

FOCUS 8/9 TASKS - Set 5

Each of the 30 topics is covered once within the 5 sheets

Sheet 5A

Surds	Q1
Non linear simultaneous equations	Q2
Sketching transformed graphs	Q3
Mixed areas	Q4
Frustums cones spheres	Q5
Probability - dependent events	Q6

Sheet 5B

Quadratic formulae rearranging first	Q1
Algebraic fractions	Q2
Rearranging formulae	Q3
Equating coefficients / identities	Q4
Equations of perpendicular lines	Q5
Equation of a tangent to a circle	Q6

Sheet 5C

Indices	Q1
Iteration	Q2
Completed square to find the vertex	Q3
Transformations and invariance	Q4
Median from a histogram	Q5
Venn diagrams	Q6

Sheet 5D

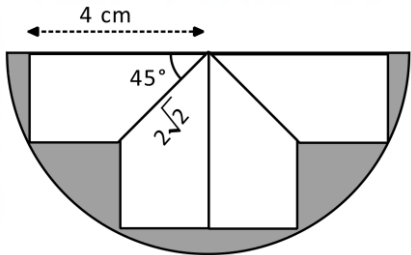
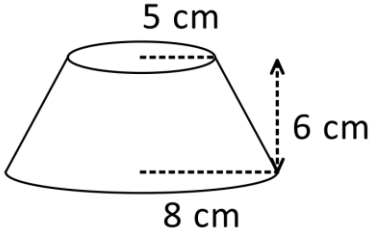
nth term of quadratic sequences	Q1
Defining inequalities for a region	Q2
Calculations involving exact trig values	Q3
3D trigonometry and Pythagoras	Q4
Sine cosine rule	Q5
Vector Proofs	Q6

Sheet 5E

Proportion problems	Q1
Functions - inverse and composite	Q2
Quadratic inequalities	Q3
Similar triangle problems	Q4
Area under a graph	Q5
Geometric Proof and 'show that'	Q6

SKILLS CHECK

Rationalise the denominator $\frac{3}{\sqrt{3}-1}$	Factorise $4xy - 9x^3y^3$	Work out $1\frac{2}{3} + \frac{2}{3} \div \frac{1}{4}$	Solve $\frac{x+2}{3} \leq \frac{x-1}{2}$
Find the equation of the line with gradient $\frac{1}{2}$ passing through (4,-2) in the form $ay + bx = c$	Speed = 4 m/s Time = 36 minutes Distance =	Calculate 45% of £82	Simplify $\frac{2x}{x+3} - \frac{x-3}{x-1}$

QUESTION 1 Show that $\frac{3\sqrt{18}-3\sqrt{2}}{4-\sqrt{8}}$ can be written in the form $a(b + \sqrt{2})$. Find the value of a and b	QUESTION 2 Solve the simultaneous equations. $x + 2y = 1$ $x^2 - 4y^2 = 5$	QUESTION 3 Sketch the graph of $y = -\cos x$
QUESTION 4 What percentage of the semi circle is shaded? 	QUESTION 5 The frustum shown below is melted and recast as a sphere. Calculate the radius of the sphere correct to 1 d.p. 	QUESTION 6 There are 2 red counters and x blue counters in a bag. The probability of picking two counters of the same colour when 2 counters are removed is $\frac{2}{5}$. How many counters are there altogether?

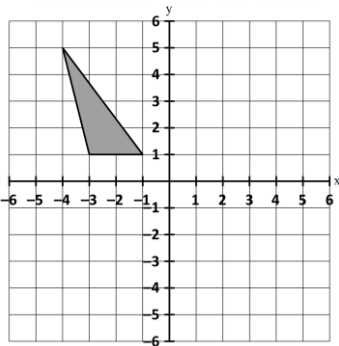
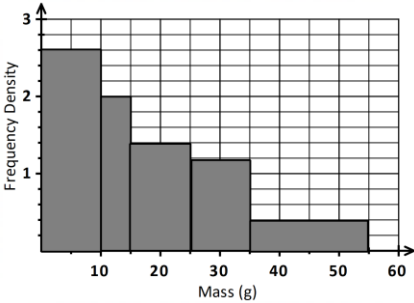
SKILLS CHECK

Rationalise the denominator $\frac{3}{2 + \sqrt{2}}$	Factorise $8xy^3 - 18x^3y$	Work out $6 - \frac{2}{3} \times 1\frac{1}{4}$	Solve $\frac{x-2}{4} \leq \frac{x+1}{2}$
Find the equation of the line with gradient $\frac{1}{3}$ passing through (3,3) in the form $ay + bx = c$	Speed = 2m/s Distance = 18 km Time =	Calculate 2.5% of £82	Simplify $\frac{x+3}{2x} - \frac{x-3}{x}$

QUESTION 1 Solve $\frac{3x+2}{x-4} = 3x+1$ (answers correct to 2 d.p.)	QUESTION 2 Simplify $\frac{12x^2 - 6x - 6}{6x^2 - 9x + 3} \times \frac{2x^2 + 5x - 3}{4x + 2}$	QUESTION 3 Make x the subject of the formula $\frac{a}{\sqrt{x}} + d = \frac{c}{a\sqrt{x}}$
QUESTION 4 Work out the value of a, b and c $(ax + 2)(2x + b) - 2x \equiv 6x^2 + cx + 6$	QUESTION 5 A straight line, L , passes through the point with coordinates (6, 4) and is perpendicular to the line with equation $y + 2x = 1$. Find an equation of the straight line L .	QUESTION 6 A circle has equation $x^2 + y^2 = 25$ Find the equation of the tangent to the circle at point (-4,3)

