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

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

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

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

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

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

PTS: 2 REF: 081113ia 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: 3 PTS: 2 REF: 011224ia STA: A.N.1
TOP: Properties of Reals

11 ANS:
\[ -6a + 42. \text{ distributive} \]

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

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

13 ANS: 4 PTS: 2 REF: 060930ia STA: A.A.29
TOP: Set Theory

14 ANS: 4 PTS: 2 REF: 081022ia STA: A.A.29
TOP: Set Theory

15 ANS: 2 PTS: 2 REF: 061128ia STA: A.A.29
TOP: Set Theory

16 ANS: 4 PTS: 2 REF: 011222ia STA: A.A.29
TOP: Set Theory
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 \( \{ -1, 0, 2, 3, 4 \} \).

\[ A = \{ 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 \} \]

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

![Graph showing frequency histogram with scores on the x-axis and frequency on the y-axis.]

PTS: 2  REF: 081132ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables  KEY: frequency histograms

35 ANS:

![Table showing frequency distribution with intervals, tally marks, and frequency counts.]

![Graph showing a bar chart with morning temperatures.] 

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

![Histogram of Test Scores]

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>51–60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61–70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71–80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>81–90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91–100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PTS: 3  REF: 011135ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables  KEY: frequency histograms

37. ANS: 

![Frequency Histogram of Number of Days Outside]

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1</td>
<td>IIII</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2–3</td>
<td>IIII</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>4–5</td>
<td>IIII</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>6–7</td>
<td>IIII</td>
<td>3</td>
<td>20</td>
</tr>
</tbody>
</table>

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

38. ANS: 

\[25 - 18 = 7\]

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

39. ANS: 

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

PTS: 4  REF: 061038ia  STA: A.S.9  TOP: Frequency Histograms, Bar Graphs and Tables
The median score, 10, is the vertical line in the center of the box.

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

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

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

\[ 75 - 15 = 60 \]
They will not reach their goal in 18 months.
63 ANS: 3
mean = 6, median = 6 and mode = 7

PTS: 2 REF: 080804ia STA: A.S.4 TOP: Central Tendency

64 ANS: 4
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

65 ANS: 3
mean = $8 \frac{7}{11}$, median = 81 and mode = 76

PTS: 2 REF: 011118ia STA: A.S.4 TOP: Central Tendency

66 ANS: 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

67 ANS: 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

68 ANS: 81.3, 80, both increase

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

69 ANS: 12, 7. Both the median and the mode will increase.

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

70 ANS: 4
\[
\frac{2 + 3 + 0 + 1 + 3 + 2 + 4 + 0 + 2 + 3}{10} = \frac{20}{10} = 2 + 0.5 \\
x = 25
\]

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

71 ANS: 3
The other situations are quantitative.

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

72 ANS: 3
The other situations are quantitative.

PTS: 2 REF: 060905ia STA: A.S.1 TOP: Analysis of Data
73 ANS: 4
The other situations are quantitative.

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

74 ANS: 4
The other sets of data are qualitative.

PTS: 2 REF: 011116ia STA: A.S.1 TOP: Analysis of Data

75 ANS: 2
The other sets of data are qualitative.

PTS: 2 REF: 011211ia STA: A.S.1 TOP: Analysis of Data

76 ANS: 2
The two values are shoe size and height.

PTS: 2 REF: fall0714ia STA: A.S.2 TOP: Analysis of Data

77 ANS: 3
Frequency is not a variable.

PTS: 2 REF: 011014ia STA: A.S.2 TOP: Analysis of Data

78 ANS: 3
To determine student interest, survey the widest range of students.

PTS: 2 REF: 060803ia STA: A.S.3 TOP: Analysis of Data

79 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

80 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

81 ANS: 4
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

82 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
85 ANS: 1
A rooster crows before sunrise, not because of the sun.

PTS: 2  REF: fall0707ia  STA: A.S.14  TOP: Analysis of Data

86 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

87 ANS: 3  PTS: 2  REF: 081017a  STA: A.S.14

88 ANS: 2  PTS: 2  REF: 061122ia  STA: A.S.14

89 ANS: 2  PTS: 2  REF: 081104ia  STA: A.S.14

90 ANS: 1  PTS: 2  REF: fall0723ia  STA: A.M.3  TOP: Error  KEY: area

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

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

92 ANS: 2
\[
\frac{55.42 - 50.27}{55.42} \approx 0.093
\]

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

93 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

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

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

95 ANS: 2
\[
\frac{(2.6 \times 6.9) - (2.5 \times 6.8)}{(2.6 \times 6.9)} \approx 0.052
\]

PTS: 2  REF: 011209ia  STA: A.M.3  TOP: Error  KEY: area
96 ANS: 1
\[
\left| \frac{289 - 282}{289} \right| \approx 0.024
\]

PTS: 2 REF: 080828ia STA: A.M.3 TOP: Error
KEY: volume and surface area

97 ANS: 2
The volume of the cube using Ezra’s measurements is 8 \((2^3)\). The actual volume is 9.261 \((2.1^3)\). The relative error is \(\left| \frac{9.261 - 8}{9.261} \right| \approx 0.14\).

