## Year 10 Maths Intermediate Knowledge Booklet Term 2

Name:

## Class:

| Order | Unit | Links | Pre-requisite skills |
| :---: | :---: | :---: | :---: |
| 1 | Integers, powers \& roots |  |  |
| 2 | Lines, angles \& shape |  |  |
| 3 | Simplifying \& substituting | Unit 1 | Using powers, listing factors, understanding product / sum. |
| 4 | Area and perimeter | Unit 2 | Forming expressions for area/perimeter algebraically through use of brackets, correct notation and simplifying expressions. |
| 5 | Calculations \& Accuracy | Unit 1 | Understanding numbers. |
| 6 | FDP | Unit 1 | Using powers, understanding lowest common multiples. |
| 7 | Sequences, functions and graphs | Unit 3/5 | Substituting into a function applying BIDMAS to calculate coordinates, factorising for roots of quadratics, understanding powers and all 4 operations with negatives. |
| 8 | Ratio \& Proportion | Unit 1/7 | Decimals/powers as multipliers, calculating/understanding fractions as parts. |
| 9 | Transformations | Unit 2/8 | Identifying 90/180/270 degrees, plotting mirror lines of basic functions. |
| 10 | Pythagoras and Trigonometry | Unit 1/2/3/4/5 | Powers/surds, types of triangles, use in area/perimeter problems to find required lengths, rounding answers. |
| 11 | Forming and solving | Unit 3/4 | Properties of 2d shapes, angle facts including polygons \& parallel lines, algebraic notation and simplifying, forming expressions. |
| 12 | Measures | Unit 1/7 | Calculating, multiplying decimals and powers of 10 for metric conversions. |
| 13 | Volume and Surface area | Unit 4/5/13 | Area of 2d shapes, rounding/calculating with bounds, conversion of units (length/area/volume), calculating missing sides using pythagoras/ trigonometry. |
| 14 | Probability | Unit 1/7 | Types of numbers, calculating with fractions \& decimals. |
| 15 | Inequalities | Unit 12/8/5/7 | Solving equations, rounding, plotting graphs for regions, calculating with fractions. |
| 16 | Statistics | Unit 1/6/9/16 | Using a protractor for pie charts, proportion to calculate angles for a pie chart, use of inequality symbols for recording data. |

## Homework 1 Due

Homework 2 Due
Homework 3 Due

Year 10 - Term 2: Intermediate

| Overview | Learning Objective |  |  |
| :---: | :---: | :---: | :---: |
| Iopic: Area and Perimeter <br> Big Questions <br> - Show me a sector with a bigger area than a circle. <br> - A square has an area of 100 m , what is the perimeter of this square? <br> - A farmer has 1000 m of fencing. What is the largest area he can enclose with | - Solve problems involving area and perimeter. | - Calculate the length of an arc and the area of a sector. |  |
| Iopic: Calculations and <br> Accuracy <br> Big Questions <br> - What's the difference between bounds and rounding? <br> - Show me an example of a division calculation using decimals that approximates to 60 <br> - what do you understand from the terms: over estimate and underesti- | Introduction to upper and lower bounds. <br> - Use inequality notation to specify error intervals due to rounding. |  |  |
| Iopic: Fractions, decimals and percentages <br> Big Questions <br> - The original price of a top was reduced by $20 \%$ in a sale to give $£ 40$. Explain why the original price was not £48. <br> - What is the difference between simple and compound interest? <br> -Dividing by a decimal gives you a smaller answer-true/smaller/never. | - Convert between improper \& mixed fractions. <br> - Multiply and divide fractions. <br> - Multiply and divide decimals. <br> - Find a fraction of an amount. <br> - Express one quantity of another as a percentage. (With Calculator). <br> -Find a percentage of an amount (Non - calculator). <br> -Increase/decrease an amount by a given percent. (Noncalc) <br> - Compare \& order fractions. <br> -Add \& subtract fractions. | -Calculate with mixed numbers. <br> - Compare fractions, decimals and percentages. <br> -Express one quantity of another as a percentage. (NonCalc). <br> - Find percentage multipliers. <br> -Find a percentage of an amount using multipliers (Calc) <br> - Increase/ decrease a quantity by a given percentage using multipliers. (Calc) <br> -Calculate simple | - Calculate compound interest/ depreciation <br> -Calculate percentage change. <br> -Work out reverse percentage problems. |

