

JEFFERSON MATH PROJECT REGENTS AT RANDOM

The NY Integrated Algebra Regents Exams
Fall, 2007-August, 2009
(Answer Key)

www.jmap.org

Dear Sir

I have to acknolege the reciept 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 prepositions 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 calculatien also is indispensable 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 fellow 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.

[1] B

[2] A

[3] D

[4] C

[5] B

[2] $\frac{3}{8}$ 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.

or [1] A correct tree diagram or sample space is shown, but no probability or an incorrect probability is written.

or [1] $\frac{3}{8}$ 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

[6] incorrect procedure.

[7] D

[8] D

[9] D

[10] C

[11] B

[12] A

[13] B

[14] A

[4] Both equations are graphed correctly, and (-1,8) and (5,-4) are stated.

[3] Appropriate work is shown, but one computational or graphing error is made, but the appropriate points of intersection are stated.

or [3] Both equations are graphed correctly, but only one point of intersection is stated.

[2] Appropriate work is shown, but two or more computational or graphing errors are made, but appropriate points of intersection are stated.

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

or [2] Both equations are graphed correctly, but the points of intersection are not stated or are stated incorrectly.

or [2] (-1,8) and (5,-4) are found as points of intersection, but a method other than a graphic method is used.

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

or [1] One of the equations is graphed correctly, but no further correct work is shown.

or [1] (-1,8) and (5,-4) are stated, but no work is shown.

[0] (-1,8) or (5,-4) is stated, 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

[15] obviously incorrect procedure.

[16] B

[17] A

[18] B

[19] A

[3] 30.4, and appropriate work is shown, and "no," and an appropriate justification is given.

[2] Appropriate work is shown, but one computational or rounding error is made, but an appropriate answer and justification are given.

or [2] 30.4, and appropriate work is shown, and "no," but no justification or an incorrect justification is given.

[1] Appropriate work is shown, but two or more computational or rounding errors are made, but an appropriate answer and justification are given.

or [1] Appropriate work is shown, but one conceptual error is made, but an appropriate answer and justification are given.

or [1] 30.4 and "no," but no work is shown, and no justification or an incorrect justification is given.

[0] "No," but no work is shown, and no justification or an incorrect justification is given.

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

[20] obviously incorrect procedure.

[21] A _____

[22] C _____

[23] B _____

[24] A _____

[25] D _____

[26] D _____

[27] A _____

[28] D _____

[29] C _____

[30] B _____

[4] 39 and 63, and appropriate work is shown, such as using trigonometry or the Pythagorean theorem.

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

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

or [2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect trigonometric function.

or [2] $\tan 52 = \frac{50}{x}$ and $\sin 52 = \frac{50}{y}$ or an

equivalent equation, but no further correct work is shown.

or [2] 39 or 63, and appropriate work is shown.

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

or [1] $\tan 52 = \frac{50}{x}$ or $\sin 52 = \frac{50}{y}$ or an

equivalent equation, but no further correct work is shown.

or [1] 39 and 63, but no work is shown.

[0] 39 or 63, 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

[31] obviously incorrect procedure.