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

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

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

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

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

100 ANS: \[
\frac{600 - 592}{592} \approx 0.014
\]

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

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

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

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

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

104 ANS: 
(T,J,F), (T,J,N), (T,K,F), (T,K,N), (T,C,F), (T,C,N), (B,J,F), (B,J,N), (B,K,F), (B,K,N), (B,C,F), (B,C,N), (S,J,F), 

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

105 ANS: 
8, 3

PTS: 4 REF: 011238ia STA: A.S.19 TOP: Sample Space

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

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

107 ANS: 
(S,S), (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


109 ANS: 3

\[ \frac{15}{15 + 13 + 12} = \frac{15}{40} = \frac{3}{8} \]

PTS: 2 REF: 061006ia STA: A.S.21 TOP: Experimental Probability

110 ANS: 3

\[ \frac{3 + 2 + 4 + 3}{20} = \frac{12}{20} \]

PTS: 2 REF: 011129ia STA: A.S.21 TOP: Experimental Probability

111 ANS: 
\[ \frac{6}{25} - \frac{(11 + 5 + 3)}{25} \]

PTS: 2 REF: 011232ia STA: A.S.21 TOP: Experimental Probability

112 ANS: 2 PTS: 2 REF: 011002ia STA: A.S.20 TOP: Theoretical Probability
113 ANS: 4
\[ P(O) = \frac{3}{6}, \quad P(E) = \frac{3}{6}, \quad P(<6) = \frac{5}{6}, \quad P(>4) = \frac{2}{6} \]
PTS: 2 REF: 010903ia STA: A.S.22 TOP: Theoretical Probability

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

115 ANS:
orchestra: \( \frac{3}{26} > \frac{4}{36} \)

PTS: 2 REF: 011033ia STA: A.S.22 TOP: Theoretical Probability

116 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

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

118 ANS: 2
The events are not mutually exclusive: \( P(\text{prime}) = \frac{3}{6}, \quad P(\text{even}) = \frac{3}{6}, \quad P(\text{prime AND even}) = \frac{1}{6} \)
\[ P(\text{prime OR even}) = \frac{3}{6} + \frac{3}{6} - \frac{1}{6} = \frac{5}{6} \]

PTS: 2 REF: 080830ia STA: A.S.23 TOP: Theoretical Probability KEY: not mutually exclusive events

119 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

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

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

121 ANS: 2 PTS: 2 REF: 011212ia STA: A.S.23 TOP: Theoretical Probability KEY: independent events
122 ANS: 3  PTS: 2  REF: 080907ia  STA: A.S.20  
TOP: Geometric Probability

123 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

124 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

125 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

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

PTS: 2  REF: 010928ia  STA: A.S.23  TOP: Geometric Probability

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

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

128 ANS:  
\[
\frac{1}{8} \quad \text{After the English and social studies books are taken, 8 books are left and 1 is an English book.}
\]

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

129 ANS: 4  
\[
5 \times 2 \times 3 = 30
\]

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

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

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

131 ANS: 3  PTS: 2  REF: 060808ia  STA: A.N.8  
TOP: Permutations

132 ANS: 4  
\[
\sqrt{5} \times 4 \times 3 \times 2 \times 1 = 120
\]

PTS: 2  REF: 061109ia  STA: A.N.8  TOP: Permutations
133 ANS: 1
\[4P_4 = 4 \times 3 \times 2 \times 1 = 24\]

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

134 ANS: 4
\[8P_3 = 336\]

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

135 ANS: 3
\[6P_4 = 360\]

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

136 ANS: 60
\[3P_3 = 60\]

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

137 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

138 ANS: 4
\[25(x - 3) = 25x - 75\]

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

139 ANS: 2
PTS: 2
REF: 060904ia
STA: A.A.1
TOP: Expressions

140 ANS: 3
PTS: 2
REF: 011104ia
STA: A.A.1
TOP: Expressions

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

142 ANS: 3
PTS: 2
REF: 011205ia
STA: A.A.1
TOP: Expressions

143 ANS: 4
\[5(x + 4) = 5x + 20\]

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

144 ANS: 4
\[A = lw = (3w - 7)(w) = 3w^2 - 7w\]

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

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

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

147 ANS: 4
PTS: 2
REF: 061016ia
STA: A.A.2
TOP: Expressions
Not all of the homework problems are equations. The first problem is an expression.

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

\[ 3p = 21 \]

\[ p = 7 \]

Debbie failed to distribute the 3 properly.
156 ANS:

$$4. \ 3 + 2g = 5g - 9$$

$$12 = 3g$$

$$g = 4$$

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

157 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

158 ANS: 1

$$\frac{2x}{3} + \frac{1}{2} = \frac{5}{6}$$

$$\frac{2x}{3} = \frac{1}{3}$$

$$6x = 3$$

$$x = \frac{1}{2}$$

PTS: 2  REF: 011112ia  STA: A.A.25  TOP: Solving Equations with Fractional Expressions
159 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

160 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

161 ANS: 4
\[
\frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15}
\]

\[
\frac{(2x \times 3) + (5 \times 1)}{5 \times 3} = \frac{7x - 2}{15}
\]

\[
\frac{6x + 5}{15} = \frac{7x - 2}{15}
\]

\[
6x + 5 = 7x - 2
\]

\[
x = 7
\]

PTS: 2 REF: 080820ia STA: A.A.25
TOP: Solving Equations with Fractional Expressions
162 ANS: 
\[
\frac{m}{5} + \frac{3(m-1)}{2} = 2(m-3) \\
2m + \frac{15(m-1)}{10} = 2m - 6 \\
\frac{17m - 15}{10} = 2m - 6 \\
17m - 15 = 20m - 60 \\
45 = 3m \\
15 = m
\]

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

163 ANS: 2 PTS: 2 REF: 080901ia STA: A.A.4 TOP: Modeling Equations

164 ANS: 2 PTS: 2 REF: 010915ia STA: A.A.5 TOP: Modeling Equations

165 ANS: 4 PTS: 2 REF: 081011ia STA: A.A.5 TOP: Modeling Equations

166 ANS: 4 
\[w(w+5) = 36\] 
\[w^2 + 5w - 36 = 0\]

PTS: 2 REF: fall0726ia STA: A.A.5 TOP: Modeling Equations

167 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

168 ANS: 
\[7, 9, 11. \ x + (x + 2) + (x + 4) = 5(x + 2) - 18\] 
\[3x + 6 = 5x - 8\] 
\[14 = 2x\] 
\[7 = x\]

PTS: 4 REF: 011237ia STA: A.A.6 TOP: Modeling Equations
169  ANS: 3
    \[3ax + b = c\]
    \[3ax = c - b\]
    \[x = \frac{c - b}{3a}\]

