

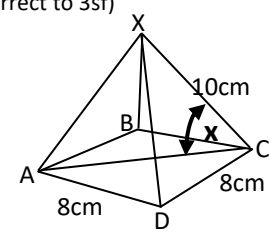
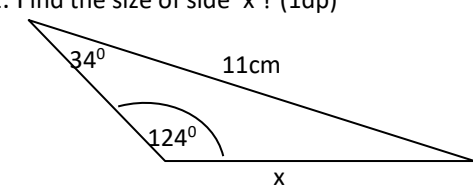
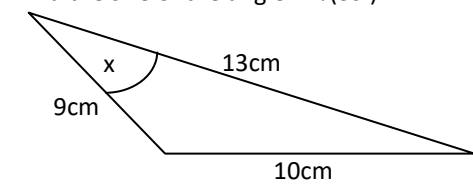
Maths Key Skills

Stage 11: Skill Check 8 Answers

Name:

Date:

Class/Group:

A: Number & Algebra		B: Algebra, Proportion, Geometry & Measure		C: Geometry & Measure & Statistics	
1. Simplify: $\sqrt{45} + \sqrt{20}$	11:1 $3\sqrt{5} + 2\sqrt{5}$ $5\sqrt{5}$	11. Make (y) the new subject of: $xy + 4x = 6 + y$	11:12 $xy - y = 6 - 4x \Rightarrow y(x-1) = 6 - 4x \Rightarrow y = \mathbf{6 - 4x/x - 1}$	21. Work out the angle that XC makes with the plane ABCD. (correct to 3sf)	11:26 55.6°
2. Expand & simplify: $(5 + \sqrt{2})(5 - \sqrt{2})$	11:2 $25 - 2 = 23$	12. One solution for $\sin x = -0.2$ is $x = 192^\circ$. Use the graph to find another solution.	11:14 $360 - 12 = 348^\circ$		$AC = \sqrt{8^2 + 8^2} = \sqrt{128}$ $\frac{1}{2} AC = \frac{1}{2} \sqrt{128}$ $\cos x = \frac{\frac{1}{2} \sqrt{128}}{10} = 0.56..$ $x = 55.6^\circ$
3. If $x=18$ & $y=12$ (both to nearest integer) Work out maximum value of $x + y$	11:3 $18.5 + 12.5 = 31$	13. This is the graph of $y = f(x)$. Sketch on the grid: $y = -f(x)$	11:15	22. Find the size of side 'x'? (1dp)	11:27 7.4cm
4. Simplify the following fraction: $\frac{2x^2 - x - 3}{4x^2 - 9}$	11:4 $\frac{x+1}{2x+3}$	14. Estimate the area under the graph above the x-axis	11:16 $1.5 + 3.5 = 5$ $2(5) = 10$		$\frac{x}{\sin 34} = \frac{11}{\sin 124}$ $x = \frac{11 \sin 34}{\sin 124} = 7.4\text{cm}$
5. Solve: $\frac{x-8}{x+3} = \frac{x-2}{x-1}$	11:5 $x=1.4$	15. Find equation of tangent at the point P(-2, 5) on a circle with centre (5,3)	11:18 $m_{\text{radius}} = (5-3) \div (-2-5) = 2/-7$ $m_{\text{tangent}} = 7/2$ Equation of tangent: $y = 7/2x + c$ $(-2, 5): 5 = 7/2(-2) + c; c = 12$ Equation of tangent: $y = 7x/2 + 12$ or $2y - 7x - 24 = 0$	23. Find the size of the angle 'x'? (3sf)	11:28 50.1°
	$(x-8)(x-1) = (x+3)(x-2)$ $x^2 - 9x + 8 = x^2 + x - 6$ $10x = 14$ $x = 1.4$				$\cos x = \frac{9^2 + 13^2 - 10^2}{2 \times 9 \times 13} = 0.641.....$ $x = 50.1^\circ$

6. If $g(x) = x^2 + 1$, work out:
 $g^{-1}(x)$

11:7
 $g^{-1}(x)$
 $=\sqrt{x-1}$

7. Find the turning point of:
 $y = x^2 - 2x - 5$

11:8
(1, -6)

$(x-1)^2 - 1 - 5$
 $(x-1)^2 - 6$
(1, -6)

16. Estimate & interpret the gradient of the tangent at 5s

velocity(m/s)

time(s)

11:20
Acceleration
0.6m/s²
at 5seconds

24. $\vec{AB} = 2\mathbf{b} - \frac{1}{2}\mathbf{a}$ and $\vec{AD} = 3\mathbf{b} - \frac{3}{4}\mathbf{a}$

Show clearly that A, B and D lie in a straight line (i.e. points are collinear)

$\vec{AB} = 2(\mathbf{b} - \frac{1}{4}\mathbf{a})$ or $\frac{1}{2}(4\mathbf{b} - \mathbf{a})$
 $\vec{AD} = 3(\mathbf{b} - \frac{1}{4}\mathbf{a})$ or $\frac{3}{4}(4\mathbf{b} - \mathbf{a})$

Same vector (same direction, different lengths)
Common letter 'A'

11:29

8. Solve by completing the square:
 $x^2 - 12x - 5 = 12$
(Write down the EXACT values)

11:9
 $x = 6 + \sqrt{53}$
or $6 - \sqrt{53}$

$(x-6)^2 - 36 - 5 = 12$
 $(x-6)^2 = 53$
 $(x-6) = \pm\sqrt{53}$
 $x = 6 + \sqrt{53}$ or $6 - \sqrt{53}$

17. $x^3 - 4x + 5 = 0$ can be solved using the iteration formula:
 $x_{n+1} = \sqrt[3]{4x_n - 5}$ (Correct to 2dp)
Start with $x_1 = -2$ & work out an approximation for x by finding x_5

11:21
-2.46

18. Work out the angle of this triangle
With an area of 5cm^2
(Correct to 2sf)

3.7cm x° 2.8cm

$5 = 0.5 \times 3.7 \times 2.8 \times \sin x$
 $\sin x = 5 \div (0.5 \times 3.7 \times 2.8)$
 $= 0.965\dots$

11:22
75°

25. Use the table to complete the histogram:

f
d

Minutes

Time(min)	Frequency	fd
$0 < t \leq 5$	3	0.6
$5 < t \leq 15$	5	0.5
$15 < t \leq 40$	6	0.24
$40 < t \leq 60$	6	0.3

11:30

9. To solve: $4x^2 - 5x - 3 = 0$ by formula. Give answers in surd form.

11:10
 $\frac{5 \pm \sqrt{73}}{8}$

19. Find the size of angle 'x'

x 72° 54°

11:23
54°

10. Write down the solution set for: $(x+3)(2x-5) \geq 0$

11:11
 **$\{x: x \leq -3$
or $x \geq 2.5\}$**

20. Work out the length of the diagonal of the cuboid. (1dp)

5cm 8cm 4cm

$\sqrt{5^2 + 8^2 + 4^2}$
10.2cm

11:24
10.2cm

Total (A)
Test Total (A+B+C)

Total (B)
R (0-9)

Total (C)
Y (10-19) G (20-25)