- [3] The correct graph is drawn, and -1 and 3 are found.
[2] Appropriate work is shown, but one graphing error is made, but appropriate roots are identified.
or [2] The graph of the parabola is drawn correctly, but no further correct work is shown.
[1] Appropriate work is shown, but two or more graphing errors are made, but appropriate roots are identified.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] -1 and 3 are stated, but no work is shown.
[0] -1 or 3 is stated, 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.
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- [4] Both inequalities are graphed and shaded correctly, and at least one is labeled, and a point in the solution set is identified.
[3] Appropriate work is shown, but one graphing error is made, such as drawing a solid line for $x > 2$ or shading incorrectly, but an appropriate point in the solution set is identified.
or [3] Both inequalities are graphed and shaded correctly, and a point in the solution set is identified correctly, but the graphs are not labeled or are labeled incorrectly.
or [3] Both inequalities are graphed and shaded correctly, and at least one is labeled, but no point in the solution set is identified.
[2] Appropriate work is shown, but two or more graphing errors are made, but an appropriate point in the solution set is identified.
or [2] Appropriate work is shown, but one conceptual error is made, such as graphing the lines $x = 2$ and $y = 2x - 6$ and identifying the point of intersection.
or [2] One of the inequalities is graphed and shaded correctly, and at least one is labeled, but no further correct work is shown.
[1] Appropriate work is shown, but one conceptual error and one graphing error are made, but an appropriate point in the solution set is identified.
or [1] Both inequalities are graphed incorrectly, but an appropriate point in the solution set is identified.
or [1] The lines $x = 2$ and $y = 2x - 6$ are graphed correctly, and at least one is labeled, but no further correct work is shown.
or [1] A point in the solution set is identified and shown to be correct by checking in both inequalities, but no graphs are drawn.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-
- [33] _____
- [34] B _____
- [35] A _____

[36] B _____

[37] A _____

[2] Ann's, and appropriate work is shown to justify the answer.

[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 calculating gas mileage of both vehicles, but no further correct work is shown.

[0] Ann's, 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

[38] obviously incorrect procedure. _____

[39] A _____

[40] A _____

[41] C _____

[42] C _____

[43] B _____

[44] C _____

[45] A _____

[4] A correct tree diagram or sample space is given, and 18 total meals, 12 meals without juice, and 6 meals with chicken nuggets.

[3] A correct tree diagram or sample space is given, but either 18, 12, or 6 is missing or is incorrect.

or [3] The fundamental counting principle is used to find 18 total meals, 12 meals without juice, and 6 meals with chicken nuggets, but no tree diagram or sample space is given.

or [3] An incorrect tree diagram or sample space is given, but an appropriate number of meals is found for all three categories.

[2] A correct tree diagram or sample space is given, but an appropriate number of meals is found for only one category.

or [2] An incorrect tree diagram or sample space is given, but an appropriate number of meals is found for only two categories.

[1] A correct tree diagram or sample space is given, but no number of meals is found correctly.

or [1] An incorrect tree diagram or sample space is given, but an appropriate number of meals is found for only one category.

or [1] 18 total meals, 12 meals without juice, and 6 meals with chicken nuggets, but no work is shown.

[0] 18 total meals or 12 meals without juice or 6 meals with chicken nuggets, 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

[46] obviously incorrect procedure. _____

[47] A _____

[48] C _____

[49] B _____

[4] The tables are completed correctly, and a correct cumulative frequency histogram is drawn and labeled.

[3] The tables are completed correctly, but one graphing error is made on the cumulative frequency histogram.

or [3] The tables are completed with one error, but an appropriate cumulative frequency histogram is drawn and labeled.

or [3] The tables are completed correctly and a correct cumulative frequency histogram is drawn, but the histogram is not labeled or is labeled incorrectly.

[2] The tables are completed with two errors, but an appropriate cumulative frequency histogram is drawn and labeled.

or [2] Appropriate work is shown, but one conceptual error is made, such as drawing a frequency histogram or a cumulative frequency bar graph.

or [2] The tables are completed correctly, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one graphing or labeling error are made on the cumulative frequency histogram.

or [1] The frequency table is completed correctly, but no further correct work is shown.

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

[50] incorrect procedure.

[51] C

[52] D

[53] C

[54] B

[55] A

[4] 6 and -2 , and appropriate work is shown, such as an algebraic solution or trial and error with at least three trials and appropriate checks.

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

or [3] Appropriate work is shown, but only one solution is found.

[2] The correct quadratic equation is written in standard form.

or [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] The trial-and-error method is used to find at least one solution, but only two trials and appropriate checks are shown.

or [2] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or [2] An incorrect quadratic equation of equal difficulty is solved appropriately.