    PTS: 2  REF: 080808ia  STA: A.A.23  TOP: Transforming Formulas

170  ANS: 2
    \[P = 2l + 2w\]
    \[P - 2l = 2w\]
    \[\frac{P - 2l}{2} = w\]

    PTS: 2  REF: 010911ia  STA: A.A.23  TOP: Transforming Formulas

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

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

173  ANS: 1
    \[s = \frac{2x + t}{r}\]
    \[rs = 2x + t\]
    \[rs - t = 2x\]
    \[\frac{rs - t}{2} = x\]

    PTS: 2  REF: 011228ia  STA: A.A.23  TOP: Transforming Formulas

174  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
\[a + ar = b + r\]
\[a(1 + r) = b + r\]
\[a = \frac{b + r}{1 + r}\]

PTS: 2  REF: 060913ia  STA: A.A.23  TOP: Transforming Formulas

176 ANS:
\[bc + ac = ab\]
\[c(b + a) = ab\]
\[c = \frac{ab}{b + a}\]

PTS: 2  REF: 081131ia  STA: A.A.23  TOP: Transforming Formulas
Integrated Algebra Regents Exam Questions by Performance Indicator: Topic Answer Section

177 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

178 ANS:

\[ \frac{2,160}{25} = \frac{x}{45} \]

\[ 25x = 54,000 \]

\[ x = 2,160 \]

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

179 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

180 ANS: 4

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

PTS: 2 REF: 010902ia STA: A.M.1 TOP: Speed

181 ANS: 4

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

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

182 ANS: 1

\[ \frac{12.8 + 17.2}{3 + 5} = 3.75 \]

PTS: 2 REF: 061117ia STA: A.M.1 TOP: Speed

183 ANS: 4

\[ \frac{5}{45} = \frac{8}{x} \]

\[ 5x = 360 \]

\[ x = 72 \]

PTS: 2 REF: 060901ia STA: A.M.1 TOP: Speed
184 ANS:
\[ \frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25 \]

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

185 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

186 ANS:
The turtle won by .5 minutes. Turtle: \( \frac{d}{s} = \frac{100}{20} = 5 \). Rabbit: \( \frac{d}{s} = \frac{100}{40} = 2.5 + 3 = 5.5 \)

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

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

PTS: 3 REF: 011236ia STA: A.M.1 TOP: Speed

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

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

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

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

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

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

191 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

192 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
193 ANS: 2
Candidate B received 45%. \(45\% \times 1860 = 837\)

PTS: 2 \hspace{1cm} \text{REF: 081007ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Percents}

194 ANS:
\[
\frac{1}{6}, 16.67\%, $13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}, \quad 18 \times 0.75 = 13.5
\]

PTS: 3 \hspace{1cm} \text{REF: 060835ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Percents}

195 ANS:
\[
30.4\%; \text{ no, } 23.3\%. \quad \frac{7.50 - 5.75}{7.50} = 30.4\%. \quad \frac{7.50 - 5.75}{7.50 - 5.75} = 23.3\%
\]

PTS: 3 \hspace{1cm} \text{REF: 080935ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Percents}

196 ANS:
\[
259.99 \times 1.07 - 259.99(1 - 0.3) \times 1.07 = 83.46
\]

PTS: 4 \hspace{1cm} \text{REF: 011239ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Percents}

197 ANS: 4
\[
\frac{150}{20} = \frac{x}{30} \\
20x = 4500 \\
x = 225
\]

PTS: 2 \hspace{1cm} \text{REF: 081101ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Direct Variation}

198 ANS:
\[
d = 6.25h, \quad 250. \quad d = 6.25(40) = 250
\]

PTS: 2 \hspace{1cm} \text{REF: 010933ia} \hspace{1cm} \text{STA: A.N.5} \hspace{1cm} \text{TOP: Direct Variation}

199 ANS: 2
PTs: 2 \hspace{1cm} \text{REF: 080823ia} \hspace{1cm} \text{STA: A.A.32} \hspace{1cm} \text{TOP: Slope}

200 ANS: 1
PTs: 2 \hspace{1cm} \text{REF: 081115ia} \hspace{1cm} \text{STA: A.A.32} \hspace{1cm} \text{TOP: Slope}

201 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 \hspace{1cm} \text{REF: 011007ia} \hspace{1cm} \text{STA: A.A.33} \hspace{1cm} \text{TOP: Slope}

202 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 \hspace{1cm} \text{REF: 081005ia} \hspace{1cm} \text{STA: A.A.33} \hspace{1cm} \text{TOP: Slope}
203  \( m = \frac{4 - 10}{3 - (-6)} = \frac{2}{3} \)

PTS: 2  REF: fall0716ia  STA: A.A.33  TOP: Slope

204  \( m = \frac{1 - (-4)}{-6 - 4} = \frac{1}{2} \)

PTS: 2  REF: 060820ia  STA: A.A.33  TOP: Slope

205  \( m = \frac{5 - 3}{2 - 7} = \frac{2}{5} \)

PTS: 2  REF: 010913ia  STA: A.A.33  TOP: Slope

206  \( m = \frac{4 - (-4)}{-5 - 15} = \frac{2}{5} \)

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

207  \( m = \frac{5 - 2}{3 - (-2)} = \frac{3}{5} \)

PTS: 2  REF: 061004ia  STA: A.A.33  TOP: Slope

208  \( m = \frac{6 - 4}{3 - (-2)} = \frac{2}{5} \)

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

209  \( m = \frac{-3 - 1}{2 - 5} = \frac{-4}{-3} = \frac{4}{3} \)

PTS: 2  REF: 011215ia  STA: A.A.33  TOP: Slope

210  \( m = \frac{-A}{B} = \frac{-3}{-7} = \frac{3}{7} \)

