slope

188 ANS: 2
\[
m = \frac{5 - 2}{3 - (-2)} = \frac{3}{5}
\]
PTS: 2  
REF: 061004ia  
STA: A.A.33  
TOP: Slope
189 ANS: 3
\[ m = \frac{6 - 4}{3 - (-2)} = \frac{2}{5} \]

PTS: 2  REF: 061110ia  STA: A.A.33  TOP: Slope

190 ANS: 1
\[ m = \frac{4 - (-4)}{-5 - 15} = -\frac{2}{5} \]

PTS: 2  REF: 080915ia  STA: A.A.33  TOP: Slope

191 ANS: 4
\[ A(-3,4) \text{ and } B(5,8). \quad m = \frac{4 - 8}{-3 - 5} = -\frac{4}{-8} = \frac{1}{2} \]

PTS: 2  REF: 011007ia  STA: A.A.33  TOP: Slope

192 ANS: 2
\[ A(-3,8) \text{ and } B(3,6). \quad m = \frac{8 - 6}{-3 - 3} = \frac{2}{-6} = -\frac{1}{3} \]

PTS: 2  REF: 081005ia  STA: A.A.33  TOP: Slope

193 ANS: 2
\[ m = -\frac{A}{B} = \frac{-3}{-7} = \frac{3}{7} \]

PTS: 2  REF: 011122ia  STA: A.A.37  TOP: Slope

194 ANS: 2
If the car can travel 75 miles on 4 gallons, it can travel 300 miles on 16 gallons. \[ \frac{75}{4} = x \quad \Rightarrow \quad x = 300 \]

PTS: 2  REF: 080807ia  STA: A.G.4  TOP: Graphing Linear Functions

195 ANS: 1
\[ y = mx + b \]
\[ -6 = (-3)(4) + b \]
\[ b = 6 \]

PTS: 2  REF: 060922ia  STA: A.A.34  TOP: Writing Linear Equations

196 ANS: 4
\[ y = mx + b \]
\[ -1 = (2)(3) + b \]
\[ b = -7 \]

PTS: 2  REF: 080927ia  STA: A.A.34  TOP: Writing Linear Equations
197 ANS: 1
\[ y = mx + b \]
\[ 5 = (-2)(1) + b \]
\[ b = 7 \]

PTS: 2 REF: 081108ia STA: A.A.34 TOP: Writing Linear Equations

198 ANS:
\[ y = \frac{3}{4}x + 10 \]
\[ y = mx + b \]
\[ 4 = \frac{3}{4}(-8) + b \]
\[ 4 = -6 + b \]
\[ 10 = b \]

PTS: 3 REF: 011134ia STA: A.A.34 TOP: Writing Linear Equations

199 ANS: 1
\[ m = \frac{3 - 0}{0 - 2} = \frac{3}{2} \] Using the given y-intercept (0,3) to write the equation of the line \( y = \frac{3}{2}x + 3 \).

PTS: 2 REF: fall0713ia STA: A.A.35 TOP: Writing Linear Equations

200 ANS: 3
\[ m = \frac{7 - 3}{-3 - 3} = \frac{4}{-6} = -\frac{2}{3} \]
\[ y = mx + b \]
\[ 3 = -\frac{2}{3}(3) + b \]
\[ 3 = -2 + b \]
\[ 5 = b \]

PTS: 2 REF: 011013ia STA: A.A.35 TOP: Writing Linear Equations

201 ANS: 3 PTS: 2 REF: 010910ia STA: A.A.35 TOP: Writing Linear Equations

202 ANS: 2
\[ m = \frac{5 - 3}{8 - (-1)} = \frac{2}{7} \] \( y - y_1 = m(x - x_1) \)
\[ y - 5 = \frac{2}{7}(x - 8) \]

PTS: 2 REF: 081029ia STA: A.A.35 TOP: Writing Linear Equations
203 ANS: 
\[ y = \frac{2}{5}x + 2. \quad m = \frac{4 - 0}{5 - (-5)} = \frac{2}{5}. \quad y = mx + b \]
\[ 4 = \frac{2}{5}(5) + b \]
\[ b = 2 \]

PTS: 3 REF: 080836ia STA: A.A.35 TOP: Writing Linear Equations

204 ANS: 1
\[ 4y - 2x = 0 \]
\[ 4(-1) - 2(-2) = 0 \]
\[ -4 + 4 = 0 \]

PTS: 2 REF: 011021ia STA: A.A.39 TOP: Identifying Points on a Line

205 ANS: 4
\[ 2x - 3y = 9 \]
\[ 2(0) - 3(-3) = 9 \]
\[ 0 + 9 = 9 \]

PTS: 2 REF: 081016ia STA: A.A.39 TOP: Identifying Points on a Line

206 ANS: 3
\[ 2(1) + 3 = 5 \]

PTS: 2 REF: 081007ia STA: A.A.39 TOP: Linear Equations

207 ANS: 2 PTS: 2 REF: 080810ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

208 ANS: 1 PTS: 2 REF: 080911ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

209 ANS: 2 PTS: 2 REF: 081014ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

210 ANS: 4 PTS: 2 REF: 061112ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

211 ANS: 1
The slope of both is \(-4\).

PTS: 2 REF: 060814ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

212 ANS: 1
The slope of \(y = 3 - 2x\) is \(-2\). Using \(m = -\frac{A}{B}\), the slope of \(4x + 2y = 5\) is \(-\frac{4}{2} = -2\).

PTS: 2 REF: 010926ia STA: A.A.38 TOP: Parallel and Perpendicular Lines
The slope of $2x - 4y = 16$ is $\frac{-A}{B} = \frac{-2}{-4} = \frac{1}{2}$.

$y - kx = 7$ may be rewritten as $y = kx + 7$.

