Scoring Guide for the Algebra 2/Trigonometry Test Sampler

Answers to multiple-choice questions 1 through 27, and the specific rubrics for open-ended questions 28 through 39, are provided on the following pages. A complete and correct student response is provided for each open-ended question. The response shows one example of how to solve the problem. In most cases there are other acceptable solutions. Other student responses are shown for each score level.

The maximum raw score for the Regents Examination in Algebra 2/Trigonometry is allocated as follows:

<table>
<thead>
<tr>
<th>Part I</th>
<th>27 two-credit multiple-choice questions</th>
<th>54 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part II</td>
<td>8 two-credit open-ended questions</td>
<td>16 credits</td>
</tr>
<tr>
<td>Part III</td>
<td>3 four-credit open-ended questions</td>
<td>12 credits</td>
</tr>
<tr>
<td>Part IV</td>
<td>1 six-credit open-ended question</td>
<td>6 credits</td>
</tr>
</tbody>
</table>

**Part I**

<table>
<thead>
<tr>
<th>(1) 2</th>
<th>(8) 4</th>
<th>(15) 1</th>
<th>(22) 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) 3</td>
<td>(9) 2</td>
<td>(16) 2</td>
<td>(23) 3</td>
</tr>
<tr>
<td>(3) 1</td>
<td>(10) 3</td>
<td>(17) 4</td>
<td>(24) 3</td>
</tr>
<tr>
<td>(4) 4</td>
<td>(11) 3</td>
<td>(18) 4</td>
<td>(25) 4</td>
</tr>
<tr>
<td>(5) 1</td>
<td>(12) 3</td>
<td>(19) 1</td>
<td>(26) 2</td>
</tr>
<tr>
<td>(6) 4</td>
<td>(13) 3</td>
<td>(20) 2</td>
<td>(27) 4</td>
</tr>
<tr>
<td>(7) 2</td>
<td>(14) 1</td>
<td>(21) 4</td>
<td></td>
</tr>
</tbody>
</table>
Part II

(28) Express \( \frac{5}{3-\sqrt{2}} \) with a rational denominator, in simplest radical form.

Rubric

[2] \( \frac{5(3+\sqrt{2})}{7} \) or an equivalent answer, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made, such as not expressing the answer in simplest radical form.

or

[1] \( \frac{5(3+\sqrt{2})}{7} \) or an equivalent answer, but no work is shown.

[0] The answer is expressed as a decimal.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
\[
\frac{5}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{15+5\sqrt{2}}{9-2}
\]

\[
\frac{15+5\sqrt{2}}{7}
\]

\[
\frac{5(3+\sqrt{2})}{7}
\]
\[
\frac{5}{(3-\sqrt{2})(3+\sqrt{2})} = \frac{15 + 5\sqrt{2}}{9 + \sqrt{2} - 3\sqrt{2} + \sqrt{4}}
\]

\[
= \frac{15 + 5\sqrt{2}}{9 + \sqrt{4}}
\]

\[
= \frac{15 + 5\sqrt{2}}{11}
\]
\[
\frac{5}{3-\sqrt{2}} \cdot \sqrt{2} \div \frac{5\sqrt{2}}{3-2} = 5\sqrt{2}
\]
Write an equation of the circle shown in the graph below.

Rubric

[2] \((x + 3)^2 + (y - 4)^2 = 25\) or an equivalent equation, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] \((x + 3)^2 + (y - 4)^2 = 25\) or an equivalent equation, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
Student work for Item 29 – Score 2

\[
d = \sqrt{(x-x_0)^2 + (y-y_0)^2}
\]

\[
= \sqrt{(-3+0)^2 + (4-0)^2}
\]

\[
= \sqrt{9 + 16}
\]

\[
= \sqrt{25}
\]

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

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

\[
(x+3)^2 + (y-4)^2 = 25
\]
Student work for Item 29 – Score 2

\((x + 3)^2 + (y - 4)^2 = 25\)

center = -3, 4

K = 3

h = -4

radius = 5
Student work for Item 29 – Score 1

\[ (x^2 + 3) + (y^2 - 9) = 25 \]
\[(x+3)^2 - (y-4)^2 = 36\]
(30) Solve for $x$: \[ \frac{4x}{x-3} = 2 + \frac{12}{x-3} \]

**Rubric**

[2] $\emptyset$, $\{\}$, or no solution, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] The equation $4x = 2(x - 3) + 12$ is written, but no further correct work is shown.

or

[1] $3$, and appropriate work is shown.

or

[1] $\emptyset$, $\{\}$, or no solution, but no work is shown.

