



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 & 4 = 17 marks) (1.1.6)

Solve the following linear equations showing full working.

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

$$6x+6 = 366$$

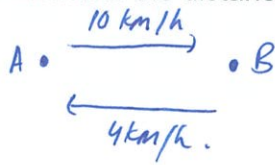
$$6x = 360$$

$$x = 60$$

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)

$$x = 3y - 5 \quad - (1)$$

$$3x + 5y = 13 \quad - (2)$$

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)

$$5x + 2y = 41 \quad - (1)$$

$$3x + 5y = 36 \quad - (2)$$

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

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

$$-15x - 25y = -180 \quad \downarrow +$$

$$-19y = -57$$

$$y = 3 \quad \checkmark$$

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

$$5x = 35$$

$$x = 7 \quad \checkmark$$

$\therefore x = \frac{3}{7}$
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 : $\underline{x} \underline{y}$

NOTE:

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

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

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

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

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

$$-18x = -144$$

$$x = 8$$

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

The original number is 86.

Q7 (3 marks) (1.1.6)

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

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

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

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

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

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

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

$$x = -(a-b)$$