## Circles

ircumference $=$
$\pi \times$ diameter, $C=$
Circumference $=$
$2 \times \pi \times$ radius, $C$

$4=\pi \pi^{2}$ Used to calculate the AREA of

Arc Length ( Area of sector $=\frac{\theta}{360} \times \pi r^{2}$
$\pi$ circumference of a circle and its
diameter always equal to $\approx 3.14$
Area of a circle $=$
$\pi \times$ radius squared
Need-To-Know Facts

Pi is the ratio between the
${ }_{\text {z }} \boldsymbol{l u}=\forall$ 'perenbs snipè $\times u$



|  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $\frac{\text { base } x \text { height }}{2}$ | $\frac{(a+b) \times \text { height }}{2}$ |  | O $\times$ $\times$ $\stackrel{1}{\mid c}$ | $\frac{\text { width } x \text { height }}{2}$ |
| $\begin{aligned} & \frac{0}{100} \\ & \stackrel{\Gamma}{\Gamma} \\ & \frac{\pi}{2} \\ & \hline 1 \end{aligned}$ |  |  |  | $\stackrel{ \pm}{ \pm}$ |

$\begin{array}{ll} \\ \text { Surface area }= \\ \text { Top }=\quad\left(\pi \times r^{2}\right)+ \\ \text { Bottom }=\quad\left(\pi \times r^{2}\right)+ \\ \text { Curved }= & (2 \times r \times \pi \times H)\end{array}$
Arc length $+2 r$

By adding the area of all of the faces, we can find the surface area of the whole cylinder.

DIRECTED NUMBER RULES
$5+$ above the number being rounded increases by 1 .
$4+$ below $=$ the number being rounded stays the same.

Knowledge Recall
Score to beat

| SCHOOL Date Due |  | Score to beat |  |
| :---: | :---: | :---: | :---: |
| Section A:Number | Section B: Algebra | Section C: Using and applying |  |
| C. 1 <br> 1. To increase an amount by $5.4 \%$, what single multiplier would you use? | C. 6 <br> 11. Expand \& simplify: $3(x-y)-4(x+2 y)$ | 21. |  |
| C. 1 <br> 2. Decrease $£ 280$ by $73 \%$ | C. 6 <br> 12. Factorise $7 \mathrm{~b}^{2}+14 \mathrm{~b}$ | 10 m <br> To find ' d ' choose one calculation: $\sqrt{ } 5^{2}+3^{2}$ OR $\sqrt{ } 10^{2}-3^{2}$ OR $\sqrt{ } 5^{2}-3^{2}$ |  |
| C. 2 <br> 3. Divide $£ 48$ in ratio of $5: 3$ | C.7 <br> 13. Simplify $\frac{7^{2} \times 7^{3}}{7}$ | 22. <br> 40 is rounded to the nearest whole. Write down the minimum possible |  |
| C. 2 <br> 4. Share 450 in the ratio of $4: 5$ | $C .8$ <br> 14. Solve: $2 \mathrm{x}-1>3$ | length it could have been. |  |
| C. 3 <br> 5. Work out: $2 \frac{2}{3}-\frac{5}{6}$ | C. 9 <br> 15. Make $c$ the subject of the formula: $A=c+d$ | 23. <br> It took 5hours to drive from Durham to Birmingham. |  |
| C. 3 <br> 6. Work out: $1 \frac{2}{3} \times \frac{5}{6}$ | C. 9 <br> 16. Work out the value of: $x y+5$ When $\mathrm{x}=2$ and $\mathrm{y}=-3$ | The average speed was 48 mph . <br> What is the distance from Durham to Birmingham? |  |
| C. 4 <br> 7. Round off 0.267 to one significant figure | C. 10 <br> 17. Write down the nth term of this sequence: $51117 \quad 23$... | 24. <br> The relative frequency of a drawing pin falling pin up was $3 / 8$. How many times |  |
| C. 4 <br> 8. Estimate the answer to: $3987 \div 213$ | C. 10 <br> 18. Write down the $5^{\text {th }}$ term in the sequence given by: $T(n)=n^{2}+2 n$ | would you expect it to fall pin up in 120 drops? |  |
| C. 5 <br> 9. Write down the first 3 multiples of 9 | C. 11 <br> 19. If $y=x^{2}-x$, <br> find the value of $y$ when $x=-4$ | 25. Use $\pi$ on the calculator Work out the volume of this cylinder? (Correct to 1 decimal place) |  |
| C. 5 <br> 10. Write down the LCM of 9 and 12 | C. 11 <br> 20. A graph has the equation $y=5 x+7$ What is its gradient and $y$-intercept |  |  |
| Total (A) | Total (B) | Total (C) |  |
| Test Total $(A+B+C)$ | R (0-9) | -19) G (20-25) |  |

