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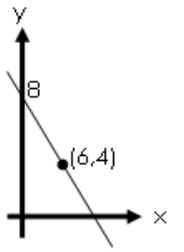
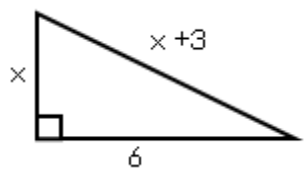
Maths Revision Booklet

Name:

After each exercise check your answers at the back of this booklet

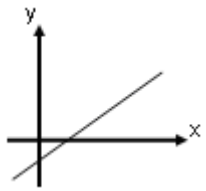
Exercise	1	2	3	4	5	6	7	8	9	10
Score										

Sheet 1	Mark:
1 Evaluate $3\frac{1}{3} - 2\frac{4}{5}$	
2 Find the equation of the straight line passing through these points: (2,-3) and (3,9).	
3 Simplify $m^5 \times m^{-9}$	
4 Change the subject of the formula to *m*: $k = \frac{mn^2}{p}$	
5 Solve $4\sin x^\circ = 2$ (for $0 < x < 360$)	
6 Find the mean and standard deviation for this data: 3, 4, 6, 8, 8	
7 Factorise fully: $2t^2 - 18$	
8 A classic car bought for £74,000 increases in value by 6.5% every year for 3 years. Its new value?	
9 Is a triangle with sides 82cm, 80cm and 18cm right-angled?	
10 Find the roots of the equation $y = x^2 - 2x - 15$	

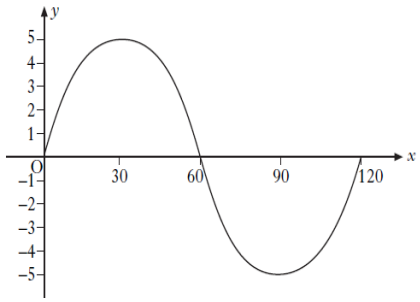
Sheet 2	Mark:
1 Evaluate 14.3 + 8.2 x 30	
2 Find the equation of the given straight line. 	
3 Simplify $\frac{\sqrt{12}}{\sqrt{60}}$	
4 Change the subject of the formula to *r*: $p = \frac{3r^2}{y}$	
5 Solve $5\tan x^\circ + 3 = 4$ (for $0 < x < 360$)	
6 Solve this equation to 2d.p. $3x^2 + 7x - 4 = 0$	
7 Factorise fully: $3x^2 + 9x - 30$	
8 A bottle contains 336ml which is 30% more than it used to. What was the **original** volume?	
9  Find the value of x:	
10 Find the roots of the equation $y = 2x^2 - 9x - 5$	

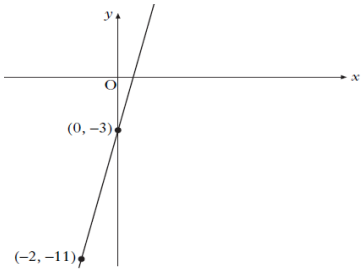
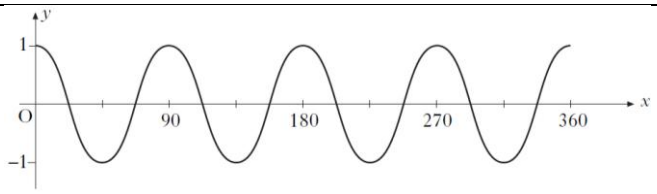
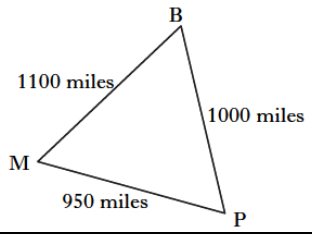
Sheet 3	Mark:
1 Find $4\frac{2}{5} \div \frac{1}{4}$	
2 Find the equation of a straight line through (3,-5) parallel to y=4x+2.	
3 Remove brackets and simplify $a^{\frac{1}{2}}\left(a^{\frac{1}{2}} - 2\right)$	
4 Solve x -2(x+1) = 8	
5 Sketch the graph of $y=4\cos 2x^{\circ}$ for $0 \leq x \leq 360$	
6 Find the volume of a sphere with radius 5cm, giving your answer to two significant figures.	
7 Remove brackets and simplify $(2x + 3)^2 - 3(x^2 - 6)$	
8 Dave's car was bought for £16,000 but is losing 7.5% each year. What will it be worth in 4 years?	
9 Triangle ABC has AC=5.6m, angle ABC=83° and angle ACB=40°. Find the length of AB.	
10 Describe the nature of the roots of $y = 5x^2 - 7x - 2$	