[1] $x^2 - 11x - 12 = -7x$, but no further correct work is shown.

or [1] 6 and -2 , but no work or only one trial with an appropriate check is shown.

or [1] An incorrect equation of a lesser degree of difficulty is solved appropriately.

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

[0] 6 or -2 , 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

[56] obviously incorrect procedure.

[57] C

[58] C

[59] B

[60] A

[61] B

[3] 1,512 and 1,551.25 and 0.025, and appropriate work is shown.

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

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

or [1] Appropriate work is shown, but one conceptual error is made, such as dividing by 1,512.

or [1] Appropriate work is shown to find 1,512 and 1,551.25, but no further correct work is shown.

or [1] 1,512 and 1,551.25 and 0.025, but no work is shown.

[0] 1,512 or 1,551.25 or 0.025, 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

[62] obviously incorrect procedure.

[63] C

[64] D

[65] A

[66] D

[67] D

[68] D

[2] $36 - 9\pi$ or $36 - 3^2\pi$, 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 expressed in terms of π .

or [1] $36 - 9\pi$, 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

[69] incorrect procedure.

[3] $\frac{38}{\pi}$ or an equivalent answer in terms of

π , and 2, and appropriate work is shown, and an appropriate explanation is given.

[2] Appropriate work is shown, but one computational or rounding error is made, but an appropriate explanation is given.

or [2] Appropriate work is shown and an appropriate explanation is given, but the correct height of the can is expressed as a decimal.

or [2] $\frac{38}{\pi}$ and 2, and appropriate work is

shown, but an appropriate explanation is not given.

[1] Appropriate work is shown, but two or more computational or rounding errors are made, but an appropriate explanation is given.

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate explanation is given.

or [1] $\frac{38}{\pi}$ and 2, but no work is shown.

[0] $\frac{38}{\pi}$ or 2, 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

[70] obviously incorrect procedure.

[71] D

[72] C

[73] B

[74] A

[3] $\frac{3}{4x-8}$ or $\frac{3}{4(x-2)}$, and appropriate work is shown.

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

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

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

or [1] $\frac{3}{4x-8}$ or $\frac{3}{4(x-2)}$, 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

[75] incorrect procedure.

[76] D

[77] A

[78] C

[79] B

[2] 111.25 or $111\frac{1}{4}$, and appropriate work is shown.

[1] Appropriate work is shown, but the answer is rounded.

or [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] 111.25 , 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

[80] incorrect procedure.

[2] $\frac{3}{8}$ or 0.375 , and appropriate work is shown.

[1] Appropriate work is shown, but the answer is rounded.

or [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] $\frac{3}{8}$, 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

[81] incorrect procedure.

[82] C

[83] D

[3] $10 + 2d \geq 75$ or an equivalent inequality and 33 , and appropriate work is shown.

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

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

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

or [1] An incorrect inequality of equal difficulty is solved appropriately.

or [1] $10 + 2d \geq 75$, but no further correct work is shown.

or [1] 33 , 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

[84] incorrect procedure.

[85] A

[86] A

[87] C

[88] C

[4] The frequency table is completed correctly, and a correct frequency histogram is drawn and labeled.

[3] The frequency table is completed correctly, but one graphing or labeling error is made in the frequency histogram.

or [3] The frequency table is completed incorrectly, but an appropriate frequency histogram is drawn and labeled.

[2] The frequency table is completed correctly, but two or more graphing or labeling errors are made in the frequency histogram.

or [2] The frequency table is completed correctly, but one conceptual error is made, such as drawing a cumulative frequency histogram, bar graph, or broken-line graph.

[1] Appropriate work is shown, but one conceptual error and one graphing or labeling error are made in the frequency histogram.

or [1] The frequency table is completed incorrectly, and two or more graphing or labeling errors are made in the frequency histogram.

or [1] The frequency table is completed correctly, but no further correct work is shown.

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

[89] incorrect procedure.

[90] A

[91] B

[92] C

[93] C

[94] B

[95] D

[96] D

[4] An appropriate equation is written, width=3, length=18, and appropriate work is shown.