[0] $\emptyset$, but no work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
Solve for $x$: \[
\frac{4x}{x+3} = \frac{2}{1} + \frac{12}{x+3}
\]

\[
4x = 2(x+6) + 12
\]

\[
4x = 2x + 12
\]

\[
2x = 6
\]

\[
x \neq 3
\]

No solution
\[
\frac{4x}{x-3} = \frac{2}{x-3} + \frac{12}{x-3} \rightarrow \frac{2x - 6 + 12}{x-3}
\]

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

\[
(x-3)(2x+6) \quad 4x^2 - 12x = 2x^2 + 6x - 6x - 18
\]

\[
\frac{4x^2 - 12x}{2x^2 + 18} = \frac{2x^2 - 18}{2x^2 + 18}
\]

\[
\frac{2x^2 - 12x + 18}{2x^2 - 18} = 0
\]

\[
(x^2 - 6x + 9) = 0
\]

\[
2(x - 3)(x - 3) = 0
\]

\[
x = 3
\]

\[
\text{undefined}
\]

\[
\frac{4(3)}{(3) - 3} = 2 + \frac{12}{(3) - 3}
\]

\[
\frac{12}{0} = 2 + \frac{12}{0}
\]
\[
\frac{4x}{x-3} = \frac{2}{1} + \frac{12}{x-3}
\]
\[
\frac{4x}{x-3} = \frac{12 + 12}{x-3}
\]
\[
(x-3)(14) = (4x)(x-3)
\]
\[
14x - 42 = 4x^2 - 12x
\]
\[
14x - 42 = 4x^2 - 12x
\]
\[
4x^2 = 26x + 462
\]
\[
2(2x^2 - 13x + 21)
\]
\[
2 = 0
\]
\[
(2x - 7)(x - 3) = 0
\]
\[
x = \frac{7}{2}
\]
\[
x = 3
\]
\[
x = 3.5
\]
Find, to the nearest minute, the angle whose measure is 3.45 radians.

Rubric

[2] 197°40′ or 11,860′, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or

[1] Appropriate work is shown, but one conceptual error is made, such as stating the angle to be 197.67°.

or

[1] A correct formula, substitution, or conversion is written, but no further correct work is shown.

or

[1] 197°40′ or 11,860′, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 31 – Score 2

\[
\frac{\text{deg}}{\text{rad}} \times \frac{180}{\pi} \times 3.45 \times \frac{180}{\pi} = \frac{621}{\pi} = \frac{\pi x}{\pi} \Rightarrow x = 197°40′
\]
\[
\frac{3.45}{1} \cdot \frac{180}{\pi} = 201° - 360° = 201°
\]

\[
\frac{90}{15} = 6 \quad \frac{201}{6} = 43.5
\]

\[
60° - 43.5° = 16.5°
\]
Student work for Item 31 – Score 0

\[ 3.45 \text{ radians} \]

\[ 197.77 \text{ ft} \]

\[ \theta = 360 \text{ degrees} \]

\[ 3.45 = x \]

\[ 196 \text{ minutes} \]

\[ 6^2 \]
(32) Matt places $1,200 in an investment account earning an annual rate of 6.5% compounded continuously. Using the formula \(V = Pe^{rt}\), where \(V\) is the value of the account in \(t\) years, \(P\) is the principal initially invested, \(e\) is the base of a natural logarithm, and \(r\) is the rate of interest, determine the amount of money, to the nearest cent, that Matt will have in the account after 10 years.

Rubric

[2] 2,298.65, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] \(V = 1200e^{0.065(10)}\), but no further correct work is shown.

or

[1] 2,298.65, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 32 – Score 2

\[ V = Pe^{rt} \]
\[ V = 1200e^{0.065(10)} \]
\[ V = 1200e^{0.65} \]
\[ V \approx 2,298.648995 \]

The amount will be about $2,298.65 after 10 years.
\[ V = P e^{rt} \]

\[ P = 1,200 \]
\[ t = 10 \text{ years} \]
\[ r = 6.5\% \]

\[ V = 1,200 e^{0.065 \times 10} \]
\[ V = 1,200 e^{0.65} \]

\[ V = 1,200 (2.718281828)^{0.65} \]
\[ V = 1,200 \times 2.9826 \]
\[ V = 3,579.12 \]
\[ v = 1200 (e)^{9.65 (10)} \]
\[ v = 1003.385475 (e) \]
(33) If $\theta$ is an angle in standard position and its terminal side passes through the point $(-3, 2)$, find the exact value of $\csc \theta$.