$-6x - 17 \geq 8x + 25$

$-42 \geq 14x$

$-3 \geq x$

$3(2m - 1) \leq 4m + 7$

$6m - 3 \leq 4m + 7$

$2m \leq 10$

$m \leq 5$

$-2x + 5 > 17$

$-2x > 12$

$x < -6$

$-4x + 2 > 10$

$-4x > 8$

$x < -2$
\( \frac{4}{3}x + 5 < 17 \)
\( \frac{4}{3}x < 12 \)
\( 4x < 36 \)
\( x < 9 \)

PTS: 2 \hspace{1em} REF: 060914ia \hspace{1em} STA: A.A.21 \hspace{1em} TOP: Interpreting Solutions

\( -2(x - 5) < 4 \)
\( -2x + 10 < 4 \)
\( -2x < -6 \)
\( x > 3 \)

PTS: 2 \hspace{1em} REF: 080913ia \hspace{1em} STA: A.A.21 \hspace{1em} TOP: Interpreting Solutions

\(-12 \cdot \left( \frac{2}{3}x + 3 < -2x - 7 \right) \)
\( x + 9 < -6x - 21 \)
\( 7x < -30 \)
\( x < -\frac{30}{7} \)

PTS: 3 \hspace{1em} REF: 061034ia \hspace{1em} STA: A.A.21 \hspace{1em} TOP: Interpreting Solutions

222 ANS: 1 \hspace{1em} PTS: 2 \hspace{1em} REF: 080803ia \hspace{1em} STA: A.A.4
TOP: Modeling Inequalities

223 ANS: 4 \hspace{1em} PTS: 2 \hspace{1em} REF: 060906ia \hspace{1em} STA: A.A.4
TOP: Modeling Inequalities

224 ANS: 2 \hspace{1em} PTS: 2 \hspace{1em} REF: 060821ia \hspace{1em} STA: A.A.5
TOP: Modeling Inequalities

225 ANS: 2 \hspace{1em} PTS: 2 \hspace{1em} REF: 011005ia \hspace{1em} STA: A.A.5
TOP: Modeling Inequalities

226 ANS: 4 \hspace{1em} PTS: 2 \hspace{1em} REF: fall0715ia \hspace{1em} STA: A.A.5
TOP: Modeling Inequalities

227 ANS: 4 \hspace{1em} PTS: 2 \hspace{1em} REF: 081107ia \hspace{1em} STA: A.A.5
TOP: Modeling Inequalities
228 ANS: 1
13.95 + 0.49s ≤ 50.00
0.49s ≤ 36.05
s ≤ 73.57

PTS: 2 REF: 080904ia STA: A.A.6 TOP: Modeling Inequalities

229 ANS: 1
0.07m + 19 ≤ 29.50
0.07m ≤ 10.50
m ≤ 150

PTS: 2 REF: 010904ia STA: A.A.6 TOP: Modeling Inequalities

230 ANS:
7. 15x + 22 ≥ 120
x ≥ 6.53

PTS: 3 REF: fall0735ia STA: A.A.6 TOP: Modeling Inequalities

231 ANS:
10 + 2d ≥ 75, 33. 10 + 2d ≥ 75
d ≥ 32.5

PTS: 3 REF: 060834ia STA: A.A.6 TOP: Modeling Inequalities

232 ANS:
0.65x + 35 ≤ 45
0.65x ≤ 10
x ≤ 15

PTS: 3 REF: 061135ia STA: A.A.6 TOP: Modeling Inequalities

233 ANS: 4 PTS: 2 REF: 061028ia STA: A.G.6 TOP: Linear Inequalities

234 ANS: 2
The slope of the inequality is −\frac{1}{2}.

PTS: 2 REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities

235 ANS: 1 PTS: 2 REF: 060920ia STA: A.G.6 TOP: Linear Inequalities
(1, -3) is in the solution set. $4(1) - 3(-3) > 9$

$4 + 9 > 9$

PTS: 4 REF: 011038ia STA: A.G.6 TOP: Linear Inequalities

237 ANS: 3 PTS: 2 REF: 011117ia STA: A.G.4 TOP: Graphing Absolute Value Functions

238 ANS: 4
The transformation is a reflection in the x-axis.

PTS: 2 REF: fall0722ia STA: A.G.5 TOP: Graphing Absolute Value Functions

239 ANS: 3 PTS: 2 REF: 011017ia STA: A.G.5 TOP: Graphing Absolute Value Functions

240 ANS:

. Graph becomes wider as the coefficient approaches 0.

PTS: 3 REF: 061035ia STA: A.G.5 TOP: Graphing Absolute Value Functions
The graph becomes steeper.

ANS: 2

$2x^2 + 10x - 12 = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1)$

ANS: 2

$36x^2 - 100y^6 = 4(9x^2 - 25y^6) = 4(3x + 5y^3)(3x - 5y^3)$
253 ANS: 2
\[ a^3 - 4a = a(a^2 - 4) = a(a - 2)(a + 2) \]
PTS: 2 REF: 011108ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

254 ANS:
\[ 4x(x + 3)(x - 3), \quad 4x^3 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3) \]
PTS: 2 REF: 060932ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

255 ANS: 3
\[ x^2 - 6x = 0 \]
\[ x(x - 6) = 0 \]
\[ x = 0 \quad x = 6 \]

PTS: 2 REF: 080921ia STA: A.A.27 TOP: Solving Quadratics by Factoring

256 ANS: 4
\[ x^2 - 7x + 6 = 0 \]
\[ (x - 6)(x - 1) = 0 \]
\[ x = 6 \quad x = 1 \]

PTS: 2 REF: 060902ia STA: A.A.28 TOP: Roots of Quadratics

257 ANS: 2
\[ x^2 - 5x + 6 = 0 \]
\[ (x - 3)(x - 2) = 0 \]
\[ x = 3 \quad x = 2 \]

PTS: 2 REF: 081120ia STA: A.A.28 TOP: Roots of Quadratics

258 ANS: 3
\[ x^2 - 10x + 21 = 0 \]
\[ (x - 7)(x - 3) = 0 \]
\[ x = 7 \quad x = 3 \]

PTS: 2 REF: 010914ia STA: A.A.28 TOP: Roots of Quadratics

259 ANS:
\[ -2, 3. \quad x^2 - x = 6 \]
\[ x^2 - x - 6 = 0 \]
\[ (x - 3)(x + 2) = 0 \]
\[ x = 3 \text{ or } -2 \]

PTS: 3 REF: 011034ia STA: A.A.28 TOP: Roots of Quadratics
260 ANS: 
\[-15, 2 \quad x^2 + 13x - 30 = 0\]
\[ (x + 15)(x - 2) = 0\]
\[ x = -15, 2 \]