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

211  \( \frac{75}{4} = \frac{x}{16} \)

\( x = 300 \)

PTS: 2  REF: 080807ia  STA: A.G.4  TOP: Graphing Linear Functions
**212** ANS: 1  
\[ y = mx + b \]  
\[-6 = (-3)(4) + b \]  
\[ b = 6 \]

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

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

**PTS: 2**  
**REF: 080927ia**  
**STA: A.A.34**  
**TOP: Writing Linear Equations**

**214** ANS: 1  
\[ y = mx + b \]  
\[ 5 = (-2)(1) + b \]  
\[ b = 7 \]

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

**215** 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**

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

**217** 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**

**218** 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**
219 ANS: 2
\[ m = \frac{5-3}{8-1} = \frac{2}{7} \]
\[ y - y_1 = m(x - x_1) \]
\[ y - 5 = \frac{2}{7}(x - 8) \]

220 ANS:
\[ y = \frac{2}{5}x + 2, \quad m = \frac{4-0}{5-(-5)} = \frac{2}{5} \]
\[ y = mx + b \]
\[ 4 = \frac{2}{5}(5) + b \]
\[ b = 2 \]

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

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

223 ANS: 4
\[ 3y + 2x = 8 \]
\[ 3(-2) + 2(7) = 8 \]
\[ -6 + 14 = 8 \]

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

225 ANS: 2
\[ PTS: 2 \]
\[ REF: 080810ia \]
\[ STA: A.A.36 \]
\[ TOP: Parallel and Perpendicular Lines \]

226 ANS: 1
\[ PTS: 2 \]
\[ REF: 080911ia \]
\[ STA: A.A.36 \]
\[ TOP: Parallel and Perpendicular Lines \]

227 ANS: 2
\[ PTS: 2 \]
\[ REF: 081014ia \]
\[ STA: A.A.36 \]
\[ TOP: Parallel and Perpendicular Lines \]
228 ANS: 4 PTS: 2 REF: 061112ia STA: A.A.36
TOP: Parallel and Perpendicular Lines

229 ANS: 1
The slope of both is −4.

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

230 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

231 ANS: 1
The slope of \( 2x - 4y = 16 \) is \( \frac{-A}{B} = \frac{-2}{-4} = \frac{1}{2} \)

PTS: 2 REF: 011026ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

232 ANS: 2
\( y - kx = 7 \) may be rewritten as \( y = kx + 7 \)

PTS: 2 REF: 061015ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

233 ANS: 4
\(-6x - 17 \geq 8x + 25\)
\(-42 \geq 14x\)
\(-3 \geq x\)

PTS: 2 REF: 081121ia STA: A.A.24 TOP: Solving Inequalities

234 ANS: 1
\(3(2m - 1) \leq 4m + 7\)
\(6m - 3 \leq 4m + 7\)
\(2m \leq 10\)
\(m \leq 5\)

PTS: 2 REF: 081002ia STA: A.A.24 TOP: Solving Inequalities

235 ANS:
\(2(x - 4) \geq \frac{1}{2}(5 - 3x)\)
\(4(x - 4) \geq 5 - 3x\)
\(4x - 16 \geq 5 - 3x\)
\(7x \geq 21\)
\(x \geq 3\)

PTS: 3 REF: 011234ia STA: A.A.24 TOP: Solving Inequalities
236 ANS: 1
\[-2x + 5 > 17\]
\[-2x > 12\]
\[x < -6\]

PTS: 2       REF: fall0724ia       STA: A.A.21       TOP: Interpreting Solutions

237 ANS: 4
\[-4x + 2 > 10\]
\[-4x > 8\]
\[x < -2\]

PTS: 2       REF: 080805ia       STA: A.A.21       TOP: Interpreting Solutions

238 ANS: 1
\[\frac{4}{3}x + 5 < 17\]
\[\frac{4}{3}x < 12\]
\[4x < 36\]
\[x < 9\]

PTS: 2       REF: 060914ia       STA: A.A.21       TOP: Interpreting Solutions

239 ANS: 4
\[-2(x - 5) < 4\]
\[-2x + 10 < 4\]
\[-2x < -6\]
\[x > 3\]

PTS: 2       REF: 080913ia       STA: A.A.21       TOP: Interpreting Solutions

240 ANS:
\[-12. 3\left(\frac{2}{3}x + 3 \right) < -2x - 7\]
\[x + 9 < -6x - 21\]
\[7x < -30\]
\[x < \frac{-30}{7}\]

PTS: 3       REF: 061034ia       STA: A.A.21       TOP: Interpreting Solutions

241 ANS: 1       PTS: 2       REF: 080803ia       STA: A.A.4       TOP: Modeling Inequalities

242 ANS: 4       PTS: 2       REF: 060906ia       STA: A.A.4       TOP: Modeling Inequalities
243  ANS: 2  PTS:  2  REF: 060821ia  STA: A.A.5
TOP: Modeling Inequalities

244  ANS: 2  PTS:  2  REF: 011005ia  STA: A.A.5
TOP: Modeling Inequalities

245  ANS: 4  PTS:  2  REF: fall0715ia  STA: A.A.5
TOP: Modeling Inequalities

246  ANS: 4  PTS:  2  REF: 081107ia  STA: A.A.5
TOP: Modeling Inequalities

247  ANS: 1
0.07m + 19 \leq 29.50
0.07m \leq 10.50
m \leq 150

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

248  ANS: 1
13.95 + 0.49s \leq 50.00
0.49s \leq 36.05
s \leq 73.57

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

249  ANS:
7. \  15x + 22 \geq 120
x \geq 6.53

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

250  ANS:
10 + 2d \geq 75, 33. \  10 + 2d \geq 75
\ d \geq 32.5

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

251  ANS:
0.65x + 35 \leq 45
0.65x \leq 10
x \leq 15

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

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

253  ANS: 1  PTS:  2  REF: 011210ia  STA: A.G.6
TOP: Linear Inequalities

254  ANS: 1  PTS:  2  REF: 060920ia  STA: A.G.6
TOP: Linear Inequalities

9
The slope of the inequality is $-\frac{1}{2}$.

$$\begin{align*}
(1,-3) \text{ is in the solution set. } &4(1) - 3(-3) > 9 \\
&4 + 9 > 9
\end{align*}$$
Graph becomes wider as the coefficient approaches 0.