**Rubric**

[2] $\frac{\sqrt{13}}{2}$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] Appropriate work is shown, but the answer is not stated as an exact value.

or

[1] $\frac{\sqrt{13}}{2}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

**Student work for Item 33 – Score 2**

\[
\csc \theta = \frac{1}{\sin \theta} = \frac{\sqrt{13}}{2}
\]
\[
\sin \theta = \frac{y}{r} = \frac{2}{\sqrt{12}} \\
\csc \theta = \frac{1}{\sin \theta} \\
\csc \theta = \frac{r}{y} = \frac{\sqrt{12}}{2} \\
r = \sqrt{x^2 + y^2} = \sqrt{(-3)^2 + h^2} \\
r = \sqrt{12}
\]
Student work for Item 33 – Score 0

\[ \csc = 3 \tan \]

\[
\frac{\sin \theta}{2} = \frac{\sin 40}{\sqrt{13}}
\]

\[
\sin \theta = 33.69067527 \cdot \frac{180}{\pi}
\]

\[
33.691\pi \approx 180
\]
(34) Find the first four terms of the recursive sequence defined below.

\[ \begin{align*}
  a_1 &= -3 \\
  a_n &= a_{n-1} - n
\end{align*} \]

Rubric

[2] –3, –5, –8, and –12, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] –3, –5, –8, and –12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
\[a_2 = a_1 - 2\]
\[a_2 = -3 - 2\]
\[a_2 = -5\]
\[a_3 = a_2 - 3\]
\[a_3 = -5 - 3\]
\[a_3 = -8\]
\[a_4 = a_3 - 4\]
\[a_4 = -8 - 4\]
\[a_4 = -12\]
\[ a_2 = a_1 - 2 \]
\[ a_2 = -3 - 2 \]
\[ a_2 = -5 \]
\[ a_3 = a_2 - 2 \]
\[ a_3 = -5 - 2 \]
\[ a_3 = -7 \]
\[ a_4 = a_3 - 2 \]
\[ a_4 = -7 - 2 \]
\[ a_4 = -9 \]
\[ \{ -3, -5, -7, -9 \} \]
Student work for Item 34 – Score 0

-3 = -3 - 1 - 0 =

\[ a_2 = -4 \]
\[ a_3 = -5 \]
\[ a_4 = -6 \]

\[ \frac{-3}{-4} = -\frac{4n}{4} \] 1st term

\[ a_{-4} = 0 - 4 - (-4) \] 2nd term
\[ a_{-4} = (5) \]

\[ a_{-5} = 0 - 5 - (-5) = 0 \] 3rd term

\[ a_{-6} = 0 - 6 - (-6) = -7 \] 4th term
(35) A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

Rubric

[2] 41,040, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] $9C_2 \cdot 20C_3$, but no further correct work is shown.

or

[1] 41,040, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 35 – Score 2

$$9C_2 \cdot 20C_3$$

$$36 \cdot 1140 = 41040$$
Student work for Item 35– Score 1

\( q c_2 \cdot 20c_3 = 1176 \)

\( q c_2 + 20c_3 \)

\( 3 \times 1140 = 3420 \)
Student work for Item 35 – Score 0

\[ \frac{p}{q} \frac{p}{3} \]

\[ 72 + 6840 = 6912 \]
Part III

(36) Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

Rubric

[4] $3 \pm \sqrt{7}$, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made, or the answer is not expressed in simplest radical form.

[2] Appropriate work is shown, but two or more computational errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] $3 \pm \sqrt{7}$, but the answer is found by a method other than completing the square.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or

[1] $3 \pm \sqrt{7}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
\[
\frac{2x^2 - 12x + 4}{2} = 0
\]

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

\[
x^2 - 6x + 9 = -2 + 9
\]

\[
\sqrt{(x-3)^2} = \sqrt{7}
\]

\[
x - 3 = \pm \sqrt{7}
\]

\[
x = 3 \pm \sqrt{7}
\]
\[2x^2 - 12x + 4 = 0\]
\[2(x^2 - 6x + 2) = 0\]
\[x^2 - 6x + 2 = 0\]
\[x^0 - 6x = -2\]
\[(x - 3)(x - 3) = -2 + 9\]
\[(x - 3)^2 = 7\]
\[x - 3 = \pm \sqrt{7}\]
\[x = 3 \pm \sqrt{7}\]
\[
\frac{2x^2 - 12x + 4}{2} = \frac{0}{2}
\]

