



## Preparation for A Level Maths – MIND THE GAP!



### 1. SIMPLIFY

1)  $\sqrt{2} \times \sqrt{8}$    2)  $\sqrt{45}$    3)  $5\sqrt{12} + 2\sqrt{18}$

### 2. FRACTIONS

Work out without a calculator:

1)  $\frac{3}{4} + \frac{1}{3}$    2)  $5\frac{1}{3} - \frac{3}{2}$    3)  $2\frac{2}{3} \times \frac{1}{4}$    4)  $5\frac{1}{3} \div \frac{1}{4}$

### 3. LAWS OF INDICES

Express the following in their simplest form:

1)  $9^{\frac{1}{2}}$    2)  $81^{\frac{1}{4}}$    3)  $64^{\frac{1}{6}}$    4)  $64^{\frac{2}{3}}$    5)  $y^{10} \times y^2 \div y^5$   
6)  $125^{\frac{2}{3}}$    7)  $(\frac{125}{8})^{-\frac{1}{3}}$

### 4. FACTORISING

Factorise the following:

1)  $9x - 21z$    2)  $20x^2 - 4x$    3)  $8x^2y + 28xy^2$    4)  $3\pi a^2 + 4\pi ab$

### 5. ALGEBRAIC FRACTIONS

Cancel these fractions as far as possible:

1)  $\frac{3x^2}{7x}$    2)  $\frac{8x+6}{2x-4}$    3)  $\frac{3x^2+6x}{2x+4}$

Express as a single fraction:

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

Simplify these expressions:

1)  $\frac{3x+1}{3} \times \frac{x}{3(x+1)}$    2)  $\frac{x(x-1)}{3} \div \frac{x-1}{x}$

### 6. CHANGING THE SUBJECT OF FORMULA

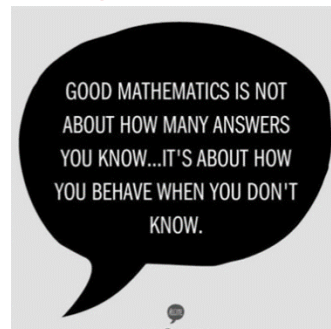
1) Express a in terms of b given  $b(a+2)=4$

2) Make t the subject of the formula  $s = \sqrt{\frac{t+1}{u}}$

### 7. QUADRATIC EQUATIONS

Solve the following:

1)  $x^2 + 3x + 2 = 0$    2)  $x^2 - 7x + 10 = 0$    3)  $2x^2 - x - 10 = 0$



Factorise the following expressions:

1)  $x^2 - 9$                       2)  $9x^2 - 25$

Solve the following, giving your answer to 2 decimal places:

1)  $x^2 + 3x - 5 = 0$                       2)  $x^2 + 11x = -11$



8. SIMULTANEOUS EQUATIONS

Solve these simultaneous equations:

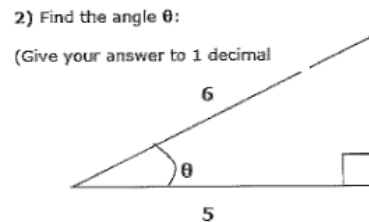
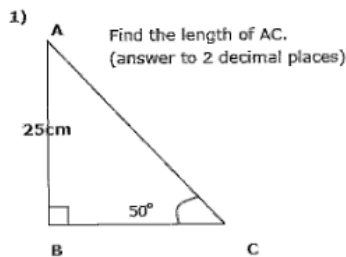
1)  $5x + 3y = 17$  and  $4x + 10y = 25$                       2)  $x = 2y + 1$  and  $3x - 4y = 7$

3)  $x^2 + y^2 = 13$  and  $5y + x = 13$

9. STRAIGHT LINE GRAPHS

- 1) Find the gradient of the line passing through (2,12) and (4,1)
- 2) Find the equation of the line which passes through (0,-2) and has a gradient of 4
- 3) Find the distance between the points P (2,6) and Q (5,14)
- 4) Find the equation of the line perpendicular to  $y=3x+1$  at the point (0,1)

10. BASIC TRIGONOMETRY



11. SINE AND COSINE RULE

- 1) Two ships A and B leave Mersey Docks, M, at the same time. Ship A travels at a bearing of  $120^\circ$  and ship B travels at a bearing of  $100^\circ$ . After 1 hour ship A has travelled 25km and angle MBA is  $130^\circ$ . Find the speed of ship B.
- 2) Use the cosine rule to find the length of the third side of the triangle with sides  $AB=5\text{cm}$ ,  $AC=7\text{cm}$  and angle BAC is  $35^\circ$ . (Give your answer to two decimal places)