SKILLS CHECK

Rationalise the denominator $\frac{3 + \sqrt{2}}{2 + \sqrt{2}}$	Factorise $3x^3y - 3xy^3$	Work out $\left(1\frac{1}{4}\right)^2 - \frac{7}{8}$	Solve $\frac{2x - 1}{3} \leq \frac{x - 1}{4}$
Find the equation of the line with gradient $-\frac{1}{4}$ passing through (8,2) in the form $ay + bx = c$	Speed = 5 m/s Distance = 13.5 km Time = ? minutes	Calculate 0.5% of £320	Simplify $\frac{x + 3}{x - 1} - \frac{x}{x^2 - 1}$

QUESTION 1 Solve $2 \times 2^{4x} = \frac{1}{128}$	QUESTION 2 Using $x_{n+1} = \frac{1}{3} + \frac{x_n^3}{3}$ with $x_0 = 1$ Find the values of x_1, x_2, x_3	QUESTION 3 Express $4x + 2x^2 - 7$ in completed square form State the coordinates of the vertex of the graph $y = 4x + 2x^2 - 7$
QUESTION 4 Write down the coordinates of the invariant point when the triangle has been reflected in the line $y = x$ and then translated by vector $\begin{pmatrix} -4 \\ 4 \end{pmatrix}$ 	QUESTION 5 Calculate an estimate of the median mass 	QUESTION 6 A box contains 40 pens that are red or black. 8 are red . 14 of the pens do not work including 2 red pens. Given that the pen is black, what is the probability that it works?

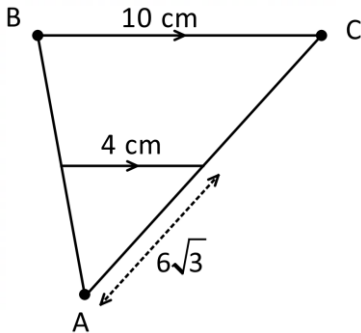
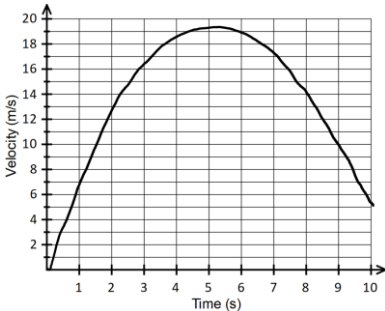
SKILLS CHECK

Rationalise the denominator $\frac{4 - \sqrt{2}}{\sqrt{2} - 1}$	Factorise $9x^2y - 16y^3$	Work out $\left(1\frac{1}{4}\right)^2 \div \frac{15}{16}$	Solve $\frac{x}{4} - 1 \leq \frac{x}{3} + 2$
Find the equation of the line with gradient $-\frac{1}{2}$ passing through (4,-1) in the form $ay + bx = c$	Speed = 0.5 m/s Distance = 27 km Time =	Calculate 105% of £128	Simplify $\frac{x}{x+4} - \frac{x}{x^2-16}$

QUESTION 1 Find the nth term 2, 5, 12, 23, 38	QUESTION 2 Write down the three inequalities that define the shaded region 	QUESTION 3 Calculate the perimeter of the triangle. Give your answer in the form $\sqrt{a} + b\sqrt{c}$
QUESTION 4 Calculate perimeter of the triangle BHF (correct to 1 d.p.) 	QUESTION 5 Calculate x (correct to 1 decimal place) 	QUESTION 6 $AB = x$ $AC = y$ E is the midpoint of BC Points CDF lie in a line such that the ratio $CD : DF = 1 : k$ If $EF = \frac{1}{2}y + \frac{5}{2}x$ find k

SKILLS CHECK

Rationalise the denominator $\frac{3 - \sqrt{3}}{2\sqrt{3} - 3}$	Factorise $6x^2 - 5x - 50$	Work out $2\frac{1}{5} \times 1\frac{1}{2}$	Solve $\frac{x-2}{4} \leq \frac{x}{3} + 1$
Find the equation of the line with gradient $\frac{1}{4}$ passing through (8, 3) in the form $ay + bx = c$	Speed = 8m/s Time = 55 minutes Distance = ? km	Increase £450 by 2.5%	Simplify $\frac{4x}{2x-4} - \frac{x}{x^2-4}$

QUESTION 1 y is inversely proportional to the square of x. x is proportional to cube root of t When $y = 8$, $x = \frac{1}{2}$ and $t = \frac{1}{8}$. Find the value of y when $t = \frac{1}{64}$	QUESTION 2 $f(x) = ax^2 - 2$ $g(x) = x - b$ $gf(2) = 5f(2)$ Show that $16a + b = 8$	QUESTION 3 Solve $27x - 10x^2 - 18 \geq 0$
QUESTION 4 Calculate AC giving your answer in the form $a\sqrt{b}$ 	QUESTION 5 Using the velocity time graph calculate an estimate of the distance travelled between $t = 2$ and $t = 6$ 	QUESTION 6 Prove that the opposite angles in a cyclic quadrilateral sum to 180°