PERTH MODERN SCHOOL
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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.

a) $7x-11=5x$

$2x = 11$

$x = \frac{11}{2}$ or 5.5 ✓

b) $6x+7=10-4x$

$10x = 3$

$x = \frac{3}{10}$ or 0.3 ✓

c) $2(1+3x)=9x-2$

$2 + 6x = 9x - 2$ ✓

$4 = 3x$

$x = \frac{4}{3}$ ✓

d) $x+7=\frac{5}{2}x$

$\frac{3}{2}x = 7$ ✓

$x = \frac{14}{3}$ ✓✓

e) $\frac{5x-3}{3}=\frac{8x+1}{6}$

$6(5x-3) = 3(8x+1)$ ✓

$30x - 18 = 24x + 3$ ✓

$6x = 21$

$x = \frac{7}{2}$. ✓

OR 3.5

f) $\frac{x}{4}+\frac{x}{5}=7$

$\frac{5x}{20} + \frac{4x}{20} = \frac{140}{20}$ ✓

$9x = 140$ ✓

$x = \frac{140}{9}$. ✓

g) $\frac{3y-1}{2}+\frac{5y+2}{4}=y$

$\frac{2(3y-1)}{4} + \frac{5y+2}{4} = \frac{4y}{4}$. ✓

$6y - 2 + 5y + 2 = 4y$ ✓

$7y = 0$ ✓

$y = 0$. ✓

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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.

$$2x = 1200$$
$$x = 600$$

∴ 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.

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

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.

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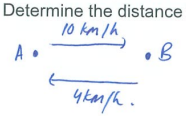
Q4 (4 marks) (1.1.6)
A woman travels at 10 km/h from A to B and from B to A at 4 km/h. The total journey takes 90 minutes.
Determine the distance travelled.



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).

$10x = 4y \quad -①$ ✓

$x + y = \frac{3}{2} \quad -②$

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

Substitute ③ into ② $\therefore$ ✓

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

$\frac{7}{5}y = \frac{3}{2}$. ✓

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

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

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

$3(3y - 5) + 5y = 13$ ✓

$9y - 15 + 5y = 13$

$14y = 28$

$\therefore y = 2$. ✓

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

$= 6 - 5$

$= 1$.

$x = 1$. ✓

b)

$5x + 2y = 41 \quad -①$

$3x + 5y = 36 \quad -②$

Multiply ① by 3 and ② by −5, then add the resulting equations:

$15x + 6y = 123$

$-15x - 25y = -180$ ↓ +

$-19y = -57$

$y = 3$. ✓

$\therefore 5x + 6 = 41$

$5x = 35$

$x = 7$ ✓

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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 : $x\ y$

NOTE: $x + y = 14 \quad -①$

$10y + x = 10x + y - 18 \quad -②$ } ✓

$\therefore y = 14 - x \quad -③$ 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)

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

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

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

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

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

$x = \frac{-(a-b)(a-b)}{(a-b)}$ ✓

$x = -(a-b)$ ✓

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