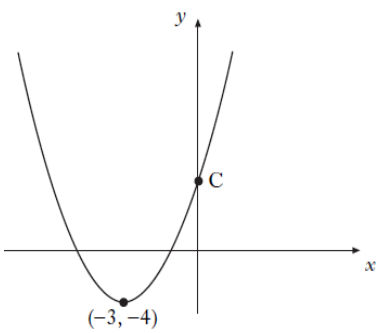
Sheet 4	Mark:
1 Without a calculator: $\frac{2.3+2.1x5}{2^3}$	
2 Does the point (-2,5) lie on the line y = 3x +10? Explain your answer.	
3 Simplify, leaving your answer as a surd: $2\sqrt{20}-3\sqrt{5}$	
4 Simplify (x + 4)(3x -1)	
5 Sketch the graph of $y = 3\sin(0.5x^{\circ})$ for $0 \le x \le 360$	
6 Solve $3x^2-11x+1=0$, giving your answers to two decimal places.	
7 Factorise $3x^2-12x-15$	
8 In a Spring Sale, a bag of springs now costs £3.60. What was it worth **before** the 20% sale?	
9 What is the area of an equilateral triangle of side 40cm?	
10 Sketch y = (x - 3)(x+2). Label the intercepts and turning point.	

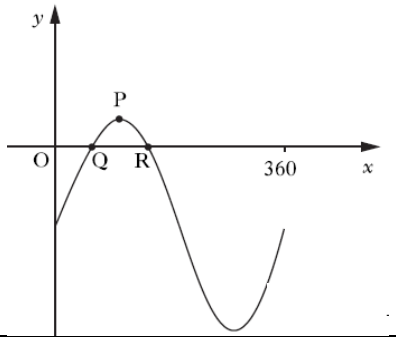
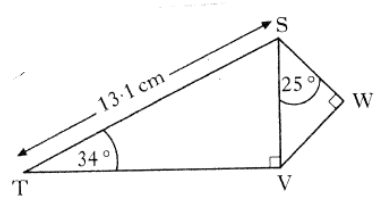
Sheet 5	Mark:
1 If $f(x) = x^2 + 3x$, find $f(-2)$	
2  Which of these could this line represent? A: $y = 3x + 2$ B: $y = -3x + 2$ C: $y = 3x - 2$ D: $y = 3x^2 - 2$ E: $y = -3x - 2$	
3 Find the length of the longest side on a right angled triangle with smaller sides 1cm and 7cm (leave your answer as a simplified surd).	
4 Solve $2x + 15 \leq 3(x - 1)$	
5 Solve $4\tan x^\circ = 2$ (for $0 < x < 180$)	
6 Calculate the standard deviation for this: 3, 8, 14, 20	
7 Expand and simplify $(3x+1)(x^2-5x+4)$	
8 China's population is 1.34×10^9. If this increases by 5% for the next 6 years, what will it be?	
9 A square has side x. It has a diagonal of 6cm. Calculate the exact length of x.	
10 How many real solutions are there to the equation $2x^2 - 2x + 3 = 0$?	