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

or [3] Appropriate work is shown, but the length and width are not labeled or are labeled incorrectly.

or [3] Appropriate work is shown to find either the length or the width of the walkway, but no further correct work is shown.

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

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

or [2] An appropriate quadratic equation in standard form (set equal to zero) is written, but no further correct work is shown.

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

or [1] An appropriate equation is written, but no further correct work is shown.

or [1] Width = 3 and length =18, but no work is shown.

[0] Width = 3 or length =18, but no work is shown.

or [0] 3 and 18, 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

[97] obviously incorrect procedure.

[98] B

[99] A

- [4] Appropriate graphs are drawn, and (1, 0) and (-4, -5) are stated.
[3] Appropriate work is shown, but one graphing error is made, but appropriate solutions are stated.
or [3] Both graphs are drawn correctly, but only one solution is stated.
[2] Appropriate work is shown, but two or more graphing errors are made, but appropriate solutions are stated.
or [2] Appropriate work is shown, but one conceptual error is made, such as graphing a line instead of a parabola, but appropriate solutions are stated.
or [2] Both graphs are drawn correctly, but no solutions are stated.
or [2] (1, 0) and (-4, -5) are found as the points of intersection, but a method other than graphic is used.
[1] Appropriate work is shown, but one conceptual error and one graphing error are made.
or [1] The system is solved algebraically for only the x values, y values, or the coordinates of one point.
or [1] One graph is drawn correctly, but no further correct work is shown.
or [1] (1, 0) and (-4, -5) are stated, but no work is shown.
[0] (1,0) or (-4, -5) is stated, 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.
- [100] _____

- [3] $60 - 42\sqrt{5}$, and appropriate work is shown.
[2] Appropriate work is shown, but one computational error is made.
or [2] Appropriate work is shown, but only one term is expressed in simplest radical form.
[1] Appropriate work is shown, but two or more computational errors are made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] Appropriate work is shown, but the answer is expressed as a decimal.
or [1] The distributive property is correctly applied, yielding $6\sqrt{100} - 21\sqrt{20}$, but no further correct work is shown.
or [1] $60 - 42\sqrt{5}$, 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.
- [101] _____
- [102] D
- [2] 4, 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] 4, 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.
- [103] _____
- [104] B

[3] The data are plotted correctly, an appropriate line of best fit is drawn, and its equation is stated.

[2] The data are plotted incorrectly, but an appropriate line of best fit is drawn, and an appropriate equation is stated.

or [2] The data are plotted correctly, but an incorrect line of best fit is drawn, but an appropriate equation is stated.

or [2] The data are plotted correctly, and an appropriate line of best fit is drawn, but its equation is not stated or is stated incorrectly.

[1] The data are plotted correctly, but no further correct work is shown.

or [1] The data are plotted incorrectly, but an appropriate line of best fit is drawn, but no further correct work is shown.

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

[105] incorrect procedure.

[106] D

[107] C

[108] B

[109] D

[4] A marker = \$.50 or 50¢ and a pencil = \$.15 or 15¢, and appropriate work is shown, such as solving a system of equations algebraically or by trial and error with at least three trials and appropriate checks.

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

[3] Appropriate work is shown, but only the cost of a marker or a pencil is found, but appropriate units are written.

or [3] Appropriate work is shown, but the correct answers are not labeled or are labeled incorrectly, but appropriate units are written.

or [3] Appropriate work is shown, and the answers are labeled correctly, but the units are written incorrectly, such as a marker = .50¢.

[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] Appropriate work is shown, but the answers are not labeled or are labeled incorrectly, and the units are not written or are written incorrectly.

or [2] An incorrect system of equations is written, but two appropriate answers are found and labeled, and appropriate units are written.

or [2] The trial-and-error method is used to find the correct answers, but only two trials and appropriate checks are shown.

or [2] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no answers are found.

