



**PERTH MODERN SCHOOL**  
Exceptional schooling. Exceptional students.  
**Independent Public School**

**Course** 11 METHODS **Year** 11

Student name: MARKING KEY Teacher name: \_\_\_\_\_

**Task type:** Test 1 Weds week 2 2021

**Time allowed for this task:** 40 mins

**Number of questions:** \_\_\_\_\_

**Materials required:** No calculators nor classpads

**Standard items:** Pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

**Special items:** Drawing instruments, templates (No notes allowed)

**Marks available:** 42\_ marks & 7 questions

**Task weighting:** 10\_ %

**Formula sheet provided:** No

**Note:** All part questions worth more than 2 marks require working to obtain full marks.

Q1 (1, 1, 2, 3, 3, 3 &amp; 4 = 17 marks) (1.1.6)

Solve the following linear equations showing full working.

<p>a) <math>7x - 11 = 5x</math></p> $2x = 11$ $x = \frac{11}{2} \text{ or } 5.5$	<p>b) <math>6x + 7 = 10 - 4x</math></p> $10x = 3$ $x = \frac{3}{10} \text{ or } 0.3$
<p>c) <math>2(1 + 3x) = 9x - 2</math></p> $2 + 6x = 9x - 2$ $4 = 3x$ $x = \frac{4}{3}$	<p>d) <math>x + 7 = \frac{5}{2}x</math></p> $\frac{3}{2}x = 7$ $x = \frac{14}{3}$
<p>e) <math>\frac{5x - 3}{3} = \frac{8x + 1}{6}</math></p> $6(5x - 3) = 3(8x + 1)$ $30x - 18 = 24x + 3$ $6x = 21$ $x = \frac{7}{2}$ <p>OR 3.5</p>	<p>f) <math>\frac{x}{4} + \frac{x}{5} = 7</math></p> $\frac{5x}{20} + \frac{4x}{20} = \frac{140}{20}$ $9x = 140$ $x = \frac{140}{9}$
<p>g) <math>\frac{3y - 1}{2} + \frac{5y + 2}{4} = y</math></p> $\frac{2(3y - 1)}{4} + \frac{5y + 2}{4} = \frac{4y}{4}$ $6y - 2 + 5y + 2 = 4y$ $7y = 0$ $y = 0$	

Q2 (2 & 2 = 4 marks) (1.1.6)

\$1200 is divided between three students A, B & C. Student A receives one third the amount that student B receives and student C receives twice the amount of student A. Let  $x$  equal the amount that student B receives.

- a) Write the above as a linear equation in terms of  $x$ .

$$x + \frac{1}{3}x + \frac{2}{3}x = 1200$$

- b) Solve for  $x$  and hence state the amount that each student receives.

$$2x = 1200$$

$$x = 600$$

$\therefore$  Student B receives \$600, student A receives \$200 and student C receives \$400.

Q3 (2 & 2 = 4 marks) (1.1.6)

Three consecutive even numbers add up to 366.

- a) By introducing a variable  $x$ , express the above statement as a linear equation for  $x$ .

Let  $x$  be an integer such that:

$2x$ ,  $2x+2$  and  $2x+4$  are three consecutive even numbers.

$$\therefore 6x+6 = 366$$

- b) Solve for  $x$  and hence state the three even numbers.

$$6x+6 = 366$$

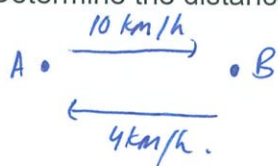
$$6x = 360$$

$$x = 60$$

Thus the three even numbers are 120, 122 and 124.

Q4 (4 marks) (1.1.6)

A woman travels at 10 km/h from A to B and from B to A at 4 km/h. The total journey takes 90 minutes. Determine the distance travelled.



Note:  $AB = BA$ .

$$\therefore 10x = 4y$$

where  $x$  is the time taken to travel from A to B and  $y$  is the time taken to travel from B to A (both in hours).

Q5 (3 & 3 = 6 marks) (1.1.6)

Solve the following.

a)  
 $x = 3y - 5$  — (1)

$3x + 5y = 13$  — (2)

Substitute (1) into (2)

$$3(3y - 5) + 5y = 13 \quad \checkmark$$

$$9y - 15 + 5y = 13$$

$$14y = 28$$

$$\therefore y = 2 \quad \checkmark$$

$$\therefore x = 3(2) - 5$$

$$= 6 - 5$$

$$= 1$$

$$x = 1 \quad \checkmark$$

b)  
 $5x + 2y = 41$  — (1)

$3x + 5y = 36$  — (2)

Multiply (1) by 3 and (2) by -5, then add the resulting equations:

$$15x + 6y = 123 \quad \checkmark$$

$$-15x - 25y = -180 \quad \checkmark$$

$$-19y = -57$$

$$y = 3 \quad \checkmark$$

$$\therefore 5x + 6 = 41$$

$$5x = 35$$

$$x = 7 \quad \checkmark$$

$$10x = 4y \quad \text{--- (1)} \quad \checkmark$$

$$x + y = \frac{3}{2} \quad \text{--- (2)} \quad \checkmark$$

$$\therefore x = \frac{2}{5}y \quad \text{--- (3)}$$

Substitute (3) into (2)  $\therefore \checkmark$

$$\frac{2}{5}y + y = \frac{3}{2} \quad x = \frac{3}{7}$$

$$\frac{7}{5}y = \frac{3}{2} \quad \checkmark$$

$$y = \frac{15}{14}$$

The distance travelled is  $\frac{60}{7}$  km.

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Q6 (4 marks) (1.1.6)

Hilary thinks of a two-digit number. The sum of the digits is 14. If she reverses the digits, the new number is 18 less than her original number. Solve for Hilary's original number **using** simultaneous equations.

Let  $x$  and  $y$  be the digits of the two-digit number :  $\overline{xy}$

NOTE:

$$x + y = 14 \quad \text{--- (1)}$$

$$10y + x = 10x + y - 18 \quad \text{--- (2)}$$

$$\therefore y = 14 - x \quad \text{--- (3) sub (3) into (2)}$$

$$10(14 - x) + x = 10x + 14 - x - 18$$

$$140 - 10x + x = 10x + 14 - x - 18$$

$$-18x = -144$$

$$x = 8 \quad \checkmark$$

$$\therefore y = 14 - 8 = 6 \quad \checkmark$$

The original number is 86.  $\checkmark$

Q7 (3 marks) (1.1.6)

Solve for  $x$  in terms of the constants  $a$  &  $b$  for the following. (simplify)

$$\frac{x+a}{b} + \frac{b-x}{a} - 2 = 0$$

$$\frac{a(x+a) + b(b-x) - 2ab}{2ab} = 0 \quad \checkmark$$

$$ax + a^2 + b^2 - bx - 2ab = 0$$

$$ax - bx = -a^2 + 2ab - b^2$$

$$x(a-b) = -(a^2 - 2ab + b^2)$$

$$x = \frac{-(a-b)(a-b)}{(a-b)} \quad \checkmark$$

$$x = -(a-b) \quad \checkmark$$