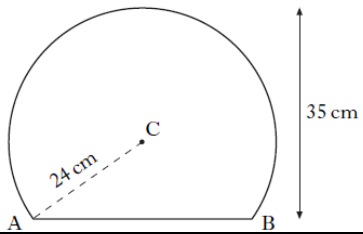
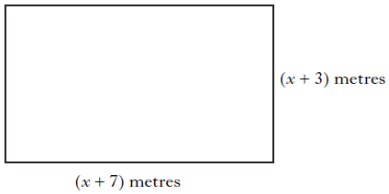
Sheet 6 Mark:

1	Find $\frac{1}{2}\left(1\frac{2}{7}-\frac{5}{9}\right)$	
2	A straight line with gradient 5 passes through (4,8) and (2,a). Find the value of a.	
3	Expand $k^2\left(3k+2k^{-4}-k^{\frac{1}{2}}\right)$	
4	Change the subject of the formula to *W*: $5W-J^2=\frac{4}{L}$	
5	 This is the graph y=asin(bx°) Find the value of a and b.	
6	Can a cylinder with height 10cm and diameter 8cm hold 500ml of water? Explain your answer.	
7	Factorise fully: $10x^2 - 50x - 240$	
8	My total bill for fixing my car included 8% tax. If the bill was £324, what was the bill **before** tax?	
9	A triangle has sides 12cm, 14cm and 21cm. Find the sizes of its biggest angle.	
10	Sketch y = (2x - 5)(x + 1.5) Label the intercepts and turning point.	

Sheet 7	Mark:
1 Without a calculator find $\frac{4}{7}$ to three decimal places.	
2  What is the equation of this line?	
3 Find $27^{\frac{2}{3}}$	
4 Solve $3x+1=\frac{x-5}{2}$	
5  What is the value of a in this graph $y = \cos(ax^{o})$	
6 Show that the standard deviation of 1,1,1,2,5 is $\sqrt{3}$ and **write down** the s.d. of 101,101,101,102,105.	
7 Multiply out and simplify: $3(x^2 - 5x + 1) - 2x(x - 4)$	
8 If these shapes have the same height which has greater volume: a cone with radius 3cm or a cylinder with radius 2cm?	
9  Here's the Bermuda Triangle (Bermuda-Miami-Puerto Rico). Find angle BMP	
10 Write down the axis of symmetry and the coordinates of the turning point of $y = (x-6)^2 + 2$	

Sheet 8	Mark:
1 Without a calculator find 35% of £84.50	
2 A straight line is given by $y=mx+c$. Sketch this to illustrate a possible graph when $m > 0$ and $c < 0$.	
3 Simplify $\frac{ab^6}{a^2b^3}$	
4 Write $\frac{3}{a}+\frac{5}{a-1}$ as a single fraction	
5 Solve $4\sin x^\circ = 2\sin x^\circ + 1$ for $0 \le x \le 360$	
6 Solve $3x^2 + 2x = 10$, giving your answer to two decimal places.	
7 Factorise $10.2^2 - 9.8^2$. Can you use your answer to see what the value of this expression is?	
8 The big jar of marmalade (450g) has 12.5% more than the standard one. What's in the standard one?	
9 Plot the point A (-5,2) on a coordinate diagram. How far is it from A to the origin?	
10  Here is the graph of $y=(x-a)^2+b$ Find a, b and use your equation to find c.	

Sheet 9	Mark:
1 Find the mean of $\frac{3}{5}, \frac{5}{8}, \frac{3}{4}, \frac{1}{2}$.	
2 Find the gradient and y-intercept for this straight line: $6x + 2y = 5$	
3 Express $\frac{12}{\sqrt{2}}$ with a rational denominator in its simplest form.	
4 Change the subject of the formula to h: $A = \frac{1}{2}h(a+b)$	
5  The graph shown is $y = 5\sin x^{\circ} - 4$. Find the coordinates of Q and P.	
6 4M1 Test Scores: Mean=75%, s.d.=10% 4M2 Test Scores: Mean=69%, s.d.=8% Give two valid comparisons.	
7 Factorise fully $2y^2 - 30y - 68$	
8 A patient gets 250mm of a drug at 3pm. Every hour the amount of blood decreases by 20%. How much is in the blood at 6pm?	
9  Find the length of SW.	
10 Describe the types of roots this quadratic has: $y = 3x^2 + 2x$	

Sheet 10		Mark:
1	Jamie is baking cakes for a party. Each cake needs $\frac{2}{5}$ block of butter. If he has 7 blocks of butter how many cakes can he make?	
2	Find the equation of a straight line between (-8, 3) and (-4,-5).	
3	Express $p^3\left(p^{-3} - \sqrt{p}\right)$ in simplest form.	
4	Solve for x: $\frac{3(x-1)}{5} = \frac{x+1}{2}$	
5	Solve $\sin^2 x = \frac{1}{4}$ for $0 \le x \le 360$	
6	A cuboid has a volume of 1.98m^3. It has a length of 110cm and a breadth of 150cm. Find the height.	
7	Multiply out and simplify: $(x+2)^3$	
8	My microwave cost £150 (includes 17.5% VAT). How much did it cost before VAT was added?	
9	 Find the length of AB.	
10	This garden has an area of 45m^2. Find x. 	