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

or [1] A correct system of equations is written, but no further correct work is shown.

or [1] The trial-and-error method is used to find the correct answers, but only one trial with an appropriate check is shown.

or [1] A marker = \$.50 or 50¢ and a pencil = \$.15 or 15¢, but no work is shown.

[0] One correct equation is written, but no

[110] further correct work is shown.

or [0] Either the correct price of a marker or a pencil is stated, but no work is shown.

or [0] The correct prices of the marker and pencil are found, but no work is shown, and the answers are not labeled or are labeled incorrectly.

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

[111] C

[112] D

[113] D

[114] D

[115] D

[116] C

[117] B

[118] A

[119] A

[120] B

[4] Mean = 225,000, median = 175,000, and the median is stated to be the best measure of central tendency, an appropriate justification is given, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.

or [3] Mean = 225,000, median = 175,000, and the median is stated to be the best measure of central tendency, but no justification is given.

[2] Appropriate work is shown, but two or more computational errors are made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.

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

or [2] Appropriate work is shown to find mean = 225,000 and median = 175,000, but no further correct work is shown.

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

or [1] Mean = 225,000 and median = 175,000, but no further work is shown.

[0] Mean = 225,000 or median = 175,000, but no further work is shown.

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

[121] obviously incorrect procedure.

[122] C

[123] C

[124] A

- [2] "No," and an appropriate justification is given.
[1] The equations and expressions are correctly categorized, but the justification is missing or is incorrect.
or [1] Appropriate justification is given, but the question is not answered or is answered incorrectly.
[0] "No," but the justification is missing or is incorrect.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [125] [4] 618.45, 613.44, and 0.008, and appropriate work is shown, and an appropriate justification is given.
[3] Appropriate work is shown, but one computational or rounding error is made.
or [3] 618.45, 613.44, and 0.008, and appropriate work is shown, but no justification is given.
[2] Appropriate work is shown, but two or more computational or rounding errors are made.
or [2] Appropriate work is shown, but one conceptual error is made, such as dividing by 618.45.
[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
or [1] 618.45 and 613.44, and appropriate work is shown, but no further correct work is shown.
or [1] 618.45, 613.44, and 0.008, but no work is shown.
[0] 618.45 or 613.44, and appropriate work is shown, but no further correct 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.
-
- [126]

- [3] $\frac{4}{9}$, and a correct tree diagram or sample space is shown.
[2] A correct tree diagram or sample space is shown, but no probability or an incorrect probability is given.
or [2] An incorrect tree diagram or sample space is shown, but an appropriate probability is found.
[1] Appropriate work is shown, but one conceptual error is made.
or [1] $\frac{4}{9}$, 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.
-
- [127] [4] (-2,5) or $x = -2$. and $y = 5$, and appropriate algebraic work is shown.
[3] Appropriate algebraic work is shown, but one computational error is made, but appropriate values are found for x and y .
or [3] $x = -2$ or $y = 5$, and appropriate algebraic work is shown.
[2] Appropriate algebraic work is shown, but two or more computational errors are made, but appropriate values are found for x and y .
or [2] Appropriate algebraic work is shown, but one conceptual error is made.
or [2] (-2,5) or $x = -2$ and $y = 5$, but a method other than an algebraic method is used.
[1] Appropriate algebraic work is shown, but one conceptual error and one computational error are made.
or [1] The trial-and-error method is used to find the correct solution, but fewer than three trials and appropriate checks are shown.
or [1] $x = -2$ or $y = 5$, but a method other than an algebraic method is used.
or [1] (-2,5) or $x = -2$ and $y = 5$, but no work is shown.
[0] $x = -2$ or $y = 5$, 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.
-
- [128]

[129] C

[130] B

[2] $4x(x - 3)(x + 3)$, and appropriate work is shown.

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

or [1] Appropriate work is shown, but one conceptual error is made, such as leaving the answer as $4x(x^2 - 9)$.

or [1] $4x(x - 3)(x + 3)$, 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

[131] incorrect procedure.

