MPM 2DI EXAM REVIEW – Chapter 1: Linear Systems

Match the words or phrases (a to i) with the best definition (1 – 8). One term will not be used.

a. linear system
b. equivalent linear systems
c. method of substitution
d. slope
e. point of intersection (solution)
f. equivalent linear equations
g. graph
h. intercept
i. method of elimination

____ 1. Where two lines meet
____ 2. Consists of at least two lines
____ 3. The point where a relation crosses the x- or y-axis
____ 4. Two linear systems that have the same solutions
____ 5. A method of solving a system in which one variable is replaced
____ 6. This is equal for two lines that are parallel
____ 7. When two linear equations are added or subtracted to solve a linear system
____ 8. When two linear equations that have the same graph

9. ***GRAPH PAPER REQUIRED:*** Find the point of intersection of the lines $y = -\frac{5}{2}x$ and $y = -x + 3$ **by graphing** the system.

10. ***GRAPH PAPER REQUIRED:*** Lee has $200 and would like to buy 10 books as gifts. A paperback book costs $14 and a hard cover costs $24. **Graphically** find the number of each kind of book that Lee should buy to spend all of his $200.

11. Solve this linear system using the method of substitution, then show a "check" for your solution.

$$2(x-4)+y=6$$
$$3x-2(y-3)=13$$

12. At the deli, two smoked turkey subs and 5 veggie subs cost $29. Four smoked turkey subs and three veggie subs cost $30.
a) Create a linear system with two equations to model this situation.
b) Solve the system, using the method of elimination, to find the cost of a smoked turkey sub and the cost of a veggie sub.

ALL REMAINING QUESTIONS, FOR FULL MARKS, MUST BE SOLVED USING A LINEAR SYSTEM.

13. One metal alloy is 25% copper, while another is 50% copper. How much of each alloy should be used to make 1500 g of a metal alloy that is 40% copper?

14. Chris needs to make 500 L of a 35% acidic solution. He has only two of the acidic solutions available, a 25% solution and a 50% solution. How many litres of each acidic solution should he mix?

15. A houseboat on the Trent river system travelled 48 km upstream (against the current) in 6 h. It only took the houseboat 4 h to make the same trip downstream (with the current).
(a) How fast would the houseboat have travelled in still water?
(b) How fast was the river's current?

16. A salmon fishing boat on a BC river travelled upstream in 4 h. Returning downstream at the same speed, it took 3 h. The distance was 72 km each way.
(a) Find the speed of the fishing boat in still water.
(b) Find the speed of the river's current.

CHAPTER 1 EXAM REVIEW FINAL ANSWERS

1. e
2. a
3. h
4. b
5. c
6. d
7. i
8. f

9. $(-2, 5)$
10. $(4, 6)$
11. $x = 5$ and $y = 4$
12. a) Let the cost of a smoked turkey sub in dollars be *t* and the cost of a veggie sub in dollars be *v*.
    $2t + 5v = 29$
    $4t + 3v = 30$
    b) A smoked turkey sub costs $4.50 and a veggie sub costs $4.

13. Let *x* represent the amount of the 25% copper alloy used, and *y* represent the amount of the 50% alloy used.
    $x + y = 1500$
    $0.25x + 0.5y = (0.4)(1500)$
    …
    To make 1500 g of an alloy that is 40% copper, 600 g of the 25% copper alloy and 900g of the 50% copper alloy should be used.

14. Let *x* litres represent the number of litres of the 25% acidic solution to use, and *y* represent the number of litres of the 50% acidic solution to use.
    $x + y = 500$
    $0.25x + 0.5y = (0.35)500$
    …
    To make the 35% acidic solution, Chris should mix 300 L of the 25% solution and 200 L of the 50% solution.

15. Let the speed of the houseboat in still water (no current) be *h*, and the speed of the river's current be *c*, both in kilometres per hour.
    Upstream:
    $48 = (h - c) \times 6$
    Downstream:
    $48 = (h + c) \times 4$
    …
    The houseboat travelled at 10 km/h in still water, and the river current was 2 km/h.

16. Let *f* be the speed of the fishing boat in still water, and *c* be the speed of the river's current.
    Upstream:
    $72 = (f - c) \times 4$
    Downstream:
    $72 = (f + c) \times 3$
    …
    The fishing boat's speed in still water was 21 km/h, and the river's current was 3 km/h.