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

\[
x^2 - 6x + 9 = 2 + 9
\]

\[
(x - 3)(x - 3) = 11
\]

\[
(x - 3)^2 = 11
\]

\[
x - 3 = \sqrt{11}
\]

\[
x = 3 + \sqrt{11}
\]
\[
\begin{align*}
\frac{x^2 + 2x + M}{x - 1} &= 0 \\
-12 &= \sqrt{12^2 - 4 \cdot 2 \cdot y} \\
12 &= \sqrt{144} = \sqrt{16} \\
12 &= 4 \sqrt{7} \\
\frac{12}{4} &= 3 \sqrt{7}
\end{align*}
\]
Student work for Item 36 – Score 0

\[ a = 2 \]
\[ b = 12 \]
\[ c = 4 \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-12 \pm \sqrt{(-12)^2 - 4(2)(4)}}{2(2)} \]

\[ x = \frac{-12 \pm \sqrt{144 - 32}}{4} \]

\[ x = \frac{-3 \pm \sqrt{112}}{4} \]

\[ x = 3 \pm \sqrt{112} \]

\[ x = 3 \pm 4\sqrt{7} \]
(37) Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of $x$.

Rubric

[4] $\pm \frac{3}{2}, -\frac{1}{2}$ or an equivalent answer, and appropriate algebraic work is shown.

[3] Appropriate work is shown, but one computational or factoring error is made.

[2] Appropriate work is shown, but two or more computational or factoring errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] $(4x^2 - 9)(2x + 1) = 0$ is found, but no further correct work is shown.

or

[2] $\pm \frac{3}{2}, -\frac{1}{2}$, but a method other than algebraic is used.

[1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made.

or

[1] $4x^2(2x + 1) - 9(2x + 1) = 0$ is found, but no further correct work is shown.

or

[1] $\pm \frac{3}{2}, -\frac{1}{2}$ or an equivalent answer, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
\[8x^3 + 4x^2 - 18x - 9 = 0\]
\[4x^2(2x+1) - 9(2x+1) = 0\]
\[(4x^2 - 9)(2x+1) = 0\]
\[(2x+1)(2x+3)(2x-3) = 0\]

\[2x+1 = 0 \quad 2x+3 = 0 \quad 2x-3 = 0\]
\[2x = -1 \quad 2x = -3 \quad 2x = 3\]
\[x = \frac{-1}{2} \quad x = \frac{-3}{2} \quad x = \frac{3}{2}\]
\[ 4x^2 (2x+1) - 9(2x+1) = 0 \]

\[(4x^2 - 9)(2x+1) = 0 \]

\[ 4x^2 - 9 = 0 \quad \text{and} \quad 2x+1 = 0 \]

For \[ 4x^2 - 9 = 0 \]

\[ 4x^2 = 9 \]

\[ x^2 = \frac{9}{4} \]

\[ x = \pm \frac{3}{2} \]

For \[ 2x+1 = 0 \]

\[ 2x = -1 \]

\[ x = -\frac{1}{2} \]
\[ 8x^3 + 4x^2 = 18x + 9 \]
\[ 4x^2(2x+1) = 9(2x+1) \]
\[ 4x^2 = 9 \]
\[ x^2 = \frac{9}{4} \]
\[ x = \pm \frac{3}{2} \]
\[ 8x^3 + 4x^2 - 18x - 9 = 0 \]
\[ 4x^2(2x+1) - 9(2x+1) = 0 \]
\[ 8x^3 + 4x^2 - 18x - 9 = 0 \]

\[ 2x \left( 4x^2 + 2x - 9 \right) - 9 = 0 \]
The table below shows the results of an experiment involving the growth of bacteria.

<table>
<thead>
<tr>
<th>Time (x) (in minutes)</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bacteria (y)</td>
<td>2</td>
<td>25</td>
<td>81</td>
<td>175</td>
<td>310</td>
<td>497</td>
</tr>
</tbody>
</table>

Write a power regression equation for this set of data, rounding all values to three decimal places.

Using this equation, predict the bacteria’s growth, to the nearest integer, after 15 minutes.
Rubric for Item 38

[4] \( y = 2.001x^{2.298} \) and 1,009, and appropriate work is shown, such as substituting \( x = 15 \) into the regression equation.

[3] Appropriate work is shown, but one computational or rounding error is made.