[132] B

[3] A correct graph is drawn over the given interval, the function is identified as one that will not intersect the x -axis, and an appropriate justification is given.

[2] Appropriate work is shown, but one graphing error is made, but an appropriate answer and justification are given.

or [2] A correct graph is drawn over the given interval, but no further correct work is shown.

[1] Appropriate work is shown, but two or more graphing errors are made, but an appropriate answer and justification are given.

or [1] Appropriate work is shown, but one conceptual error is made, but an appropriate answer and justification are given.

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

[133] incorrect procedure.

[134] A

[135] B

[136] A

[3] $\frac{3}{18}$, 16.67% and \$13.50, and appropriate

work is shown.

[2] Appropriate work is shown, but one rounding error is made, such as 16.6%, 16.7%, or 17%.

or [2] An incorrect fractional rate of discount is found, but an appropriate percent is stated, and \$13.50 is found.

or [2] Appropriate work is shown, but only two correct answers are found.

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

or [1] Appropriate work is shown, but only one correct answer is found.

or [1] $\frac{3}{18}$, 16.67% and \$13.50, but no work is shown.

[0] $\frac{3}{18}$, 16.67% or \$13.50, 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.

[137] _____

[138] D

[139] D

[140] B

[141] D

[142] A

[2] $d = 6.25h$ or an equivalent equation and 250, 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] A correct equation is written, but no further correct work is shown.

or [1] Appropriate work is shown to find 250, but the equation is missing or is incorrect.

[0] 250, 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

[143] obviously incorrect procedure.

[144] A

[145] A

[146] D

[147] D

[148] D

[149] C

[150] C

[4] Both equations are graphed correctly, and at least one is labeled, and $(1, -3)$ is stated.

[3] Appropriate work is shown, but one computational, graphing, or labeling error is made, but an appropriate point of intersection is stated.

or [3] Both equations are graphed correctly and at least one is labeled, but the point of intersection is not stated or is stated incorrectly.

[2] Appropriate work is shown, but two or more computational, graphing, or labeling errors are made, but an appropriate point of intersection is stated.

or [2] Appropriate work is shown, but one conceptual error is made, but an appropriate point of intersection is stated.

or [2] Both equations are graphed correctly, but neither is labeled, and the point of intersection is not stated or is stated incorrectly.

or [2] $(1, -3)$, but a method other than graphic is used.

[1] Appropriate work is shown, but one conceptual error and one computational, graphing, or labeling error are made, but an appropriate point of intersection is stated.

or [1] One line is graphed and labeled correctly, but no further correct work is shown.

or [1] $(1, -3)$, 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

[151] incorrect procedure.

[152] D

[153] C

[3] $y - 4 = \frac{2}{5}(x - 5)$ or $y = \frac{2}{5}x + 2$ or an equivalent equation, and appropriate work is shown.

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

or [2] Appropriate work is shown to find the slope and y -intercept, but an equation is not written or is written incorrectly.

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

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

or [1] Appropriate work is shown to find the slope or y -intercept, but an equation is not written or is written incorrectly.

or [1] $y - 4 = \frac{2}{5}(x - 5)$ or $y = \frac{2}{5}x + 2$, 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

[154] incorrect procedure.

[2] 33.4, 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] 33.4, 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

[155] incorrect procedure.

[156] A

[3] Greg, and appropriate work is shown to justify the answer.

[2] Appropriate work is shown, but one computational error is made, but an appropriate name is stated.

or [2] Appropriate work is shown computing both rates, but Greg is not stated to have the faster rate.

[1] Appropriate work is shown, but two or more computational errors are made, but an appropriate name is stated.

or [1] Appropriate work is shown, but one conceptual error is made, but an appropriate name is stated.

or [1] Appropriate work is shown to determine one of the rates, but no further correct work is shown.

[0] Greg, 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

[157] obviously incorrect procedure.