Summary

Keep a record of the questions that you are getting right.

Use this to identify the areas where you are struggling a bit.

Ask your teacher for help with these areas!

10: Quadratics (Solving, Graphs)										
9: Triangle Rules (Pythagoras, Sine Rule, Cosine Rule, Area of Triangle)										
8: Percentages (including compound interest, appreciation, depreciation, working backwards)										
7: Factorisation and Multiplying Out Brackets										
6: Using formula (including standard deviation, quadratic formula and volumes)										
5: Trigonometric graphs and equations										
4: Algebra (including changing the subject of a formula, solving equations and inequations)										
3: Surds and Indices										
2: Equation of a straight line										
1: Basic calculations (including fractions and BODMAS)										
	Homework 1	Homework 2	Homework 3	Homework 4	Homework 5	Homework 6	Homework 7	Homework 8	Homework 9	Homework 10

ANSWERS:

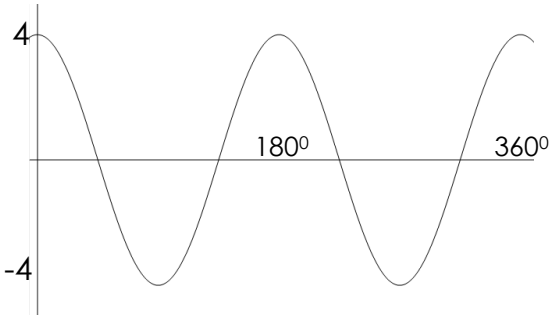
HW1

1. $\frac{8}{15}$
2. y = 12x – 27
3. $m^{-4} = \frac{1}{m^4}$
4. $n = \sqrt{\frac{kp}{m}}$
5. x = 30, 150
6. $\bar{x} = 5.8, sd = 2.28$
7. 2(t - 3)(t + 3)
8. £89,388.27
9. 82^2=6724, 80^2+18^2=6724.
   By converse of Pythagoras, right-angled!
10. x = 5, x = -3

HW2

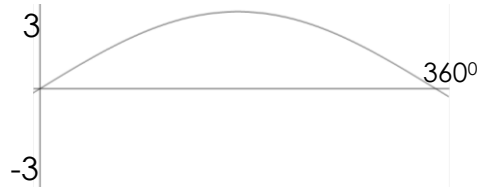
1. 260.3
2. $y = -\frac{2}{3}x + 8$
3. $\frac{1}{\sqrt{5}}$
4. $r = \sqrt{\frac{Py}{3}}$
5. x = 11.3, 191.3
6. x = 0.47, x= -2.81
7. 3(x + 5)(x – 2)
8. 258.46ml
9. x = 4.5
10. b^2-4ac > 0 so two real (distinct) roots

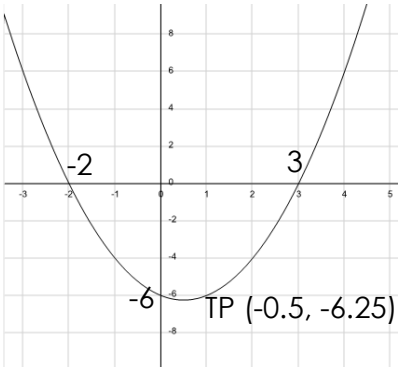
HW3

1. $\frac{88}{5} = 17\frac{3}{5}$
2. y = 4x – 17
3. $a - 2a^{\frac{1}{2}}$
4. x = -10
5. 