The graph becomes steeper.

\[2x^2 + 10x - 12 = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1)\]
ANS: 3  PTS: 2  REF: 081008ia
TOP: Factoring the Difference of Perfect Squares

ANS: 1  PTS: 2  REF: 060804ia
TOP: Factoring the Difference of Perfect Squares

ANS: 2  PTS: 2  REF: 010909ia
TOP: Factoring the Difference of Perfect Squares

ANS: 1  PTS: 2  REF: 080902ia
TOP: Factoring the Difference of Perfect Squares

ANS: 3  PTS: 2  REF: 061101ia
TOP: Factoring the Difference of Perfect Squares

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

ANS: 2
\[ 36x^2 - 100y^6 = 4(9x^2 - 25y^6) = 4(3x + 5y^3)(3x - 5y^3) \]

PTS: 2  REF: 081129ia  STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

ANS: 2
\[ 4x(x + 3)(x - 3) \]
\[ 4x^3 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3) \]

PTS: 2  REF: 060932ia  STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

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

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

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

PTS: 2  REF: 010914ia  STA: A.A.28
TOP: Roots of Quadratics
279 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

280 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

281 ANS: 1
\[ 3x^2 - 27x = 0 \]
\[ 3x(x - 9) = 0 \]
\[ x = 0, 9 \]

PTS: 2  REF: 011223ia  STA: A.A.28  TOP: Roots of Quadratics

282 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

283 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

284 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

285 ANS: 4  PTS: 2  REF: 060829ia  STA: A.G.5  TOP: Graphing Quadratic Functions
286 ANS: 2  
PTS: 2  
REF: 061113ia  
STA: A.G.5  
TOP: Graphing Quadratic Functions

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

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

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

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

291 ANS:  

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

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

292 ANS: 1  

\[ b = 3 + d \]  
\[ (3 + d)d = 40 \]
\[ bd = 40 \]  
\[ d^2 + 3d - 40 = 0 \]
\[ (d + 8)(d - 5) = 0 \]
\[ d = 5 \]

PTS: 2  
REF: 061020ia  
STA: A.A.8  
TOP: Writing Quadratics

293 ANS: 3  

\[ b = 3 + d \]  
\[ (3 + d)d = 40 \]
\[ bd = 40 \]  
\[ d^2 + 3d - 40 = 0 \]
\[ (d + 8)(d - 5) = 0 \]
\[ d = 5 \]

PTS: 2  
REF: 011208ia  
STA: A.A.8  
TOP: Writing Quadratics
294 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

295 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

296 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

297 ANS:
\(w(w + 15) = 54, 3, 18. \quad w(w + 15) = 54\)
\[w^2 + 15w - 54 = 0\]
\((w + 18)(w - 3) = 0\)
\[w = 3\]

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

298 ANS: 1
TOP: Identifying the Vertex of a Quadratic Given Graph

299 ANS: 1
TOP: Identifying the Vertex of a Quadratic Given Graph

300 ANS: 2
TOP: Identifying the Vertex of a Quadratic Given Graph

301 ANS: 2
TOP: Identifying the Vertex of a Quadratic Given Graph

302 ANS: 1
TOP: Identifying the Vertex of a Quadratic Given Graph
303 ANS: 
\[ x = 1; (1, -5) \]

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

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

305 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

306 ANS: 1  
\[ x = \frac{-b}{2a} = \frac{-(-3)}{2(2)} = \frac{3}{4}. \]

PTS: 2  
REF: 011219ia  
STA: A.A.41  
TOP: Identifying the Vertex of a Quadratic Given Equation

307 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

308 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

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

PTS: 3  
REF: 080934ia  
STA: A.A.41  
TOP: Identifying the Vertex of a Quadratic Given Equation
310 ANS: 2
\[x + 2y = 9\]
\[x - y = 3\]
\[3y = 6\]
\[y = 2\]

PTS: 2 REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems

311 ANS: 1
\[x - 2y = 1\]
\[x + 4y = 7\]
\[-6y = -6\]
\[y = 1\]

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

312 ANS: 2
\[2(x - 3y = -3)\]
\[2x + y = 8\]
\[2x - 6y = -6\]
\[7y = 14\]
\[y = 2\]

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

313 ANS: 3
\[5x + 2y = 48\]
\[3x + 2y = 32\]
\[2x = 16\]
\[x = 8\]

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

314 ANS: 3
\[2x - 5y = 11\]
\[2x - 5(-1) = 11\]
\[-2x + 3y = -9\]
\[2x = 6\]
\[-2y = 2\]
\[x = 3\]
\[y = -1\]

PTS: 2 REF: 081109ia STA: A.A.10 TOP: Solving Linear Systems
315 ANS: 3
\[ c + 3d = 8 \quad c = 4d - 6 \]
\[ 4d - 6 + 3d = 8 \quad c = 4(2) - 6 \]
\[ 7d = 14 \quad c = 2 \]
\[ d = 2 \]

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

316 ANS:
\((-2, 5)\) \(3x + 2y = 4\) \(12x + 8y = 16\) \(3x + 2y = 4\)
\[ 4x + 3y = 7 \quad 12x + 9y = 21 \quad 3x + 2(5) = 4 \]
\[ y = 5 \quad 3x = -6 \]
\[ x = -2 \]