PTS: 3  REF: 081036ia  STA: A.A.28  TOP: Roots of Quadratics

261 ANS: 2
\[ x^2 - 2x - 15 = 0 \]
\[ (x - 5)(x + 3) = 0 \]
\[ x = 5 \quad x = -3 \]

PTS: 2  REF: 011128ia  STA: A.A.28  TOP: Roots of Quadratics

262 ANS: 2
PTS: 2  REF: 061113ia  STA: A.G.5  TOP: Graphing Quadratic Functions

263 ANS: 4
PTS: 2  REF: 060829ia  STA: A.G.5  TOP: Graphing Quadratic Functions

264 ANS: 1
PTS: 2  REF: 081015ia  STA: A.G.5  TOP: Graphing Quadratic Functions

265 ANS: 3
PTS: 2  REF: 060924ia  STA: A.G.8  TOP: Solving Quadratics by Graphing

266 ANS: 2
PTS: 2  REF: 080916ia  STA: A.G.8  TOP: Solving Quadratics by Graphing

267 ANS: 4
PTS: 2  REF: 011111ia  STA: A.G.8  TOP: Solving Quadratics by Graphing

268 ANS:

PTS: 3  REF: 060836ia  STA: A.G.8  TOP: Solving Quadratics by Graphing

269 ANS: 1
\[ x^2 - 36 = 5x \]
\[ x^2 - 5x - 36 = 0 \]
\[ (x - 9)(x + 4) = 0 \]
\[ x = 9 \]

PTS: 2  REF: 061020ia  STA: A.A.8  TOP: Writing Quadratics
270 ANS:
6, 8, 10. Three consecutive even integers are \(x, x+2\) and \(x+4\). \((x+2)(x+4) = 10x + 20\)

\[x^2 + 6x + 8 = 10x + 20\]

\[x^2 - 4x - 12 = 0\]

\[(x-6)(x+2) = 0\]

\[x = 6\]

PTS: 4 REF: 011039ia STA: A.A.8 TOP: Writing Quadratics

271 ANS: 2

\[l(l-5) = 24\]

\[l^2 - 5l - 24 = 0\]

\[(l-8)(l+3) = 0\]

\[l = 8\]

PTS: 2 REF: 080817ia STA: A.A.8 TOP: Geometric Applications of Quadratics

272 ANS: 2

\[l(l-3) = 40\]

\[l^2 - 3l - 40 = 0\]

\[(l-8)(l+5) = 0\]

\[l = 8\]

PTS: 2 REF: 081116ia STA: A.A.8 TOP: Geometric Applications of Quadratics

273 ANS:
\[w(w+15) = 54, 3, 18.\] \[w(w+15) = 54\]

\[w^2 + 15w - 54 = 0\]

\[(w+18)(w-3) = 0\]

\[w = 3\]

PTS: 4 REF: 060837ia STA: A.A.8 TOP: Geometric Applications of Quadratics

274 ANS: 1 PTS: 2 REF: 080813ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

275 ANS: 2 PTS: 2 REF: 010916ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

276 ANS: 2 PTS: 2 REF: 011015ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

277 ANS: 1 PTS: 2 REF: 060811ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

278 ANS: 1 PTS: 2 REF: 061005ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph
279 ANS: 2  PTS: 2  REF: 081111ia  STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

280 ANS:
\[ x = 1; \ (1,-5) \]

PTS: 2  REF: 061133ia  STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

281 ANS: 1
\[ x = \frac{-b}{2a} = \frac{-6}{2(-1)} = 3. \]

PTS: 2  REF: 011127ia  STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

282 ANS: 3
\[ x = \frac{-b}{2a} = \frac{-10}{2(-1)} = 5. \]

PTS: 2  REF: 081018ia  STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

283 ANS: 1
\[ x = \frac{-b}{2a} = \frac{-(-16)}{2(1)} = 8. \quad y = (8)^2 - 16(8) + 63 = -1 \]

PTS: 2  REF: 060918ia  STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

284 ANS:
\[ x = \frac{-b}{2a} = \frac{-(8)}{2(-2)} = -2 \]
\[ (-2,11). \quad y = -2(-2)^2 - 8(-2) + 3 = 11 \]

PTS: 3  REF: 080934ia  STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

285 ANS: 2
\[ x + 2y = 9 \]
\[ x - y = 3 \]
\[ 3y = 6 \]
\[ y = 2 \]

PTS: 2  REF: 060925ia  STA: A.A.10  TOP: Solving Linear Systems
286 ANS: 1
\[ \begin{align*}
  x - 2y &= 1 \\
  x + 4y &= 7 \\
  -6y &= -6 \\
  y &= 1
\end{align*} \]

PTS: 2  REF: 080920ia  STA: A.A.10  TOP: Solving Linear Systems

287 ANS: 2
\[ \begin{align*}
  2(x - 3y) &= -3 \\
  2x + y &= 8 \\
  2x - 6y &= -6 \\
  7y &= 14 \\
  y &= 2
\end{align*} \]

PTS: 2  REF: 081021ia  STA: A.A.10  TOP: Solving Linear Systems

288 ANS: 3
\[ \begin{align*}
  2x - 5y &= 11 \\
  2x - 5(-1) &= 11 \\
  -2x + 3y &= -9 \\
  2x &= 6 \\
  -2y &= 2 \\
  x &= 3 \\
  y &= -1
\end{align*} \]

PTS: 2  REF: 081109ia  STA: A.A.10  TOP: Solving Linear Systems

289 ANS: 3
\[ \begin{align*}
  c + 3d &= 8 \\
  c &= 4d - 6 \\
  4d - 6 + 3d &= 8 \\
  c &= 4(2) - 6 \\
  7d &= 14 \\
  c &= 2 \\
  d &= 2
\end{align*} \]

PTS: 2  REF: 061012ia  STA: A.A.10  TOP: Solving Linear Systems

290 ANS: (-2, 5)
\[ \begin{align*}
  3x + 2y &= 4 \\
  12x + 8y &= 16 \\
  3x &= 2y \\
  4x + 3y &= 7 \\
  12x + 9y &= 21 \\
  3x &= 2(5) = 4 \\
  y &= 5 \\
  3x &= -6 \\
  x &= -2
\end{align*} \]

PTS: 4  REF: 010937ia  STA: A.A.10  TOP: Solving Linear Systems
291 ANS: 3
\[ 5x + 2y = 48 \]
\[ 3x + 2y = 32 \]
\[ 2x = 16 \]
\[ x = 8 \]

