

# WEEK 5 PRACTICE QUESTIONS

1. Answer each of the following questions, showing all working.

(a) Solve

$$\begin{array}{rcl} -x & - & 5y = 29 \\ 5x & - & y = -15 \end{array}$$

(b) Solve

$$\begin{array}{rcl} 3x & - & y = -5 \\ -3x & + & y = -3 \end{array}$$

(c) Solve

$$\begin{array}{rcl} -5x & - & y = 7 \\ -5x & - & y = -7 \end{array}$$

(d) Solve

$$\begin{array}{rcl} -7x & + & 6y = -7 \\ 7x & - & 6y = 7 \end{array}$$

2. Answer each of the following questions, showing all working.

(a) Solve

$$\begin{array}{rcl} -2x & + & 2y = 4 \\ -5x & - & 5y = 30 \end{array}$$

(b) Solve

$$\begin{array}{rcl} -2x & - & y = 5 \\ x & + & 5y = -5 \end{array}$$

(c) Solve

$$\begin{array}{rcl} 4x & - & 7y = -3 \\ 4x & - & 7y = -6 \end{array}$$

(d) Solve

$$\begin{array}{rcl} 6x & + & 4y = -2 \\ 3x & + & 2y = -1 \end{array}$$

3. The evil Dr Moriarty has tied Penelope Pureheart to the railway line at the point (1, 2). The 11:05 express train has just passed the point (-3, 10) and is racing towards Penelope. Penelope's boyfriend Dagwood Doogood is at the point (-3, 2), sitting on his horse.

(a) Find the equation of the train track.

(b) Dagwood must ride in a straight line toward the railway line and cross the line at the point (-1, 6) in front of the train, forcing it to stop before it strikes Penelope. What is the equation of the straight line marking Dagwood's ride?

(c) Unfortunately Dagwood is a twit (Penelope does not love him for his mind). He has no sense of direction, so must follow Sassie the wonder dog toward the railway line. Sassie starts at the point (-2, 0) and travels toward the railway track on a line parallel to Dagwood's. At what point will Sassie cross the railway line? (Hint: you'll need your answers to (a) and (b) to help with this.)

4. Like most MATH1040 students, Sarina always falls asleep in lectures. She dreams of Norwegian men; she *adores* Norwegian men. This week, she dreams of Luscious Lars. Sadly, due to an unfortunate incident in his childhood, Luscious Lars is obsessed with maths and moose, and doesn't notice Sarina.

(a) To attract his attention, Sarina invites Lars to a wild night out at Murwillumbah's massive moose-and-maths event, "*Moothematica*", to woo him with wieners and whisky. She has \$54 to spend; assume she spends it all on whisky and wieners. Each whisky costs \$6, and each wiener costs \$2. However, if she drinks too much she'll pass out, leaving Luscious Lars to run off with a moose handler (or do some maths). Hence the number of wieners she buys should be exactly 3 more than the number of whiskies she buys. How many of each item (whiskies and wieners) does she buy?

(b) Alas! The moose-and-maths event did not work. Sarina decides to write Lars some love poetry. There are 24 hours left before the MATH1040 exam; Sarina decides to spend all the remaining time studying, sleeping or writing poetry. However, because she wants to pass (and has slept through all of her lectures), she needs twice as much time studying as she spends writing poetry. She also spends one third as much time sleeping as she spends on all other activities.

(i) Write three equations outlining Sarina's timing dilemma. (Hint: Let  $x$  be the amount of time she spends studying,  $y$  be the amount of time she spends sleeping and  $z$  be the amount of time she spends writing poetry.)

(ii) Solve these equations, thus giving how much time she should spend on each activity. (Hint: you now have three equations with three unknowns. Solve them using substitution.)