PTS: 4 REF: 010937ia STA: A.A.10 TOP: Solving Linear Systems

317 ANS: [Graph of a system of equations]

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

318 ANS: [Graph of a system of equations]

PTS: 3 REF: 011235ia STA: A.G.7 TOP: Solving Linear Systems
319 ANS: 2
\[ L + S = 47 \]
\[ L - S = 15 \]
\[ 2L = 62 \]
\[ L = 31 \]

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

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

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

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

PTS: 2   REF: 060812ia   STA: A.A.7   TOP: Writing Linear Systems

322 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

323 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

324 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
325 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

326 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

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

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

328 ANS:
\[m = 50\$\, p = 15\$\]
\[3m + 2p = 1.80\]
\[9m + 6p = 5.40\]
\[4(0.50) + 6p = 2.90\]
\[4m + 6p = 2.90\]
\[4m + 6p = 2.90\]
\[6p = 0.90\]
\[5m = 2.50\]
\[p = 0.15\]
\[m = 0.50\]

PTS: 4 REF: 080837ia STA: A.A.7 TOP: Writing Linear Systems

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

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

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

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

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

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

PTS: 4  REF: 061139ia  STA: A.G.7  TOP: Systems of Linear Inequalities

337 ANS: 4

PTS: 2  REF: 060810ia  STA: A.A.11  TOP: Quadratic-Linear Systems

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

PTS: 2  REF: 080812ia  STA: A.A.11  TOP: Quadratic-Linear Systems
339 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 or -1

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

340 ANS: 2

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

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

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

342 ANS: 1 PTS: 2 REF: 011207ia STA: A.G.9 TOP: Quadratic-Linear Systems

343 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

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

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

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

349 ANS:

\[ 4 \]

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

350 ANS: 4

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

PTS: 4  REF: 081114ia  STA: A.A.13  TOP: Addition and Subtraction of Monomials

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

352 ANS: 1  PTS: 2  REF: 011213ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials

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


355 ANS: 1  PTS: 2  REF: 011126ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials


357 ANS: 1  PTS: 2  REF: 060807ia  STA: A.A.13  TOP: Multiplication of Polynomials
\[
\frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1
\]

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

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

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

\[
\frac{2^6}{2^5} = 2^1
\]

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

\[
\frac{(2x^3)(8x^2)}{4x^5} = \frac{16x^8}{4x^6} = 4x^2
\]

PTS: 2  REF: fall0703ia  STA: A.A.12  TOP: Division of Powers

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

PTS: 2  REF: 010932ia  STA: A.A.12  TOP: Powers of Powers

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

PTS: 2  REF: 011124ia  STA: A.A.12  TOP: Powers of Powers
\[
\left( \frac{4x^3}{2x} \right)^2 = \frac{16x^6}{2x} = 8x^5
\]

PTS: 2  REF: 011216ia  STA: A.A.12  TOP: Powers of Powers

371  ANS: 4  PTS: 2  REF: 010927ia  STA: A.N.4
TOP: Operations with Scientific Notation

372  ANS: 4  PTS: 2  REF: 060927ia  STA: A.N.4
TOP: Operations with Scientific Notation

373  ANS: 2  PTS: 2  REF: 061127ia  STA: A.N.4
TOP: Operations with Scientific Notation

374  ANS: 2  PTS: 2  REF: fall0725ia  STA: A.N.4
TOP: Operations with Scientific Notation

375  ANS: 4
\[
\frac{9.2 \times 10^6}{2.3 \times 10^3} = 4 \times 10^4
\]

PTS: 2  REF: 081006ia  STA: A.N.4  TOP: Operations with Scientific Notation

376  ANS: 1  PTS: 2  REF: 011202ia  STA: A.A.9
TOP: Exponential Functions

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

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

379  ANS: 2
\[
R = 0.5^{d-1}
\]

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

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

PTS: 2  REF: 080929ia  STA: A.A.9  TOP: Exponential Functions

381  ANS: 2
\[
2000(1 + 0.04)^3 \approx 2249
\]

PTS: 2  REF: 081124ia  STA: A.A.9  TOP: Exponential Functions

382  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

383  ANS: 3
\[
35000(1 - 0.05)^4 \approx 28507.72
\]

PTS: 2  REF: fall0719ia  STA: A.A.9  TOP: Exponential Functions
384 ANS: 2
20000(.88)^3 = 13629.44

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

385 ANS:
24,435.19. 30000(.95)^4 ≈ 24435.19

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

386 ANS:
5,583.86. A = P(1 + R)^t = 5000(1 + 0.0375)^3 ≈ 5583.86

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

387 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

388 ANS: 2
\sqrt{32} = \sqrt{16} \cdot \sqrt{2} = 4\sqrt{2}

PTS: 2 REF: 060910ia STA: A.N.2 TOP: Simplifying Radicals

389 ANS: 3
\sqrt{72} = \sqrt{36} \cdot \sqrt{2} = 6\sqrt{2}

PTS: 2 REF: 010920ia STA: A.N.2 TOP: Simplifying Radicals

390 ANS: 3
2\sqrt{45} = 2\sqrt{9 \cdot \sqrt{5}} = 6\sqrt{5}

PTS: 2 REF: 011203ia STA: A.N.2 TOP: Simplifying Radicals

391 ANS: 3
3\sqrt{250} = 3\sqrt{25 \cdot \sqrt{10}} = 15\sqrt{10}

PTS: 2 REF: 061106ia STA: A.N.2 TOP: Simplifying Radicals

392 ANS: 1
\frac{\sqrt{32}}{4} = \frac{\sqrt{16} \cdot \sqrt{2}}{4} = \sqrt{2}

PTS: 2 REF: 060828ia STA: A.N.2 TOP: Simplifying Radicals
393 ANS: 2
\[ 5\sqrt{20} = 5\sqrt{4 \cdot 5} = 10\sqrt{5} \]