PTS: 2 REF: fall0708ia STA: A.A.10 TOP: Solving Linear Systems

292 ANS:

PTS: 4 REF: 080938ia STA: A.G.7 TOP: Solving Linear Systems

293 ANS: 2
\[ L + S = 47 \]
\[ L - S = 15 \]
\[ 2L = 62 \]
\[ L = 31 \]

PTS: 2 REF: 060912ia STA: A.A.7 TOP: Writing Linear Systems

294 ANS: 1
\[ f + m = 53 \]
\[ f - m = 25 \]
\[ 2m = 28 \]
\[ m = 14 \]

PTS: 2 REF: 061126ia STA: A.A.7 TOP: Writing Linear Systems

295 ANS: 3
\[ b = 42 - r \]
\[ r = 2b + 3 \]
\[ r = 2b + 3 \]
\[ r = 2(42 - r) + 3 \]
\[ r = 84 - 2r + 3 \]
\[ 3r = 87 \]
\[ r = 29 \]

PTS: 2 REF: 060812ia STA: A.A.7 TOP: Writing Linear Systems
296 ANS: 2
\[ s + o = 126. \ s + 2s = 126 \]
\[ o = 2s \quad s = 42 \]

PTS: 2  REF: 080811ia  STA: A.A.7  TOP: Writing Linear Systems

297 ANS: 1
\[ b = 2j + 4 \quad 2j + 4 = 31 - j \]
\[ b + j = 31 \quad 3j = 27 \]
\[ b = 31 - j \quad j = 9 \]

PTS: 2  REF: 081119ia  STA: A.A.7  TOP: Writing Linear Systems

298 ANS: 1
\[ so = f + 60 \quad j = 2f - 50 \quad se = 3f \quad f + (f + 60) + (2f - 50) + 3f = 1424 \]
\[ 7f + 10 = 1424 \]
\[ f = 202 \]

PTS: 2  REF: 060917ia  STA: A.A.7  TOP: Writing Linear Systems

299 ANS: 1
\[ 1P + 2C = 5 \]
\[ 1P + 4C = 6 \]
\[ 2C = 1 \]
\[ C = 0.5 \]

PTS: 2  REF: 011003ia  STA: A.A.7  TOP: Writing Linear Systems

300 ANS: 2
\[ 3c + 4m = 12.50 \]
\[ 3c + 2m = 8.50 \]
\[ 2m = 4.00 \]
\[ m = 2.00 \]

PTS: 2  REF: 060806ia  STA: A.A.7  TOP: Writing Linear Systems

301 ANS: 2
\[ J - M = 3 \]
\[ 8J + 8M = 120 \]
\[ 8J - 8M = 24 \]
\[ 16J = 144 \]
\[ J = 9 \]

PTS: 2  REF: 011115ia  STA: A.A.7  TOP: Writing Linear Systems
\[ m = 50 \text{¢}, \ p = 15 \text{¢}. \ 3m + 2p = 1.80. \ 9m + 6p = 5.40. \ 4m + 0.50 + 6p = 2.90 \]
\[ 4m + 6p = 2.90 \quad 4m + 6p = 2.90 \quad 6p = 90 \]
\[ 5m = 2.50 \quad p = 0.15 \quad m = 0.50 \]

PTS: 3  REF: 080837ia  STA: A.A.7  TOP: Writing Linear Systems

303 ANS: 1  PTS: 2  REF: 061010ia  STA: A.A.40
TOP: Systems of Linear Inequalities

304 ANS: 2  PTS: 2  REF: 081127ia  STA: A.A.40
TOP: Systems of Linear Inequalities

305 ANS: 4  PTS: 2  REF: 080825ia  STA: A.A.40
TOP: Systems of Linear Inequalities

306 ANS: 2  PTS: 2  REF: 011023ia  STA: A.A.40
TOP: Systems of Linear Inequalities

307 ANS:

PTS: 4  REF: 010938ia  STA: A.G.7  TOP: Systems of Linear Inequalities

308 ANS:

PTS: 4  REF: 081037ia  STA: A.G.7  TOP: Systems of Linear Inequalities
\[ x^2 - 2 = x \]  
Since \( y = x \), the solutions are (2,2) and (-1,-1).

\[ x^2 - x - 2 = 0 \]
\[ (x - 2)(x + 1) = 0 \]
\[ x = 2 \text{ or } -1 \]
312 ANS: 2

\[ x^2 + 5x + 6 = -x + 1 \quad y = -x + 1 \]
\[ x^2 + 6x + 5 = 0 \quad = -(-5) + 1 \]
\[ (x + 5)(x + 1) = 0 \quad = 6 \]
\[ x = -5 \text{ or } -1 \]

PTS: 2   REF: 080812ia   STA: A.A.11   TOP: Quadratic-Linear Systems

313 ANS: 2

\[ x^2 - x - 20 = 3x - 15 \quad y = 3x - 15 \]
\[ x^2 - 4x - 6 = 0 \quad = 3(-1) - 15 \]
\[ (x = 5)(x + 1) = 0 \quad = -18 \]
\[ x = 5 \text{ or } -1 \]

PTS: 2   REF: 010922ia   STA: A.A.11   TOP: Quadratic-Linear Systems

314 ANS: 2

\[ x^2 - x = x + 3 \quad \text{Since } y = x + 3, \text{ the solutions are } (3,6) \text{ and } (-1,2). \]
\[ x^2 - 2x - 3 = 0 \]
\[ (x - 3)(x + 1) = 0 \]
\[ x = 3 \text{ or } -1 \]

PTS: 2   REF: 061118ia   STA: A.A.11   TOP: Quadratic-Linear Systems

315 ANS: 2   PTS: 2   REF: 011012ia   STA: A.G.9   TOP: Quadratic-Linear Systems

316 ANS: 1

\[ 2y - 2x = 10 \quad \text{axis of symmetry: } x = \frac{-b}{2a} = \frac{-2}{2(1)} = -1 \]
\[ 2y = 2x + 10 \]
\[ y = x + 5 \]

PTS: 2   REF: 081010ia   STA: A.G.9   TOP: Quadratic-Linear Systems
317 ANS: 4  PTS: 2  REF: 011102ia  STA: A.G.9
TOP: Quadratic-Linear Systems

318 ANS:

319 ANS:

320 ANS:

PTS: 4  REF: fall0738ia  STA: A.G.9  TOP: Quadratic-Linear Systems
321 ANS:

322 ANS:

PTS: 4 REF: 060939ia STA: A.G.9 TOP: Quadratic-Linear Systems

PTS: 4 REF: 081138ia STA: A.G.9 TOP: Quadratic-Linear Systems
323 ANS: 4

\[-3x(x - 4) - 2x(x + 3) = -3x^2 + 12x - 2x^2 - 6x = -5x^2 + 6x\]

PTS: 2  REF: 081114ia  STA: A.A.13  TOP: Addition and Subtraction of Monomials

324 ANS: 3  PTS: 2  REF: 061003ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials  KEY: addition

325 ANS: 3  PTS: 2  REF: 080819ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials  KEY: subtraction

326 ANS: 2  PTS: 2  REF: 060923ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials  KEY: subtraction

327 ANS: 3  PTS: 2  REF: 011126ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials  KEY: subtraction

328 ANS: 4  PTS: 2  REF: 061130ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials  KEY: subtraction

329 ANS: 1  PTS: 2  REF: 060807ia  STA: A.A.13  TOP: Multiplication of Polynomials

330 ANS: 3

\[
\frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1
\]

PTS: 2  REF: 011011ia  STA: A.A.14  TOP: Division of Polynomials

331 ANS:

\[
3a^2b^2 - 6a \cdot \frac{45a^4b^3 - 90a^3b}{15a^2b} = \frac{45a^4b^3}{15a^2b} - \frac{90a^3b}{15a^2b} = 3a^2b^2 - 6a
\]

PTS: 2  REF: 081031ia  STA: A.A.14  TOP: Division of Polynomials

332 ANS:

\[
x^2 - 5x - 24 = \frac{(x - 8)(x + 3)}{x - 8} = x + 3
\]

PTS: 2  REF: 061131ia  STA: A.A.14  TOP: Division of Polynomials

333 ANS: 4  PTS: 2  REF: 011020ia  STA: A.A.12  TOP: Multiplication of Powers

334 ANS: 4  PTS: 2  REF: 080903ia  STA: A.A.12  TOP: Multiplication of Powers

335 ANS: 4

\[
\frac{2^6}{2^3} = 2^5
\]

PTS: 2  REF: 060813ia  STA: A.A.12  TOP: Division of Powers

336 ANS: 1  PTS: 2  REF: 060903ia  STA: A.A.12  TOP: Division of Powers
\[
\frac{(2x^3)(8x^2)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2
\]

\[
\text{PTS: 2} \quad \text{REF: fall0703ia} \quad \text{STA: A.A.12} \quad \text{TOP: Division of Powers}
\]

\[
\frac{3k^2m^6}{4}
\]

\[
\text{PTS: 2} \quad \text{REF: 010932ia} \quad \text{STA: A.A.12} \quad \text{TOP: Division of Powers}
\]

\[
\frac{(10w^3)^2}{5w} = \frac{100w^6}{5w} = 20w^5
\]

\[
\text{PTS: 2} \quad \text{REF: 011124ia} \quad \text{STA: A.A.12} \quad \text{TOP: Powers of Powers}
\]

\[
\frac{9.2 \times 10^6}{2.3 \times 10^5} = 4 \times 10^4
\]

\[
\text{PTS: 2} \quad \text{REF: 081006ia} \quad \text{STA: A.N.4} \quad \text{TOP: Operations with Scientific Notation}
\]

\[
500(1 + 0.06)^3 \approx 596
\]

\[
\text{PTS: 2} \quad \text{REF: 080929ia} \quad \text{STA: A.A.9} \quad \text{TOP: Exponential Functions}
\]

\[
2000(1 + 0.04)^3 \approx 2249
\]

\[
\text{PTS: 2} \quad \text{REF: 081124ia} \quad \text{STA: A.A.9} \quad \text{TOP: Exponential Functions}
\]
350 ANS: 1

\[ 15000(1.2)^{\frac{6}{3}} = 21,600. \quad 21,600 - 15,000 = 6,600 \]

PTS: 2  REF: 061030ia  STA: A.A.9  TOP: Exponential Functions

351 ANS:

\[ 5,583.86. \quad A = P(1 + R)^t = 5000(1 + 0.0375)^3 \approx 5583.86 \]

PTS: 3  REF: 060935ia  STA: A.A.9  TOP: Exponential Functions

352 ANS: 4  PTS: 2  REF: 010908ia  STA: A.A.9  TOP: Exponential Functions

353 ANS: 2  PTS: 2  REF: 060830ia  STA: A.A.9  TOP: Exponential Functions

354 ANS: 3

\[ 35000(1 - 0.05)^4 \approx 28507.72 \]

PTS: 2  REF: fall0719ia  STA: A.A.9  TOP: Exponential Functions

355 ANS: 2

\[ 20000(.88)^3 = 13629.44 \]

PTS: 2  REF: 061124ia  STA: A.A.9  TOP: Exponential Functions

356 ANS: 2

\( R = 0.5^{d-1} \)

PTS: 2  REF: 011006ia  STA: A.A.9  TOP: Exponential Functions

357 ANS:

\[ 24,435.19. \quad 30000(.95)^4 \approx 24435.19 \]

PTS: 4  REF: 011138ia  STA: A.A.9  TOP: Exponential Functions

358 ANS:

. The graph will never intersect the x-axis as \( 2^x > 0 \) for all values of \( x \).

PTS: 3  REF: 080835ia  STA: A.G.4  TOP: Graphing Exponential Functions

359 ANS: 2

\[ \sqrt{32} = \sqrt{16 \sqrt{2}} = 4\sqrt{2} \]

PTS: 2  REF: 060910ia  STA: A.N.2  TOP: Simplifying Radicals
360 ANS: 3
\[\sqrt{72} = \sqrt{36 \cdot 2} = 6\sqrt{2}\]

PTS: 2 REFTOP: Simplifying Radicals

361 ANS: 3
\[3\sqrt{250} = 3\sqrt{25 \cdot 10} = 15\sqrt{10}\]

PTS: 2 REFTOP: Simplifying Radicals

362 ANS: 2
\[5\sqrt{20} = 5\sqrt{4 \cdot 5} = 10\sqrt{5}\]

PTS: 2 REFTOP: Simplifying Radicals

363 ANS: 1
\[\frac{\sqrt{32}}{4} = \frac{\sqrt{16 \cdot 2}}{4} = \sqrt{2}\]

PTS: 2 REFTOP: Simplifying Radicals

364 ANS:
\[-3\sqrt{48} = -3\sqrt{16 \cdot 3} = -12\sqrt{3}\]

PTS: 2 REFTOP: Simplifying Radicals

365 ANS:
\[30\sqrt{2} \cdot 5\sqrt{72} = 5\sqrt{36 \cdot 2} = 30\sqrt{2}\]

PTS: 2 REFTOP: Simplifying Radicals

366 ANS: 4
\[6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25 \cdot 2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}\]