[158] B

[159] D

[2] $30\sqrt{2}$, 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 in simplest radical form.

or [1] $30\sqrt{2}$, 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

[160] incorrect procedure.

[161] C

[162] B

- [3] 50, 1.5, and 10, and appropriate work is shown.
 [2] Appropriate work is shown, but one computational error is made.
 [1] Appropriate work is shown, but one conceptual error is made.
 or [1] Appropriate work is shown, but two or more computational errors are made.
 or [1] 50, and appropriate work is shown, but no further correct work is shown.
 or [1] 1.5, and appropriate work is shown, but no further correct work is shown.
 or [1] 10, and appropriate work is shown, but no further correct work is shown.
 or [1] 50, 1.5, and 10, but no work is shown.
 [0] 50 or 1.5 or 10, 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.
- [163] _____
- [164] A _____
- [2] 60, and appropriate work is shown, such as ${}_5P_3$ or $5 \times 4 \times 3$.
 [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 determining the value of ${}_5C_3$.
 or [1] 60, 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.
- [165] _____
- [166] C _____
- [167] B _____
- [168] A _____
- [169] A _____
- [170] A _____
- [171] D _____
- [172] C _____

- [4] Mean=315,000, median=180,000, and the median is stated to be the best measure of central tendency, an appropriate justification is given, and appropriate work is shown.
 [3] Appropriate work is shown, but one computational error is made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.
 or [3] Mean=315,000, median=180,000, and the median is stated to be the best measure of central tendency, but no further correct work is shown.
 [2] Appropriate work is shown, but two computational errors are made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.
 or [2] Appropriate work is shown, but one conceptual error is made.
 or [2] Appropriate work is shown to find mean=315,000 and median=180,000, but no further correct work is shown.
 [1] Appropriate work is shown, but one conceptual error and one computational error are made.
 or [1] Appropriate work is shown to find mean=315,000 or median=180,000, but no further correct work is shown.
 or [1] Mean=315,000 and median=180,000, but no further correct work is shown, and no justification is given.
 [0] Mean=315,000 or median=180,000, but no further correct work is shown, and no justification is given.
 or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- [173] _____

[4] A box-and-whisker plot is constructed correctly, where the minimum = 66, the first quartile = 72.5, the median = 85, the third quartile = 90, and the maximum = 95.

[3] A box-and-whisker plot is constructed, but one computational or graphing error is made.

[2] A box-and-whisker plot is constructed, but two or more computational or graphing errors are made.

or [2] A box-and-whisker plot is constructed, but one conceptual error is made.

[1] A box-and-whisker plot is constructed, but one conceptual error and one computational or graphing error are made.

or [1] A box-and-whisker plot is constructed, but only two of the statistical measures, the first quartile, the median, or the third quartile are found.

or [1] Minimum = 66, first quartile = 72.5, median = 85, third quartile = 90, and maximum = 95 are found, but no further correct work is shown.

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

[174] incorrect procedure.

[175] B

[176] A

[2] $\{1, 2, 4, 5, 9, 10, 12\}$ or $\{x|x = 1, 2, 4, 5, 9, 10, 12\}$

[1] 1, 2, 4, 5, 9, 10, 12, but set notation is not used.

or [1] Set notation is used and at least five correct numbers (but not the entire set) are written.

[0] Set notation is used, but fewer than five correct numbers are written.

or [0] $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

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

[177] obviously incorrect procedure.

[178] C

[179] B

[2] 50, 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] 50, 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

[180] incorrect procedure.

[181] A

[182] C

[183] B

[3] 7, and appropriate work is shown, such as solving the inequality $15x + 22 \geq 120$, solving an equation, or trial and error with at least three trials and appropriate checks.

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

or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.

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

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

or [1] An incorrect equation of equal difficulty is solved appropriately.

or [1] A correct inequality or equation is written, but no further correct work is shown.

or [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or [1] 7, but no work or only one trial with an appropriate check is shown.

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

[184] incorrect procedure.

