



**PERTH MODERN SCHOOL**  
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**Independent Public School**

**Course** **Mathematics Methods**

**Year** **11**

Student name: \_\_\_\_\_

Teacher name: \_\_\_\_\_

Date: 07/02/22 Monday Week 2 Term 1

**Task type:** **Response Test 1**

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

**Number of questions:** 7

**Materials required:** No Calculator nor CAS

**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:** 40 marks

**Task weighting:** 10%

**Formula sheet provided:** No

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

**Question 1 (1.1.6)****16 marks**

Solve the following linear equations showing full working.

(a)

(2 marks)

$$3x + 4x + 2x + 90 = 180$$

$$9x + 90 = 180 \quad \checkmark$$

$$9x = 90$$

$$x = 10 \quad \checkmark$$

(b)

(2 marks)

$$7 = 4(k + 5)$$

$$4k + 20 = 7 \quad \checkmark$$

$$4k = -13$$

$$k = -\frac{13}{4} \quad \checkmark$$

(c)

(2 marks)

$$-7n + 5 = 9 - 5n$$

$$-2n = 4 \quad \checkmark$$

$$n = -2 \quad \checkmark$$

(d)

(2 marks)

$$\frac{3m}{2} - 8 = 1$$

$$\frac{3m}{2} = 9$$

$$3m = 18 \quad \checkmark$$

$$m = 6 \quad \checkmark$$

(e)

(2 marks)

$$\frac{6+x}{2} = 4.5$$

$$6+x = 9 \quad \checkmark$$

$$x = 3 \quad \checkmark$$

(f)

(3 marks)

$$\frac{5y-1}{4} = \frac{7-2y}{5}$$

$$5(5y-1) = 4(7-2y) \quad \checkmark$$

$$25y-5 = 28-8y \quad \checkmark$$

$$33y = 33$$

$$y = 1 \quad \checkmark$$

(g)

(3 marks)

$$\frac{x+2}{5} + \frac{x-1}{2} = \frac{x+1}{3}$$

$$6(x+2) + 15(x-1) = 10(x+1) \quad \checkmark$$

$$6x + 12 + 15x - 15 = 10x + 10 \quad \checkmark$$

$$6x + 15x - 10x = 10 + 15 - 12$$

$$11x = 13$$

$$x = \frac{13}{11} \quad \checkmark$$

**Question 2 (1.1.6)****3 marks**

The area of a trapezium is given by the rule  $A = \frac{a+b}{2} \times h$ , where  $a$  and  $b$  are the parallel sides and  $h$  is the height in centimetres.

If  $A = 21\text{cm}^2$ ,  $b = 4\text{cm}$  and  $h = 6\text{cm}$ , rearrange the formula first to make  $a$  the subject, then determine  $a$ .

$$\begin{aligned} A &= \frac{a+b}{2} \times h \\ \frac{a+b}{2} &= \frac{A}{h} \\ a+b &= \frac{2A}{h} \quad \checkmark \\ a &= \frac{2A}{h} - b \quad \checkmark \\ &= \frac{2 \times 21}{6} - 4 \\ &= 3\text{cm} \quad \checkmark \end{aligned}$$

**Question 3 (1.1.6)****4 marks**

A local taxi company charges customers an upfront cost of \$2.50 to hire the taxi and \$0.75 per km. Let  $n$  be the number of km travelled and  $C$  be the total cost (dollars).

(a) Write an equation to represent the above information.

(1 mark)

$$C = 0.75n + 2.50 \quad \checkmark$$

(b) How much would a driver charge for a 10 km trip in the taxi?

(1 mark)

$$\begin{aligned} C &= 0.75(10) + 2.50 \\ &= \$10 \quad \checkmark \end{aligned}$$

(c) If a customer was charged \$8.50, how far did they travel in the taxi?

(2 marks)

$$\begin{aligned} 8.50 &= 0.75n + 2.50 \quad \checkmark \\ 6 &= 0.75n \\ n &= 8\text{km} \quad \checkmark \end{aligned}$$

**Question 4 (1.1.6)****4 marks**

Alicia is twice as old as Lily. Three years from now the sum of their ages will be 42. How old is Alicia now?

Let Lily's age be  $x$ . Use an algebraic equation of  $x$  to solve the problem.

$$\overset{\checkmark}{x} + 3 + \overset{\checkmark}{2x} + 3 = 42$$

$$3x + 6 = 42$$

$$3x = 36$$

$$x = 12 \quad \checkmark$$

$\therefore$  Alicia is 24 years old now.  $\checkmark$

**Question 5 (1.1.6)****3 marks**

Solve the simultaneous equations:

$$\begin{aligned} y &= -9x + 5 \\ 5x - 3y - 1 &= 0 \end{aligned}$$

$$5x - 3(-9x + 5) - 1 = 0$$

$$5x + 27x - 15 - 1 = 0$$

$$32x = 16$$

$$x = \frac{1}{2} \quad \checkmark$$

$$\begin{aligned} \therefore y &= -9 \times \frac{1}{2} + 5 \\ &= \frac{1}{2} \quad \checkmark \end{aligned}$$

$\checkmark$  solve by substitution/elimination

**Question 6 (1.1.6)****6 marks**

In the rectangle  $ABCD$ ,  $AB = m + 2n$ ,  $BC = 3m - 10$ ,  $CD = 5(m - n)$  and  $DA = 2n + 3$ . Find the perimeter of the rectangle.

$$m + 2n = 5(m - n) \quad \checkmark$$

$$m + 2n = 5m - 5n$$

$$7n = 4m$$

$$n = \frac{4m}{7}$$

$$\therefore n = \frac{4 \times 7}{7}$$

$$= 4 \quad \checkmark$$

$$3m - 10 = 2n + 3 \quad \checkmark$$

$$3m = 2n + 13$$

$$3m = \frac{8m}{7} + 13$$

$$21m = 8m + 91$$

$$13m = 91$$

$$m = 7 \quad \checkmark$$

$$\therefore P = 2m + 4n + 6m - 20$$

$$= 8m + 4n - 20$$

$$= 8 \times 7 + 4 \times 4 - 20$$

$$= 56 + 16 - 20$$

$$= 52 \quad \checkmark \checkmark$$

**Question 7 (1.1.6)****4 marks**Solve for  $s$  in terms of the constants  $p$ ,  $q$  &  $r$  for the following:

$$\frac{p}{s+p} = \frac{p+q}{s+r} - \frac{q}{s-q}$$

$$\frac{p}{s+p} + \frac{q}{s-q} = \frac{p+q}{s+r}$$

$$\frac{p(s-q) + q(s+p)}{(s+p)(s-q)} = \frac{p+q}{s+r} \quad \checkmark$$

$$\frac{ps - pq + qs + qp}{(s+p)(s-q)} = \frac{p+q}{s+r}$$

$$\frac{(p+q)s}{(s+p)(s-q)} = \frac{p+q}{s+r} \quad \checkmark$$

$$\frac{s}{(s+p)(s-q)} = \frac{1}{s+r}$$

$$s(s+r) = (s+p)(s-q) \quad \checkmark$$

$$\cancel{s^2} + sr = \cancel{s^2} - qs + ps - pq$$

$$ps - qs - rs = pq$$

$$(p-q-r)s = pq$$

$$s = \frac{pq}{p-q-r} \quad \checkmark$$

Accept other methods

**END OF TEST**

**Additional working space**

Question number: \_\_\_\_\_