PTS: 2 REFTOP: Operations with Radicals

367 ANS: 3
\[3\sqrt{2} + \sqrt{8} = 3\sqrt{2} + \sqrt{4 \cdot 2} = 3\sqrt{2} + 2\sqrt{2} = 5\sqrt{2}\]

PTS: 2 REFTOP: Operations with Radicals

368 ANS: 3
\[\sqrt{72} - 3\sqrt{2} = \sqrt{36 \cdot 2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2}\]

PTS: 2 REFTOP: Operations with Radicals

369 ANS:
\[-2\sqrt{3} \cdot \frac{\sqrt{21}}{2\sqrt{7}} = 5\sqrt{12} = 8\sqrt{3} - 5\sqrt[4]{3} \cdot \sqrt{3} = 8\sqrt{3} - 10\sqrt{3} = -2\sqrt{3}\]

PTS: 3 REFTOP: Operations with Radicals
370 ANS:  

\[60 - 42\sqrt{5} \cdot 3\sqrt{20(2\sqrt{5} - 7)} = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4\sqrt{5}} = 60 - 42\sqrt{5}\]

PTS: 3  REF: 080834ia  STA: A.N.3  TOP: Operations with Radicals
KEY: multiplication

371 ANS: 2

\[
\frac{9x^4 - 27x^6}{3x^3} = \frac{9x^4(1 - 3x^2)}{3x^3} = 3x(1 - 3x^2)
\]

PTS: 2  REF: fall0718ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

372 ANS: 2

\[
\frac{2x^2 - 12x}{x - 6} = \frac{2x(x - 6)}{x - 6} = 2x
\]

PTS: 2  REF: 060824ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

373 ANS: 4

\[
\frac{25x - 125}{x^2 - 25} = \frac{25(x - 5)}{(x + 5)(x - 5)} = \frac{25}{x + 5}
\]

PTS: 2  REF: 080821ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

374 ANS: 2

\[
\frac{x^2 - 2x - 15}{x^2 + 3x} = \frac{(x - 5)(x + 3)}{x(x + 3)} = \frac{x - 5}{x}
\]

PTS: 2  REF: 060921ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

375 ANS: 1

\[
\frac{x^2 - x - 6}{x^2 - 5x + 6} = \frac{(x - 3)(x + 2)}{(x - 3)(x + 2)} = \frac{x + 2}{x - 2}
\]

PTS: 2  REF: 011130ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

376 ANS: 3  PTS: 2  REF: 060817ia  STA: A.A.15  TOP: Undefined Rationals


378 ANS: 1  PTS: 2  REF: fall0728ia  STA: A.A.15  TOP: Undefined Rationals

ANS: 3
\[ x^2 - 9 = 0 \]
\[ (x + 3)(x - 3) = 0 \]
\[ x = \pm 3 \]

PTS: 2  REF: 061014ia STA: A.A.15  TOP: Undefined Rationals

ANS: 1
\[ x^2 + 7x + 10 = 0 \]
\[ (x + 5)(x + 2) = 0 \]
\[ x = -5 \text{ or } -2 \]

PTS: 2  REF: 080918ia STA: A.A.15  TOP: Undefined Rationals

ANS: 4
\[ x^2 - 4x - 12 = 0 \]
\[ (x - 6)(x + 2) = 0 \]
\[ x = 6 \text{ or } -2 \]

PTS: 2  REF: 061125ia STA: A.A.15  TOP: Undefined Rationals

\[
\frac{x^2 - 1}{x + 1} \cdot \frac{x + 3}{3x - 3} = \frac{(x + 1)(x - 1)}{x + 1} \cdot \frac{x + 3}{3(x - 1)} = \frac{x + 3}{3}
\]

PTS: 2  REF: 060815ia STA: A.A.18  TOP: Multiplication and Division of Rationals

ANS: 1
\[
\frac{4x}{x - 1} \cdot \frac{x^2 - 1}{3x + 3} = \frac{4x}{x - 1} \cdot \frac{(x + 1)(x - 1)}{3(x + 1)} = \frac{4x}{3}
\]

PTS: 2  REF: 080826ia STA: A.A.18  TOP: Multiplication and Division of Rationals

\[
\frac{x}{x + 4} \div \frac{2x}{x^2 - 16} = \frac{x}{x + 4} \cdot \frac{x^2 - 16}{2x} = \frac{1}{x + 4} \cdot \frac{(x + 4)(x - 4)}{2} = \frac{x - 4}{2}
\]

PTS: 2  REF: 081130ia STA: A.A.18  TOP: Multiplication and Division of Rationals

ANS:
\[
\frac{3}{4x - 8} \cdot \frac{3x + 6}{4x + 12} \cdot \frac{x^2 - 4}{x + 3} = \frac{3(x + 2)}{4(x + 3)} \cdot \frac{x + 3}{(x + 2)(x - 2)} = \frac{3}{4(x - 2)}
\]

PTS: 3  REF: 010935ia STA: A.A.18  TOP: Multiplication and Division of Rationals
387 ANS: \[
\frac{x - 7}{3x} \cdot \frac{2x^2 - 8x - 42}{6x^2} + \frac{x^2 - 9}{x^2 - 3x} = \frac{2(x^2 - 4x - 21)}{6x^2} \cdot \frac{x(x - 3)(x + 3)}{x(x - 3)} = \frac{(x - 7)(x + 3)}{3x} \cdot \frac{1}{x + 3} = \frac{x - 7}{3x}
\]

PTS: 4  REF: 080937ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

388 ANS: \[
\frac{x^2 + 9x + 14}{x^2 - 49} \div \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} \cdot \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3}
\]