\textit{or}

[3] \( y = 2.001x^{2.298} \) and 1,009, but no substitution is shown.

\textit{or}

[3] The expression \( 2.001x^{2.298} \) is written, and appropriate work is shown to find 1,009.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

\textit{or}

[2] Appropriate work is shown, but one conceptual error is made.

\textit{or}

[2] \( y = 2.001x^{2.298} \), but no further correct work is shown.

\textit{or}

[2] The expression \( 2.001x^{2.298} \) is written and 1,009, but no substitution is shown.

\textit{or}

[2] An incorrect regression equation of equal difficulty is solved appropriately for the bacteria’s growth, and appropriate work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

\textit{or}

[1] An incorrect regression equation of a lesser degree of difficulty is solved appropriately for the number of bacteria at fifteen minutes, and appropriate work is shown.

\textit{or}

[1] The expression \( 2.001x^{2.298} \) is written, but no further correct work is shown.

\textit{or}

[1] 1,009, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
Student work for Item 38 – Score 4

\[ y = ax^b \]
\[ a = 2.6008 - 7.7106 \]
\[ b = 2.2480562958 \]

a) \[ y = 2.001x^{2.248} \]

b) \[ y = 2.001(15)^{2.248} \]

\[ y = 1009.03168 \]
\[ y = 1009 \]
\[ y = ax^2 \]

\[ a = 2.03 \]
\[ b = 3.85 \]
\[ r^2 = 0.99999 \]
\[ r = 0.99978 \]

The power regression equation for this set of data, rounding all values to three decimal places is:

\( (2.03)(x)^{0.999} \)

The bacteria's growth, to the nearest integer, after 15 minutes is 1009.
Student work for Item 38 – Score 2

\[ y = 3 \times 10^b \]

\[ a = 2,000,000 \times 10^6 \]

\[ b = 2.248059278 \]

\[ y = 2.0 \times 2.24 \]

\[ y = 2.0 \times 2.29 \]

\[ a = 3 \times 10^6, 913 \]
Student work for Item 38 – Score 1

\[ a = 2.001 \]
\[ b = 2.298 \]

\[ \frac{(a) \times b}{(2.001) \times (2.298)} \]
Student work for Item 38 – Score 0

\[ y = 48.9x - 111.8 \]

\[ y = 48.9 \]

\[ x = 15 \]

\[ y = 623 \]
Part IV

(39) Two forces of 25 newtons and 85 newtons acting on a body form an angle of $55^\circ$.

Find the magnitude of the resultant force, to the nearest hundredth of a newton.

Find the measure, to the nearest degree, of the angle formed between the resultant and the larger force.

Rubric

[6] 101.43 and 12, and appropriate work is shown.

[5] Appropriate work is shown, but one computational or rounding error is made.

[4] Appropriate work is shown, but two computational or rounding errors are made.

  or

[4] Appropriate work is shown, but one conceptual error is made.

  or

[4] The magnitude of the resultant force is found correctly, but no further correct work is shown.

[3] Appropriate work is shown, but three or more computational or rounding errors are made.

  or

[3] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

[2] Appropriate work is shown, but two conceptual errors are made.

  or

[2] 101.43 and 12, but no work is shown.

[1] Appropriate work is shown, but two conceptual errors and one computational or rounding error are made.

  or

[1] A correct substitution is made into the Law of Cosines, but no further correct work is shown.

  or

[1] 101.43 or 12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
Student work for Item 39 – Score 6

\[ x^2 = (c)^2 + (b)^2 - 2(c)(b) \cos(c) \]

\[ x^2 = (85)^2 + (25)^2 - 2(85)(25) \cos(12^\circ) \]

\[ x = 101.43 \text{ hours} \]

\[ \frac{\sin(12^\circ)}{101.48} = \frac{\sin(x)}{25} \]

\[ \sin(x) = \frac{25 \sin(12^\circ)}{101.43} \]

\[ x = 12^\circ \]
Student work for Item 39 – Score 5

\[ 55^2 = 75^2 + 85^2 - 2(75)(85)\cos 125 \]

\[ 7225 = 102575.689085 \cos y \]

\[ x = 101.43 \text{ Newtons} \]

\[ \frac{\sin y}{25} = \frac{\sin 125}{101.43} \]

\[ \sin y = 0.196007479 \]

\[ y \approx 11^\circ \]
Student work for Item 39 – Score 4

\[ a^2 = 85^2 + 25^2 - 2(85)(25)\cos(15) \]
\[ a^2 = 14,500 - 4,250 \]
\[ a = 67.10 \text{N} \]