[185] D

[186] C

[187] D

[188] C

[189] C

[190] B

[191] A

[2] $\frac{1}{8}$ 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.

or [1] $\frac{1}{8}$ 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

[192] incorrect procedure.

[193] D

[194] C

[195] B

[196] A

[197] A

[198] D

[199] A

[200] C

[201] D

[202] C

[203] B

[204] A

[205] C

[206] B

[207] A

[208] A

[209] B

[210] A

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

or [1] $\frac{3k^2m^6}{4}$, 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

[211] incorrect procedure.

[3] 5,583.86, and appropriate work is shown.

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

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

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

or [1] $A = 5000(1 + 0.0375)^3$ or an equivalent equation, but no further correct work is shown.

or [1] 5,583.86, 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

[212] incorrect procedure.

[213] A

- [4] Correct graphs are drawn, and (0,5) and (4,-3) are stated.
 [3] Both equations are graphed, but one graphing error is made, but appropriate solutions are stated.
 or [3] Both graphs are drawn correctly, but only one solution is stated.
 [2] Both graphs are drawn correctly, but no solutions are stated.
 or [2] Both equations are graphed, but two or more graphing errors are made, but appropriate solutions are stated.
 or [2] Appropriate work is shown to find (0,5) and (4,-3), but a method other than graphing is used.
 or [2] Both equations are graphed, but one conceptual error is made.
 [1] Both equations are graphed, but one conceptual error and one graphing error are made.
 or [1] (0,5) and (4,-3) are stated, but no work is shown.
 [0] (0,5) or (4,-3) is stated, 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.
- [214] _____
- [215] C
- [216] C
- [217] B
- [218] A

- [3] 56, and appropriate work is shown.
 [2] Appropriate work is shown, but one computational error is made.
 or [2] Appropriate work is shown to find $A = \frac{1}{2}(4)(12+16)$ or an equivalent equation, but no further correct work is shown.
 [1] Appropriate work is shown, but two or more computational errors are made.
 or [1] Appropriate work is shown, but one conceptual error is made.
 or [1] Appropriate work is shown to find $AD=16$ and $BC=12$, but no further correct work is shown.
 or [1] 56, 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.
- [219] _____
- [220] C
- [221] B
- [222] D
- [223] C
- [224] D
- [2] 5,112, 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 finding the difference.
 or [1] $(12)(30)(16) - (6)(9)(12)$ or an equivalent expression, but no further correct work is shown.
 or [1] 5,112, 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.
- [225] _____
- [226] C
- [227] B

[4] $\frac{x-7}{3x}$, and appropriate work is shown.

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

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

or [2] Appropriate work is shown, but one conceptual error is made, such as not multiplying by the reciprocal.

or [2] All numerators and denominators are factored correctly, but no further correct work is shown.

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

or [1] $\frac{x-7}{3x}$, 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

[228] incorrect procedure.

[229] A _____

[3] $x = -2$ and $(-2,11)$, and appropriate algebraic work is shown.

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

or [2] An incorrect equation of the axis of symmetry is written, but an appropriate vertex is found.

or [2] $x = -2$ and $y = 11$, and appropriate work is shown, but the vertex is not stated as a point.

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

or [1] Appropriate work is shown, but one conceptual error is made, such as not expressing the axis of symmetry as an equation.

or [1] $x = -2$ and $(-2,11)$, but a method other than algebraic is used.

or [1] Appropriate work is shown to find $x = -2$, but no further correct work is shown.

or [1] Appropriate work is shown to find $(-2,11)$, but no further correct work is shown.

or [1] $x = -2$ and $(-2,11)$, but no work is shown.

[0] $x = -2$ or $(-2,11)$, 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

[230] obviously incorrect procedure.

[231] B _____

[2] $0 \leq t \leq 40$ or an equivalent answer.

[1] Appropriate work is shown, but one conceptual error is made, such as $0 < t < 40$ or $-23 \leq t \leq 50$.

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

[232] incorrect procedure.

[233] A _____

[234] C _____