PTS: 4  REF: 061037ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

389 ANS: \[
\frac{(d \times 3) + (2 \times 2d)}{2 \times 3} = \frac{3d + 4d}{6} = \frac{7d}{6}
\]

PTS: 2  REF: fall0727ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

390 ANS: \[
\frac{3}{2x} + \frac{4}{3x} = \frac{9x + 8x}{6x^2} = \frac{17x}{6x^2} = \frac{17}{6x}
\]

PTS: 2  REF: 080917ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

391 ANS: \[
\frac{3}{2x} + \frac{7}{4x} = \frac{12x + 14x}{8x^2} = \frac{26x}{8x^2} = \frac{13}{4x}
\]

PTS: 2  REF: 011120ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

392 ANS: \[
\frac{6}{5x} - \frac{2}{3x} = \frac{18x - 10x}{15x^2} = \frac{8x}{15x^2} = \frac{8}{15x}
\]

PTS: 2  REF: 010921ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

393 ANS: \[
\frac{6}{4a} \div \frac{2}{3a} = \frac{18a - 8a}{12a^2} = \frac{10a}{12a^2} = \frac{5}{6a}
\]

PTS: 2  REF: 060929ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

394 ANS: \[
\frac{7}{12x} - \frac{y}{6x^2} = \frac{42x^2 - 12xy}{72x^3} = \frac{6x(7x - 2y)}{72x^3} = \frac{7x - 2y}{12x^2}
\]

PTS: 2  REF: 061129ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

395 ANS: \[
\frac{2 + x}{5x} - \frac{x - 2}{5x} = \frac{2 + x - x + 2}{5x} = \frac{4}{5x}
\]

PTS: 2  REF: 081027ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals
\[
\frac{k + 4}{2} = \frac{k + 9}{3}
\]

\[
3(k + 4) = 2(k + 9)
\]

\[
3k + 12 = 2k + 18
\]

\[
k = 6
\]

\[
\frac{2x - 3}{x - 4} = \frac{2}{3}
\]

\[
3(2x - 3) = 2(x - 4)
\]

\[
6x - 9 = 2x - 8
\]

\[
4x = 1
\]

\[
x = \frac{1}{4}
\]
400 ANS: 4

\[
\frac{5}{x} = \frac{x + 13}{6}
\]

\[x^2 + 13x = 30\]

\[x^2 + 13x - 30 = 0\]

\[(x + 15)(x - 2) = 0\]

\[x = -15\] or \[2\]

PTS: 2 
REF: 060826ia 
STA: A.A.26 
TOP: Solving Rationals

401 ANS: 4

\[
\frac{x + 2}{x - 2} = \frac{-3}{x}
\]

\[x(x + 2) = -3(x - 2)\]

\[x^2 + 2x = -3x + 6\]

\[x^2 + 5x - 6 = 0\]

\[(x + 6)(x - 1) = 0\]

\[x = -6\] or \[1\]

PTS: 2 
REF: 011028ia 
STA: A.A.26 
TOP: Solving Rationals

402 ANS: 1

\[
\frac{2}{x - 3} = \frac{26}{x}
\]

\[-3 = \frac{24}{x}\]

\[x = -8\]

PTS: 2 
REF: 010918ia 
STA: A.A.26 
TOP: Solving Rationals
6, \(-2\).
\[
\frac{x + 1}{x} = \frac{-7}{x - 12}
\]
\[(x + 1)(x - 12) = -7x\]
\[x^2 - 11x - 12 = -7x\]
\[x^2 - 4x - 12 = 0\]
\[(x - 6)(x + 2) = 0\]
\[x = 6 \text{ or } -2\]

4, \(-5\).
\[
\frac{x + 2}{6} = \frac{3}{x - 1}
\]
\[(x + 2)(x - 1) = 18\]
\[x^2 - x + 2x - 2 = 18\]
\[x^2 + x - 20 = 0\]
\[(x + 5)(x - 4) = 0\]
\[x = -5 \text{ or } 4\]

\[
\frac{9}{4'} \quad \frac{3}{4} = \frac{-(x + 11)}{4x} + \frac{1}{2x}
\]
\[
\frac{3}{4} = \frac{-x - 11}{4x} + \frac{2}{4x}
\]
\[
\frac{3}{4} = \frac{-x - 9}{4x}
\]
\[12x = -4x - 36\]
\[16x = -36\]
\[x = -\frac{9}{4}\]
In (4), each element in the domain corresponds to a unique element in the range.

\[ 3^2 + 5^2 = x^2 \]
\[ 34 = x^2 \]
\[ \sqrt{34} = x \]
422 ANS: 1
$30^2 + 40^2 = c^2$. 30, 40, 50 is a multiple of 3, 4, 5.

$$2500 = c^2$$

$$50 = c$$

PTS: 2  REF: fall0711ia  STA: A.A.45  TOP: Pythagorean Theorem

423 ANS: 1
$8^2 + 15^2 = c^2$

$$c^2 = 289$$

$$c = 17$$

PTS: 2  REF: 080906ia  STA: A.A.45  TOP: Pythagorean Theorem

424 ANS: 2
$$\sqrt{5^2 + 7^2} \approx 8.6$$

PTS: 2  REF: 081004ia  STA: A.A.45  TOP: Pythagorean Theorem

425 ANS: 3
$10^2 + 10^2 = c^2$

$$c^2 = 200$$

$$c \approx 14.1$$

PTS: 2  REF: 061102ia  STA: A.A.45  TOP: Pythagorean Theorem

426 ANS: 3  PTS: 2  REF: 060825ia  STA: A.A.45  TOP: Pythagorean Theorem

427 ANS: 2
$$\sqrt{18.4^2 - 7^2} \approx 17$$

PTS: 2  REF: 011107ia  STA: A.A.45  TOP: Pythagorean Theorem

428 ANS: 4
$16^2 + b^2 = 34^2$

$$b^2 = 900$$

$$b = 30$$

PTS: 2  REF: 080809ia  STA: A.A.45  TOP: Pythagorean Theorem

429 ANS: 1
$$\sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85}$$

PTS: 2  REF: fall0721ia  STA: A.A.42  TOP: Trigonometric Ratios
\[ \sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17} \]

PTS: 2  REF: 010919ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \sin x = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{28}{53} \]

PTS: 2  REF: 011109ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \tan ABC = \frac{\text{opposite}}{\text{adjacent}} = \frac{5}{12} \]

PTS: 2  REF: 081112ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} = 0.53 \]

PTS: 2  REF: 081026ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48} \]

PTS: 2  REF: 061009ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17} \]

