Topic test | Financial mathematics

Financial mathematics - Applications

Name: _____ Date: _____

16 questions | 49 marks | 60 minutes

A camp budget, transport choices and constrained financial models.

A scientific calculator may be used.

1. An 80-dollar hire charge increases by 15%. Find the new charge. [2 marks]

2. Find simple interest on 2,000 dollars at 3% per year for 6 months. [2 marks]

3. An account starts at 1,000 dollars and has balances 1,050, 1,100 and 1,150 dollars after years 1, 2 and 3. Explain its simple-interest rate. [3 marks]

4. A camp charges 20 dollars per student. Costs are 130 dollars plus 7 dollars per student. Find the break-even count. [3 marks]

5. A camp charges 20 dollars per student and costs 130 dollars fixed plus 7 dollars per student. Find the balance if 8 students attend. [3 marks]

6. A camp charges 20 dollars per student and costs 130 dollars fixed plus 7 dollars per student. Find the balance if 12 students attend. [3 marks]

7. A camp charges 20 dollars per student. Its original costs are 130 dollars fixed plus 7 dollars per student. An extra 26-dollar fixed fee is added. Find the new break-even count. [3 marks]

8. A camp charges 20 dollars per student and now costs 156 dollars fixed plus 7 dollars per student. Capacity is 11 students. Can the camp break even? Explain. [4 marks]

9. Transport A costs $60 + 3n$ dollars and B costs $20 + 5n$ dollars. Find their equal-cost group size and price. [3 marks]

10. Transport A costs $60 + 3n$ dollars and B costs $20 + 5n$ dollars for n students. Compare costs for 15 students. [2 marks]

11. Transport A costs $60 + 3n$ dollars and B costs $20 + 5n$ dollars for n students. Compare costs for 30 students. [2 marks]

12. Revenue is $R = n(22 - n)$ dollars, and venue capacity is 11. [4 marks]

(a) Find both whole-number counts giving revenue 120 dollars. [3 marks]

(b) Which count is feasible? [1 mark]

13. Profit models are $P_A = 4n - 20$ and $P_B = -n^2 + 14n - 20$ dollars. [5 marks]

(a) Find their equal-profit counts. [3 marks]

(b) Compare profits at $n = 6$. [2 marks]

14. A 500-dollar budget includes transport 200, materials 120, food 80 and reserve 50 dollars. Food rises by 20%. Find the remaining balance. [3 marks]

15. A stall charges 10 dollars per item; costs are 100 dollars fixed plus 2 dollars per item. Compare surpluses for 20 and 15 sales. [4 marks]

16. A printing model is $C = 0.015n^2 + 2n + 25$ dollars, valid only for whole counts $0 \le n \le 40$. [3 marks]

(a) Find the modelled cost of 10 copies. [2 marks]

(b) Does the rule alone justify a quote for 500 copies? [1 mark]