

2024

S2 WA1 MATH (EXPRESS)

ANGLO-CHINESE-SCHOOL (BARKER ROAD)

DETAILED SOLUTIONS

Detailed solutions are crafted following the methods taught at Thinker Education and are offered as a guiding reference. Any logically sound mathematical answers are accepted.

For Thinker parents, the respective levels' blank question papers and detailed solutions have been uploaded to Teams.

For others, please Whatsapp us at 9831 9770 to obtain the question papers for your child to practise.



Full Name	Class Index No	Class
DETAILED SOLUTIONS		



**Anglo-Chinese School
(Barker Road)**

**WEIGHTED ASSESSMENT 1
SECONDARY TWO EXPRESS**

MATHEMATICS

**29 FEBRUARY 2024 (THURSDAY)
45 MINUTES**

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your index number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

The total of the marks for this paper is 30.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

For Examiner's Use

Linear Inequalities

- 1 (a) Solve the inequality $\frac{1}{2}x - 1 \geq \frac{1}{3}x + 3$.

$$\frac{1}{2}x - \frac{1}{3}x \geq 3 + 1$$

$$\frac{1}{6}x \geq 4$$

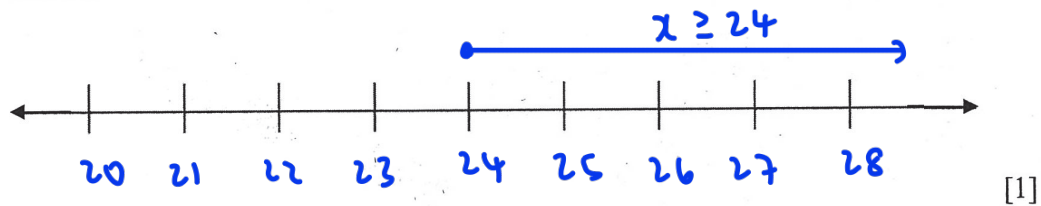
$$x \geq 4 \div \frac{1}{6}$$

$$x \geq 24$$

Answer $x \geq 24$ [2]

- (b) Show your solution from **part (a)** on the number line below.

Answer



- (c) Hence state the smallest possible value of x if x is

- (i) a rational number,

Answer $x =$ 24 [1]

- (ii) a prime number.

Answer $x =$ 29 [1]

Expansion & Factorisation of Quadratic Expressions

2 (a) Factorise $3a^2 - 20a + 12$.

$$= (3a-2)(a-6)$$

$3a - 2$	$-2a$
$a - 6$	$-18a$
$3a^2$	12
	$-20a$

Answer $(3a-2)(a-6)$ [2](b) Expand and simplify $x(x-4) - (5x-2)(x+1)$.

$$\begin{aligned} & x(x-4) - (5x-2)(x+1) \\ &= x^2 - 4x - (5x^2 + 5x - 2x - 2) \\ &= x^2 - 4x - 5x^2 - 5x + 2x + 2 \\ &= -4x^2 - 7x + 2 \end{aligned}$$

Answer $-4x^2 - 7x + 2$ [3]

Expansion & Factorisation using Identities

3 If $m + 3n = 6$ and $m - 3n = -5$, find the value of $m^2 - 9n^2$.

$$\begin{aligned}
 & m^2 - 9n^2 \\
 &= (m)^2 - (3n)^2 \\
 &= (m + 3n)(m - 3n) \\
 &= (6)(-5) \\
 &= -30
 \end{aligned}$$

Answer -30 [2]

Expansion & Factorisation using Identities

4 (a) Expand $(3x - 1)^2$.

$$\begin{aligned}
 &= (3x)^2 - 2(3x)(1) + (1)^2 \\
 &= 9x^2 - 6x + 1
 \end{aligned}$$

Answer $9x^2 - 6x + 1$ [1](b) Hence evaluate 299^2 .

$$\begin{aligned}
 & 299^2 \\
 &= (300 - 1)^2 \\
 &= [3(100) - 1]^2 \\
 &= 9(100)^2 - 6(100) + 1 \\
 &= 9(10000) - 600 + 1 \\
 &= 90000 - 600 + 1 \\
 &= 89401
 \end{aligned}$$

Answer 89401 [2]

Simultaneous Equations

5

In five years' time, a father will be three times as old as his son. Four years ago, the father was six times as old as his son. By forming a pair of linear equations in two variables, find the father's current age.

Let the father's age now be x ,
son's age now be y .