 You can also use the bus stop method of division to find answers

To convert decimals to
percentages, multiply by 100 .
For example, $0.36=36 \%$

$$
0.5=50 \%
$$

Do the inverse (divide) to convert
percentages to decimals



Fraction - written in the form $\frac{a}{b}$, means "a divided by b".

Numerator - the top number of a fraction, represent the number of parts being studied

Denominator - the bottom number of a
fraction, represents the number of parts to make one whole

Equivalent - worth the same amount as
Simplify - reducing a fraction to the equiv with the lowest possible numerator and denominator

Decimal - a number that is not an integer
Integer - a whole number with denominator 1 Percentage - written as a number out of 100 COMPARING \& ORDERING
DECIMALS

STEP 1: Stack the numbers STEP 2: Add zeros so that SIEP 1. Stack the numbers each number hos the same
being compared tine up
The $\begin{array}{ll}4.8 & 4.800 \\ 4.826 & 4.826 \\ 4.08 & 4.080 \\ 4.006 & 4.006\end{array}$ $\begin{array}{ll}4.8 & 4.800 \\ 4.826 & 4.826 \\ 4.08 & 4.080 \\ 4.006 & 4.006\end{array}$ $\begin{array}{ll}4.8 & 4.800 \\ 4.826 & 4.826 \\ 4.08 & 4.080 \\ 4.006 & 4.006\end{array}$ $\begin{array}{ll}4.8 & 4.800 \\ 4.826 & 4.826 \\ 4.08 & 4.080 \\ 4.006 & 4.006\end{array}$ STEP 3: Compare each place
$\begin{aligned} & \text { STEP 4: Order the numbers } \\ & \text { value one by one. If a } \\ & \text { from least to greatest or }\end{aligned}$
n er

 | to the next place | They are ordered from |
| :---: | :--- |
| $\downarrow \downarrow \downarrow \downarrow$ | least to greatest | 4.4 .006 least to greatest $978^{\circ} \mathrm{h} 008^{\prime} \mathrm{h}^{\prime} 080^{\prime} \mathrm{h}^{\prime} 900^{\prime} \mathrm{h}$ Remove the zeros you 4.006. 4.08. 4.8. 4.826

教 fraction
 1/100 (Hundredths)
1 L
What Percentage is this?
If a student received $\frac{28}{50}$ what percentage is this?

If a student received $\frac{28}{50}$
Change the denominator to 100 by $\times 2$

$$
\frac{56}{100}
$$

If a student received $\frac{26}{40}$ what percentage was this?
ix pure $て \div$ aq OOT of лоұеu!
Sq
$\frac{13 \times 5}{20 \times 5}=\frac{65}{100}$
Fractions to Decimals
If the fraction
If the fraction

which is a power
of 10 , the
decimal can be
found. You could
find an
equivalent
fraction to create
a denominator of
10, 100, 1000
etc.
Knowledge Recall
Date Due