6. 520cm^3
7. x^2 + 12x +15
8. £11713.51
9. 3.62m
10. b^2-4ac > 0 so two real (distinct) roots

HW4

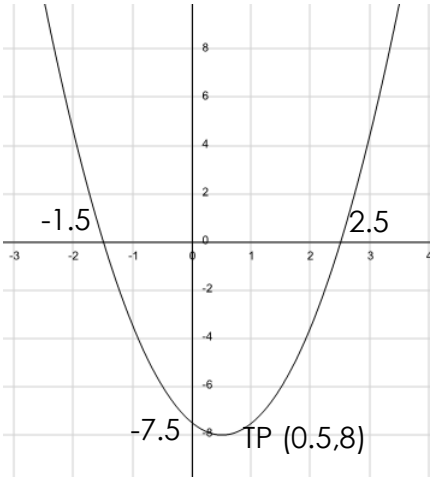
1. 1.6
2. sub in x =-2 and show y ≠ 5
3. $\sqrt{5}$
4. $3x^2$ + 11x - 4
5. 

6. x = 1.79, x = 0.05
7. 3(x – 5)(x + 1)
8. £4.50
9. 692.82cm^2
10. 

HW5

1. f(-2) = -2
2. Graph C
3. $5\sqrt{2}$
4. $x \geq 18$
5. x = 26.6
6. s.d. = 7.37
7. $3x^3 - 14x^2 + 7x + 4$
8. 1,795,728,158
9. $3\sqrt{2}$
10. $b^2-4ac < 0$ so no real roots

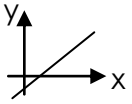
HW6

1. $\frac{23}{63}$
2. a = -2
3. $3k^3 + 2k^{-2} - k^{\frac{5}{2}} = 3k^3 + \frac{2}{k^2} - \sqrt{k^5}$
4. $W = \frac{1}{5}\left(\frac{4}{L} + J^2\right)$
5. a = 5, b = 3
6. Yes= it holds 502.4ml (2.4ml more)
7. x = 8, x = -3
8. £300
9. 107°
10. 

HW7

1. 0.571
2. y = 4x – 3
3. 9
4. $-\frac{7}{5}$
5. a = 4
6. show that s.d.= $\sqrt{3}$. New $\bar{x} = 102, sd = \sqrt{3}$
7. $x^2 - 7x + 3$
8. Cylinder (its volume is 4πh compared to 3πh)
9. Angle BMP = 57.8°
10. symmetry x = 6 and TP (6,2)

HW8

1. £29.58
2. 

3. $\frac{b^3}{a}$
4. $\frac{8a-3}{a(a-1)}$
5. x = 30,150
6. x = 1.1, -1.77
7. 8
8. 400
9. $\sqrt{29}$
10. c = 5

HW9	HW10
1. $\frac{99}{160}$ 2. m = -3 and c = 2.5 3. $6\sqrt{2}$ 4. $h = \frac{2A}{a+b}$ 5. P (90,1) and Q (53.1,0) 6. 4M1 have higher marks on average. 4M1 have less consistent marks. 7. 2(y - 17)(y + 2) 8. 128mm 9. 6.64cm 10. b^2-4ac > 0 so two real (distinct) roots	1. 17 cakes 2. y = – 2x – 13 3. $1-p^{\frac{7}{2}}$ 4. x = 11 5. x = 30,150,210,330 6. h = 1.2 7. $x^3 + 6x^2 + 12x + 8$ 8. £127.65 9. 42.66cm 10. x = 2

FORMULAE LIST

The roots of $ax^2+bx+c=0$ are $x=\frac{-b\pm\sqrt{(b^2-4ac)}}{2a}$

Sine rule: $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$

Cosine rule: $a^2=b^2+c^2-2bc\cos A$ or $\cos A=\frac{b^2+c^2-a^2}{2bc}$

Area of a triangle: $Area=\frac{1}{2}ab\sin C$

Volume of a sphere: $Volume=\frac{4}{3}\pi r^3$

Volume of a cone: $Volume=\frac{1}{3}\pi r^2 h$

Volume of a pyramid: $Volume=\frac{1}{3}Ah$

Standard deviation: $s=\sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}=\sqrt{\frac{\sum x^2-(\sum x)^2/n}{n-1}}$, where n is the sample size.