PTS: 2  REF: 011008ia  STA: A.A.42  TOP: Trigonometric Ratios

\[ \cos 30 = \frac{x}{24} \]

\[ x \approx 21 \]

PTS: 2  REF: 010912ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side

\[ \tan 32 = \frac{x}{25} \]

\[ x \approx 15.6 \]

PTS: 2  REF: 080914ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side
438 ANS: 2
\[
\sin 57 = \frac{x}{8}
\]
\[x \approx 6.7\]

PTS: 2 REASON: 061108ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

439 ANS: 2
\[
\cos 38 = \frac{10}{x}
\]
\[x = \frac{10}{\cos 38} \approx 12.69\]

PTS: 2 REASON: 081126ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

440 ANS:
\[
2.1. \cos 65 = \frac{x}{5}
\]
\[x \approx 2.1\]

PTS: 2 REASON: 011133ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

441 ANS:
\[
39, 63. \tan 52 = \frac{50}{x}, \sin 52 = \frac{50}{x}
\]
\[x \approx 39 \quad x \approx 63\]

PTS: 4 REASON: 060937ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

442 ANS:
\[
84, 71. \sin 50 = \frac{x}{110}, \cos 50 = \frac{y}{110}
\]
\[x \approx 84 \quad y \approx 71\]

PTS: 4 REASON: 081039ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

443 ANS: 1 PTS: 2 REASON: 080824ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

444 ANS: 2
\[
\sin A = \frac{8}{12}
\]
\[A \approx 42\]

PTS: 2 REASON: 060816ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

445 ANS: 1 PTS: 2 REASON: 061114ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle
\[ \sin A = \frac{10}{16} \quad B = 180 - (90 = 38.7) = 51.3 \quad \text{A 90° angle is not acute.} \]

\[ A \approx 38.7 \]

**PTS: 2**  
**REF: 080829ia**  
**STA: A.A.43**  
**TOP: Using Trigonometry to Find an Angle**

**ANS: 3**

\[ \sin x = \frac{30}{50} \]

\[ x = \sin^{-1} \frac{3}{5} \]

\[ x \approx 37 \]

**PTS: 2**  
**REF: 061033ia**  
**STA: A.A.43**  
**TOP: Using Trigonometry to Find an Angle**

**ANS: 53.**

\[ \sin A = \frac{16}{20} \]

\[ A \approx 53 \]

**PTS: 2**  
**REF: 011032ia**  
**STA: A.A.43**  
**TOP: Using Trigonometry to Find an Angle**

**ANS: 41.8.**

\[ \sin x = \frac{8}{12} \]

\[ A \approx 41.8 \]

**PTS: 3**  
**REF: 081135ia**  
**STA: A.A.43**  
**TOP: Using Trigonometry to Find an Angle**

**ANS: 1**

\[ 7 + 8 + 7 + \frac{12\pi}{2} = 22 + 6\pi \]

**PTS: 2**  
**REF: 081128ia**  
**STA: A.G.1**  
**TOP: Compositions of Polygons and Circles**

**KEY: perimeter**

**ANS: 33.4.**

Serena needs 24 \((9 + 6 + 9)\) feet of fencing to surround the rectangular portion of the garden. The length of the fencing needed for the semicircular portion of the garden is \(\frac{1}{2} \pi d = 3\pi \approx 9.4\) feet.

**PTS: 2**  
**REF: fall0733ia**  
**STA: A.G.1**  
**TOP: Compositions of Polygons and Circles**

**KEY: perimeter**
ANS:  
50.  \(12 + 10 + 12 + \frac{1}{2}(10\pi) \approx 50\)

PTS: 2  REF: 010931ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: perimeter

\[ A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1 \]

PTS: 2  REF: 061029ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: area

\[ A = lw + lw + \frac{\pi r^2}{4} = 5 \cdot 3 + 5 \cdot 3 + \frac{\pi \cdot 3^2}{4} \approx 37 \]

PTS: 2  REF: 011123ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: area

\[ \text{shaded} = \text{whole} - \text{unshaded} \]
\[ = \text{rectangle-triangle} \]
\[ = lw - \frac{1}{2}bh \]
\[ = 15 \times 6 - \frac{1}{2} \times 15 \times 4.6 \]
\[ = 90 - 34.5 \]
\[ = 55.5 \]

PTS: 2  REF: 081019ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: area

\[ 36 - 9\pi \cdot 15.6 \cdot \text{Area of square} - \text{area of 4 quarter circles. } (3 + 3)^2 - 3^2 \pi = 36 - 9\pi \]

PTS: 2  REF: 060832ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: area

\[ 56. \text{If the circumference of circle } O \text{ is } 16\delta \text{ inches, the diameter, } AD, \text{ is } 16 \text{ inches and the length of } BC \text{ is } 12 \]
\[ \text{inches } \frac{3}{4} \times 16. \text{ The area of trapezoid } ABCD \text{ is } \frac{1}{2} \times 4(12 + 16) = 56. \]

PTS: 3  REF: 060934ia  STA: A.G.1  TOP: Compositions of Polygons and Circles  
KEY: area
1. \(5^3 = 3.375\)

PTS: 2  REF: 060809ia  STA: A.G.2  TOP: Volume

2. \(\pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5\)

PTS: 2  REF: fall0712ia  STA: A.G.2  TOP: Volume

3. \(\pi \left(\frac{6}{2}\right)^2 \cdot \frac{36}{\pi} \approx 2.97. Three cans will not fit. The maximum number is 2.\)

\[
\frac{342}{\pi} = h
\]

\[
\frac{38}{\pi} = h
\]

PTS: 3  REF: 010936ia  STA: A.G.2  TOP: Volume

4. \(SA = 2lw + 2hw + 2lh = 2(3)(1.5) + 2(2)(1.5) + 2(3)(2) = 27\)

PTS: 2  REF: 060827ia  STA: A.G.2  TOP: Surface Area

5. \(SA = 2lw + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52\)

PTS: 2  REF: 061136ia  STA: A.G.2  TOP: Surface Area
ANS:

\[ V = lwh = 10 \cdot 2 \cdot 4 = 80 \]
\[ SA = 2lw + 2hw + 2lh = 2 \cdot 10 \cdot 2 + 2 \cdot 2 \cdot 4 + 2 \cdot 10 \cdot 4 = 136 \]

PTS: 3   REF: 081035ia   STA: A.G.2   TOP: Surface Area