5 years' time.

$$\text{father} = x + 5$$

$$\text{son} = y + 5$$

$$x + 5 = 3(y + 5)$$

$$x + 5 = 3y + 15$$

$$x = 3y + 10 \quad \text{--- (1)}$$

4 years' ago,

$$\text{father} = x - 4$$

$$\text{son} = y - 4$$

$$x - 4 = 6(y - 4)$$

$$x - 4 = 6y - 24$$

$$x = 6y - 20 \quad \text{--- (2)}$$

$$\text{(1) = (2): } 3y + 10 = 6y - 20$$

$$-3y = -30$$

$$y = 10$$

$$\begin{aligned} \therefore x &= 3(10) + 10 \\ &= 40 \end{aligned}$$

Answer

40 years old

[3]

Quadratic Equations

6 The length and breadth of a rectangle are $(x + 4)$ cm and x cm respectively.

- (a) Write an expression, in its simplest form, for
 (i) the perimeter of the rectangle,

$$\begin{aligned} & 2(x+4+x) \\ &= 2(2x+4) \\ &= 4x+8 \end{aligned}$$

Answer $(4x+8)$ cm [2]

- (ii) the length of the side of a square with the same perimeter.

$$\frac{4x+8}{4} = x+2$$

Answer $(x+2)$ cm [1]

- (b) If the sum of the areas of the square and the rectangle is 94 cm^2 , form an equation in x and show that it reduces to $x^2 + 4x - 45 = 0$,

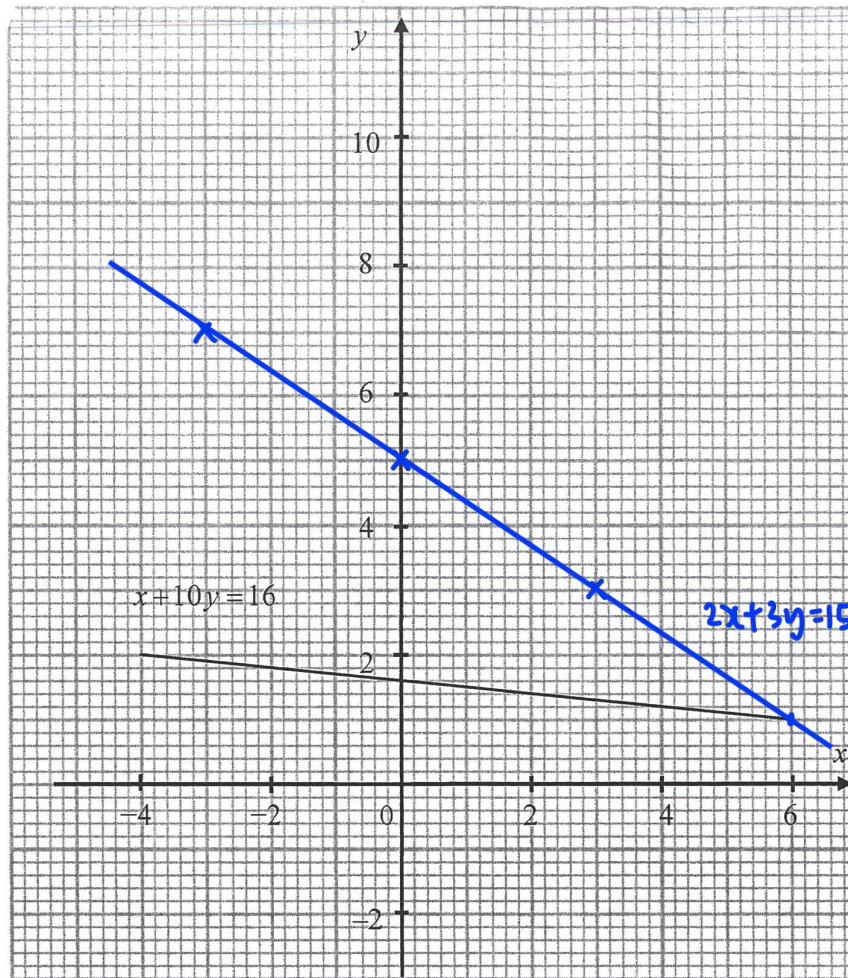
Answer

$$\begin{aligned} x(x+4) + (x+2)(x+2) &= 94 \\ x^2+4x + x^2+4x+4 &= 94 \\ 2x^2+8x-90 &= 0 \\ x^2+4x-45 &= 0 \text{ (shown)} \end{aligned}$$

[2]

Simultaneous Equations

7 The graph of $x + 10y = 16$ is drawn on the grid below.



- (a) The variables x and y are connected by the equation $2x + 3y = 15$. Some corresponding values of x and y are given in the table below. Find the value of p .

x	-3	0	3
y	p	5	3

$$\begin{aligned} \text{when } x = -3, y = p \\ 2(-3) + 3p = 15 \\ 3p = 21 \\ p = 7 \end{aligned}$$

Answer $p = \underline{7}$ [1]

- (b) On the grid above, draw and label the graph of $2x + 3y = 15$. [2]

- (c) Using the graphs, write down the solution to the simultaneous equations $2x + 3y = 15$ and $x + 10y = 16$.

Answer $x = \underline{6}$, $y = \underline{1}$ [1]

Linear Inequalities

- 8 Azlaan has 12 pieces of \$10-notes and \$5-notes in his wallet. The total value of all the notes is less than \$95. Azlaan claims that he has at most 7 pieces of \$10-notes. Do you agree? Justify your answer with calculations.

Let the no. of \$10 notes be x .

$$\therefore \$5 \text{ notes} = 12 - x$$

$$5(12 - x) + 10(x) < 95$$

$$60 - 5x + 10x < 95$$

$$5x < 35$$

$$x < 7$$

$$\therefore \text{largest no. of } \$10\text{-notes} = 6$$

Answer I do not agree. He should have less than
7 pieces of \$10 notes. [3]