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| 1. Match the function with one of the following graphs.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.210 - Identify the graph that matches the given function | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 2. Match the function with one of the following graphs.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.3 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.210 - Identify the graph that matches the given function | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 3. Match the function with one of the following graphs.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.5 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.210 - Identify the graph that matches the given function | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 4. For the function , use a graphing utility to complete the table and estimate the limit as *x* approaches infinity.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 100 | 101 | 102 | 103 | 104 | 105 | 106 | |  |  |  |  |  |  |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | 1.3333 | |  | b. | 2.3333 | |  | c. | 0.7500 | |  | d. | 1.7500 | |  | e. | –0.2500 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.7 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.211 - Estimate a limit at infinity from a table of values | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 5. For the function , use a graphing utility to complete the table and estimate the limit as *x* approaches infinity.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 100 | 101 | 102 | 103 | 104 | 105 | 106 | |  |  |  |  |  |  |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | 1.0000 | |  | b. | 2.2500 | |  | c. | 3.4300 | |  | d. | 0.3500 | |  | e. | does not exist |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.9 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.211 - Estimate a limit at infinity from a table of values | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 6. For the function , use a graphing utility to complete the table and estimate the limit as *x* approaches infinity.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 100 | 101 | 102 | 103 | 104 | 105 | 106 | |  |  |  |  |  |  |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | 3 | |  | b. | –2 | |  | c. | 8 | |  | d. | 0 | |  | e. | None of the above |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.11 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.211 - Estimate a limit at infinity from a table of values | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 7. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | –4 | |  | c. |  | |  | d. | 4 | |  | e. | –1 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.19 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 8. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | –6 | |  | c. | 0 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.20 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 9. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 1 | |  | b. | 0 | |  | c. |  | |  | d. |  | |  | e. | does not exist |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.21 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 10. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | 1 | |  | c. | 0 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.23 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 11. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | 1 | |  | d. | –5 | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.25 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 12. Find the limit.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | 1 | |  | d. | 3 | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.27 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.212 - Evaluate the limit of a function at infinity | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 13. Sketch the graph of the function using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.65 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.213 - Graph a function using extrema, intercepts, symmetry, and asymptotes | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 14. Sketch the graph of the function using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.70 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.213 - Graph a function using extrema, intercepts, symmetry, and asymptotes | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 15. Sketch the graph of the relation using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.73 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.213 - Graph a function using extrema, intercepts, symmetry, and asymptotes | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 16. Sketch the graph of the relation using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.74 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.213 - Graph a function using extrema, intercepts, symmetry, and asymptotes | | *OTHER:* | Skill | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 17. A business has a cost of for producing *x* units. The average cost per unit is . Find the limit of  as *x* approaches infinity.  ​   |  |  |  | | --- | --- | --- | |  | a. | 375.0 | |  | b. | 1 | |  | c. | 600 | |  | d. | 0 | |  | e. | 1.6 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *REFERENCES:* | 4.5.96 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.214 - Evaluate limits at infinity in applications | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 18. The graph shows the temperature *T*, in degrees Fahrenheit, of molten glass *t* seconds after it is removed from a kiln.  ​  ​  Find .  ​   |  |  |  | | --- | --- | --- | |  | a. | 1,515° | |  | b. | 65° | |  | c. | 1,450° | |  | d. | 82° | |  | e. | 1,385° |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *REFERENCES:* | 4.5.98b | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.214 - Evaluate limits at infinity in applications | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 19. A heat probe is attached to the heat exchanger of a heating system. The temperature *T* (in degrees Celsius) is recorded *t* seconds after the furnace is started. A model for the data recorded for the first two minutes is given by . Find .  ​   |  |  |  | | --- | --- | --- | |  | a. | 1,499° | |  | b. | 1,411° | |  | c. | 50° | |  | d. | 88° | |  | e. | 28° |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.99e | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.214 - Evaluate limits at infinity in applications | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 20. A container holds 6 liters of a 25% brine solution. A model for the concentration *C* of the mixture after adding *x* liters of an 0.89% brine solution to the container and then draining *x* liters of the well-mixed solution is given as . Find . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 0.67% | |  | b. | 0.33% | |  | c. | 0.93% | |  | d. | 0.89% | |  | e. | 0.25% |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.100d | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.214 - Evaluate limits at infinity in applications | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 21. Find the point on the graph of the function  that is closest to the point . Round all numerical values in your answer to four decimal places.   ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficult | | *REFERENCES:* | 4.5.101a | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.215 - Apply calculus techniques to solve a minimum/maximum problem involving the distance between points | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 22. Find the point on the graph of the function that is closest to the point .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.101b | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.215 - Apply calculus techniques to solve a minimum/maximum problem involving the distance between points | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |

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| 23. A rectangular page is to contain 144 square inches of print. The margins on each side are 1 inch. Find the dimensions of the page such that the least amount of paper is used.  ​   |  |  |  | | --- | --- | --- | |  | a. | 16, 16 | |  | b. | 13, 13 | |  | c. | 15, 15 | |  | d. | 25, 25 | |  | e. | 14, 14 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *REFERENCES:* | 4.5.102b | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | CETF.LAED.11.216 - Apply calculus techniques to solve a minimum/maximum problem involving the print area on a page | | *OTHER:* | Application | | *NOTES:* | Section 4.5 | | *DATE CREATED:* | 7/11/2017 8:26 AM | | *DATE MODIFIED:* | 7/11/2017 8:26 AM | |