PTS: 2 REF: 080922ia STA: A.N.2 TOP: Simplifying Radicals

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

PTS: 2 REF: fall0731ia STA: A.N.2 TOP: Simplifying Radicals

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

PTS: 2 REF: 081033ia STA: A.N.2 TOP: Simplifying Radicals
Integrated Algebra Regents Exam Questions by Performance Indicator: Topic
Answer Section

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

PTS: 2 REF: 011121ia STA: A.N.3 TOP: Operations with Radicals
KEY: addition

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

PTS: 2 REF: 061008ia STA: A.N.3 TOP: Operations with Radicals
KEY: subtraction

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

PTS: 2 REF: 011024ia STA: A.N.3 TOP: Operations with Radicals
KEY: addition

399 ANS:
\[ -2\sqrt{3} \frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12} = 8\sqrt{3} - 5\sqrt{4\sqrt{3}} = 8\sqrt{3} - 10\sqrt{3} = -2\sqrt{3} \]

PTS: 3 REF: 081136ia STA: A.N.3 TOP: Operations with Radicals

400 ANS:
\[ 60 - 2\sqrt{5}. 3\sqrt{20}(2\sqrt{5} - 7) = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4\sqrt{5}} = 60 - 24\sqrt{5} \]

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

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

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

402 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
403 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

404 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

405 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

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

PTS: 2  REF: 011233ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

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

PTS: 2  REF: 061131ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

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

409 ANS: 4  PTS: 2  REF: 060916ia  STA: A.A.15  TOP: Undefined Rationals

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

411 ANS: 2  PTS: 2  REF: 010925ia  STA: A.A.15  TOP: Undefined Rationals

412 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
413 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

414 ANS: 4
\[x^2 - 4x - 12 = 0\]
\[(x - 6)(x + 2) = 0\]
\[x = 6, x = -2\]

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

415 ANS: 1
\[x^2 + 5x - 6 = 0\]
\[(x + 6)(x - 1) = 0\]
\[x = -6, 1\]

PTS: 2  REF: 011214ia  STA: A.A.15  TOP: Undefined Rationals

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

PTS: 2  REF: 060815ia  STA: A.A.15  TOP: Multiplication and Division of Rationals
KEY: multiplication

417 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
KEY: multiplication

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

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

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

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

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

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

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

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

**PTS:** 2  **REF:** 081027ia  **STA:** A.A.17  **TOP:** Addition and Subtraction of Rationals

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

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

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

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

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

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

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

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

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

**PTS:** 2  **REF:** 011120ia  **STA:** A.A.17  **TOP:** Addition and Subtraction of Rationals
\[
\frac{7}{12x} - \frac{y}{6x^2} = \frac{42x^2 - 12xy}{72x^3} = \frac{6x(7x - 2y)}{72x^3} = \frac{7x - 2y}{12x^2}
\]

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

429 ANS: 4  
PTS: 2  
REF: 011025ia  
STA: A.A.17

TOP: Addition and Subtraction of Rationals

430 ANS: 1  
PTS: 2  
REF: 061024ia  
STA: A.A.17

TOP: Addition and Subtraction of Rationals

431 ANS: 2

\[
\frac{2y}{y+5} + \frac{10}{y+5} = \frac{2y+10}{y+5} = \frac{2(y+5)}{y+5} = 2
\]

PTS: 2  
REF: 011230ia  
STA: A.A.17  
TOP: Addition and Subtraction of Rationals

432 ANS: 3

\[
\frac{k+4}{2} = \frac{k+9}{3}
\]

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

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

\[k = 6\]

PTS: 2  
REF: 010906ia  
STA: A.A.26  
TOP: Solving Rationals

433 ANS: 2

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

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

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

\[4x = 1\]

\[x = \frac{1}{4}\]

PTS: 2  
REF: 081012ia  
STA: A.A.26  
TOP: Solving Rationals
\[ \frac{5}{x} = \frac{x + 13}{6} \]
\[ x^2 + 13x = 30 \]
\[ x^2 + 13x - 30 = 0 \]
\[ (x + 15)(x - 2) = 0 \]
\[ x = -15 \text{ or } 2 \]

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

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

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

\[ \frac{2}{x - 3} = \frac{26}{x} \]
\[ -3 = \frac{24}{x} \]
\[ x = -8 \]

PTS: 2  REF: 010918ia  STA: A.A.26  TOP: Solving Rationals
437 ANS:
4, -5. \( \frac{x + 2}{6} = \frac{3}{x - 1} \)

\((x + 2)(x - 1) = 18\)

\(x^2 - x + 2x - 2 = 18\)

\(x^2 + x - 20 = 0\)

\((x + 5)(x - 4) = 0\)

\(x = -5\) or \(4\)

PTS: 3 REF: 011136ia STA: A.A.26 TOP: Solving Rationals

438 ANS:
6, -2. \( \frac{x + 1}{x} = \frac{-7}{x - 12} \)

\((x + 1)(x - 12) = -7x\)

\(x^2 - 11x - 12 = -7x\)

\(x^2 - 4x - 12 = 0\)

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

\(x = 6\) or \(-2\)

PTS: 4 REF: fall0739ia STA: A.A.26 TOP: Solving Rationals

439 ANS:
\[
\frac{9}{4} \quad \frac{3}{4} = \frac{-(x + 11)}{4x} + \frac{1}{2x}
\]

\[
\frac{3}{4} = \frac{-x - 11}{4x} + \frac{2}{4x}
\]

\[
\frac{3}{4} = \frac{-x - 9}{4x}
\]

12x = -4x - 36

16x = -36

\(x = -\frac{9}{4}\)

PTS: 4 REF: 061137ia STA: A.A.26 TOP: Solving Rationals

440 ANS: 4 PTS: 2 REF: fall0717ia STA: A.G.4 TOP: Families of Functions
An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

\[ 30^2 + 40^2 = c^2. \] 30, 40, 50 is a multiple of 3, 4, 5.

