

Scores

part one: number correct _____ x 4 = _____ minus number wrong _____ = _____ (A)

part two: _____ (B) Total score (A)+(B) _____

Math Field Day Short Course Event Name(s) _____

50 points total School _____

Part one Instructions: Work alone or with a team. You should use the formulas, your calculator, and your notes. Record your answers by circling the letter to the right. Each correct answer is worth 4 points; one point will be deducted for each wrong answer. (Part one consists of 10 questions. Maximum score on part 1 is 40 points.)

	In problems 1 through 10 you are to choose the <u>closest</u> answer.	Circle the letter of the correct answer
1.	An individual wishes to deposit a certain quantity of money now so that at the end of 5 years he will have \$500.00. With interest at 4% per year, compounded semiannually, how much must he deposit now? (a) \$340.30 (b) \$400.00 (c) \$410.15 (d) \$416.95 (e) \$608.35	a b c d e
2.	A sum of \$1000.00 is borrowed for one year at an interest rate of 1% per month. If this same sum of money is borrowed for the same period at an interest rate of 12% per annum, the saving in interest charges would be: (a) \$ 0 (b) \$ 3 (c) \$ 5 (d) \$ 7 (e) \$ 14	a b c d e
3.	A certain piece of property is purchased for \$10,000 and yields a \$1000 yearly profit. If the property is sold after 5 years, what is the minimum price to break even, with interest at 6 percent? (a) \$5,000 (b) \$6,500 (c) \$7,745 (d) \$8,314 (e) \$10,000	a b c d e
4.	A steam boiler is purchased on the basis of guaranteed performance. A test indicates that the operating cost will be \$300 more per year than the manufacturer guaranteed. If the expected life of the boiler is 20 years and money is worth 8 percent, how much should the purchaser deduct from the purchase price to compensate for the extra operating cost? (a) \$2945 (b) \$3320 (c) \$4102 (d) \$5520 (e) \$6000	a b c d e
5.	A bank pays one percent interest on savings accounts four times a year. The effective annual interest rate is: (a) 1.00 percent (b) 1.04 percent (c) 3.96 percent (d) 4.00 percent (e) 4.06 percent	a b c d e
6.	How many months at an interest rate of 1 percent per month does money have to be invested before it will double in value? (a) 59 months (b) 62 months (c) 70 months (d) 76 months (e) 83 months	a b c d e

(over)

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<p>7. Given a sum of money Q that will be received six years from now. At 5 percent compound interest the present worth now of Q is \$60.00. At this same interest rate, what would be the value of Q ten years from now?</p> <p>(a) \$60.00 (b) \$76.78 (c) \$90.00 (d) \$97.73 (e) \$120.00</p>	<p>a b c d e</p>
<p>8. A small South American country experiences inflation of 20% per month. The effective annual inflation rate is</p> <p>(a) 20% (b) 240% (c) 790% (d) 2400%</p>	<p>a b c d</p>
<p>9. Annual maintenance costs for a particular section of highway pavement are \$2000. The placement of a new surface would reduce the annual maintenance cost to \$500 per year for the first 5 years and to \$1000 per year for the next 5 years. The annual maintenance after 10 years would again be \$2000. If maintenance costs are the only saving, what maximum investment can be justified for the new surface? Assume interest at 4%.</p> <p>(a) \$5,500 (b) \$7,170 (c) \$10,000 (d) \$10,340 (e) \$12,500</p>	<p>a b c d e</p>
<p>10. A personal computer system costs \$18,000, and annual maintenance is \$900. After 3 years the salvage value of the system is \$3,000. If the interest rate is 8%, the equivalent uniform annual cost is</p> <p>(a) \$6,960 (b) \$6,922 (c) \$7,288 (d) \$7,499</p>	<p>a b c d</p>

Part two Instructions: Work alone or with a team. You should use the formulas, your calculator, and your notes. Put your answers to parts (a) and (b) in the spaces provided; Circle the correct answer to part (c). The problem is worth a total of 10 points. Four points each for parts (a) and (b); two points for part (c). No credit for 11(c) if answers to parts (a) and (b) are missing.

Solve the following problem; enter the solutions in the column to the right. (Round to the nearest \$100.)	Enter the present worths in this column and circle the more economical alternative.
<p>11. An old light capacity highway bridge may be strengthened at a cost of \$22,000, or it may be replaced by a new bridge at a cost of \$40,000. It is estimated that the old bridge, when reinforced, will last for 20 years, with a maintenance cost of \$500 per year and have a salvage value of \$10,000 at the end of 20 years. The estimated salvage value of the new bridge after 20 years of service is \$15,000. The maintenance of the new bridge will be \$100 per year. If interest is 6%, determine:</p> <p>(a) the present worth of the cost of strengthening the existing bridge.</p> <p>(b) the present worth of the cost of the new bridge.</p> <p>(c) which of the two alternatives is the more economical.</p>	<p>(a) \$ _____</p> <p>(b) \$ _____</p> <p>(c) The more economical alternative is (circle one):</p> <p>(i) Strengthen existing</p> <p>(ii) Build New</p>