\[ \sin(15) = \frac{\sin(x)}{67.10} \]
\[ \sin(x) = 0.26 \]
\[ x = 15.4^\circ \]
\[ a^2 = b^2 + c^2 - 2bc \cos \theta \]

\[ a^2 = 25^2 + 85^2 - 2 \cdot 25 \cdot 85 \cos 125^\circ \]

\[ a^2 = 625 + 7225 - 60 \cdot 85 \cos 125^\circ \]

\[ a^2 = 7850 - 4250 \cos 125^\circ \approx 10272.5 \]

\[ a = \sqrt{10272.5} \approx 101.35 \]

\[ \sin 125^\circ = \frac{85}{a} \]

\[ 8191.85 = 101.35 \sin x \]

\[ \frac{69.6927}{101.35} = \frac{101.35 \sin x}{101.35} \]

\[ \sin x = 0.687 \]

\[ x = 43.39^\circ \]
\[ x^2 = 85^2 + 25^2 - 2(25 \times 88) \cos 125 \]
\[ x^2 = 7878.678822 \]
\[ x = 88.8 \]
\[ x = 89 \]

\[ \frac{\sin 125}{89} = \frac{\sin y}{85} \]
\[ 85 \sin 125 = 89 \sin y \]
\[ 0.7823362221 = \sin y \]
\[ 51 = y \]
Student work for Item 39 – Score 1

\[ x^2 = 25^2 + 85^2 - 2(25)(85)\cos 125 \]
Student work for Item 39 – Score 0

\[25^2 + 85^2 = x^2\]
\[\sqrt{7850} = x\]
\[x = 88.6 \text{ m Newton}\]

\[\cos A \approx \frac{1}{2}\]
\[A = 60^\circ\]
Appendix A

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12234

Specifications for the Regents Examination in Algebra 2/Trigonometry
(First Administration – June 2010)

The questions on the Regents Examination in Algebra 2/Trigonometry will assess both the content and the process strands of New York State Mathematics Standard 3. Each question will be aligned to one content performance indicator but will also be aligned to one or more process performance indicators, as appropriate for the concepts embodied in the task. As a result of the alignment to both content and process performance strands, the examination will assess students’ conceptual understanding, procedural fluency, and problem-solving abilities rather than assessing knowledge of isolated skills and facts.

There will be 39 questions on the Regents Examination in Algebra 2/Trigonometry. The table below shows the percentage of total credits that will be aligned with each content strand.

<table>
<thead>
<tr>
<th>Content Strand</th>
<th>% of Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Number Sense and Operations</td>
<td>6–10%</td>
</tr>
<tr>
<td>2) Algebra</td>
<td>70–75%</td>
</tr>
<tr>
<td>4) Measurement</td>
<td>2–5%</td>
</tr>
<tr>
<td>5) Statistics and Probability</td>
<td>13–17%</td>
</tr>
</tbody>
</table>

Question Types

The Regents Examination in Algebra 2/Trigonometry will include the following types and numbers of questions.

<table>
<thead>
<tr>
<th>Question Type</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple choice (2 credits each)</td>
<td>27</td>
</tr>
<tr>
<td>2-credit open ended</td>
<td>8</td>
</tr>
<tr>
<td>4-credit open ended</td>
<td>3</td>
</tr>
<tr>
<td>6-credit open ended</td>
<td>1</td>
</tr>
<tr>
<td>Total Credits</td>
<td>88</td>
</tr>
</tbody>
</table>

Calculators

Schools must make a graphing calculator available for the exclusive use of each student while that student takes the Regents Examination in Algebra 2/Trigonometry.
Appendix B

Map to Core Curriculum

The table below shows which content strand each item is aligned to. The numbers in the table represent the question numbers on the test.

<table>
<thead>
<tr>
<th>Content Strand</th>
<th>Multiple-Choice Item Number</th>
<th>2-Credit Item Number</th>
<th>4-Credit Item Number</th>
<th>6-Credit Item Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Sense and Operations</td>
<td>1, 11</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>2, 3, 5, 6, 7, 8, 9, 10,</td>
<td>29, 30, 32, 33, 34</td>
<td>36, 37</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>12, 13, 14, 16, 17, 18, 19,</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>20, 21, 22, 23, 26, 27</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td></td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics and Probability</td>
<td>4, 15, 24, 25</td>
<td>35</td>
<td>38</td>
<td></td>
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