\[ 2500 = c^2 \]

\[ 50 = c \]
458 ANS: 1
\[ 8^2 + 15^2 = c^2 \]
\[ c^2 = 289 \]
\[ c = 17 \]

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

459 ANS: 3
\[ 3^2 + 5^2 = x^2 \]
\[ x^2 = 34 \]
\[ x = \sqrt{34} \]

PTS: 2 REF: 060909ia STA: A.A.45 TOP: Pythagorean Theorem

460 ANS: 2
\[ \sqrt{5^2 + 7^2} \approx 8.6 \]

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

461 ANS: 3
\[ 10^2 + 10^2 = c^2 \]
\[ c^2 = 200 \]
\[ c = 14.1 \]

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

462 ANS: 2
\[ \sqrt{18.4^2 - 7^2} \approx 17 \]

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

463 ANS: 1
\[ \sqrt{1700^2 - 1300^2} \approx 1095 \]

PTS: 2 REF: 011221ia STA: A.A.45 TOP: Pythagorean Theorem

464 ANS: 4
\[ 16^2 + b^2 = 34^2 \]
\[ b^2 = 900 \]
\[ b = 30 \]

PTS: 2 REF: 080809ia STA: A.A.45 TOP: Pythagorean Theorem
\[
\sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17}
\]

**PTS:** 2  \hspace{1cm} **REF:** 010919ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 2

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

**PTS:** 2  \hspace{1cm} **REF:** 011109ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 1

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

**PTS:** 2  \hspace{1cm} **REF:** 081112ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 2

\[
\tan PLM = \frac{\text{opposite}}{\text{adjacent}} = \frac{4}{3}
\]

**PTS:** 2  \hspace{1cm} **REF:** 011226ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 3

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

**PTS:** 2  \hspace{1cm} **REF:** 081026ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 2

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

**PTS:** 2  \hspace{1cm} **REF:** 011008ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 3

\[
\sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85}
\]

**PTS:** 2  \hspace{1cm} **REF:** fall0721ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios

**ANS:** 1

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

**PTS:** 2  \hspace{1cm} **REF:** 061009ia  \hspace{1cm} **STA:** A.A.42  \hspace{1cm} **TOP:** Trigonometric Ratios
473 ANS: 3
\[ \cos 30 = \frac{x}{24} \]
\[ x \approx 21 \]

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

474 ANS: 2
\[ \tan 32 = \frac{x}{25} \]
\[ x \approx 15.6 \]

PTS: 2 REF: 080914ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

475 ANS: 2
\[ \sin 57 = \frac{x}{8} \]
\[ x \approx 6.7 \]

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

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

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

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

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

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

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

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

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

\[ \sin A = \frac{10}{16} \]

\[ B = 180 - (90 = 38.7) = 51.3. \]

A 90° angle is not acute.

\[ A \approx 38.7 \]

Using Trigonometry to Find an Angle

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

\[ A \approx 42 \]

Using Trigonometry to Find an Angle

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

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

\[ x \approx 37 \]

Using Trigonometry to Find an Angle

\[ 41.8. \sin x = \frac{8}{12} \]

\[ A \approx 41.8 \]

Using Trigonometry to Find an Angle

\[ 53. \sin A = \frac{16}{20} \]

\[ A \approx 53 \]

Using Trigonometry to Find an Angle

Using Trigonometry to Find an Angle

Compositions of Polygons and Circles
489 \[ A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1 \]

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

491 shaded = whole – unshaded
= rectangle-triangle
= \( lw - \frac{1}{2} bh \)
= \( 15 \times 6 - \frac{1}{2} \times 15 \times 4.6 \)
= \( 90 - 34.5 \)
= 55.5

492 \[ 7 + 8 + 7 + \frac{12\pi}{2} = 22 + 6\pi \]

493 If the area of the square is 36, a side is 6, the diameter of the circle is 6, and its radius is 3. \( A = \pi r^2 = 3^2 \pi = 9\pi \)

494 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.
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

496  
**ANS:**  
$36 - 9\pi$.  15.6. Area of square–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

500  
**ANS:**  
If the circumference of circle $O$ is 16$\overline{6}$ inches, the diameter, $\overline{AD}$, is 16 inches and the length of $\overline{BC}$ is 12 inches $\frac{3}{4} \times 16$. The area of trapezoid $ABCD$ 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

499  
**ANS:**  
$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5$

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

501  
**ANS:**  
$V = \pi r^2 h$.  \[ \frac{36}{38\pi} \approx 2.97. \text{ Three cans will not fit. The maximum number is 2.} \]

**PTS:** 3  
**REF:** 010936ia  
**STA:** A.G.2  
**TOP:** Volume
503  ANS: 4  
SA = 2lw + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52

PTS: 2   REF: 011029ia  STA: A.G.2  TOP: Surface Area

504  ANS: 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

505  ANS: 80, 136  
V = lwh = 10 \cdot 2 \cdot 4 = 80  
SA = 2lw + 2hw + 2lh = 2 \cdot 10 \cdot 2 + 2 \cdot 4 \cdot 2 + 2 \cdot 10 \cdot 4 = 136

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

506  ANS: 147.75  
2 \times 5.5 \times 3 + 2 \times 6.75 \times 3 + 2 \times 5.5 \times 6.75 = 147.75

PTS: 2   REF: 011231ia  STA: A.G.2  TOP: Surface Area

507  ANS: 
2(x + 3)(x - 4) + 2(5)(x - 4) + 2(x + 3)(5)  
2(x^2 - 4x + 3x - 12) + 10(x - 4) + 10(x + 3)  
2x^2 - 2x - 24 + 10x - 40 + 10x + 30  
2x^2 + 18x - 34

PTS: 3   REF: 061136ia  STA: A.G.2  TOP: Surface Area