

Maths Key Skills

Name:

Date:

Stage 11: Skill Check 10 Answers

Class/Group:

A: Number & Algebra		B: Algebra, Proportion, Geometry & Measure		C: Geometry & Measure & Statistics	
1. Write $8\sqrt{8}$ in the form $k\sqrt{2}$	11:1 16$\sqrt{2}$	11. Make (b) the new subject of : $3(a+b)=5+7b$	$3a+3b=5+7b \Rightarrow 7b-3b=3a-5 \Rightarrow 4b=3a-5 \Rightarrow$ $b = (3a-5)/4$	21. Work out the angle x (correct to 3sf)	11:26 x = 31.4°
2. Rationalise the denominator & simplify: $\frac{4}{3\sqrt{2}}$	11:2 $\frac{2\sqrt{2}}{3}$	12. This is the graph of $y = \cos x$ One solution for $\cos x = -0.44$ (2dp) is $x = 116^\circ$. Use the graph to find another solution.	 116 = 90+26 270 - 26 = 244°	 $y = \sqrt{7^2 + 13^2} = \sqrt{218}$ $\sin \frac{1}{2} x = 4/\sqrt{218}$ $\frac{1}{2} x = 15.7186\dots$ $x = 31.4^\circ$	
3. If $x=18$ & $y=12$ (both to nearest integer) Work out minimum value of $x \div y$	11:3 17.5 ÷ 12.5 = 1.4	13. This is the graph of $y = f(x)$. Sketch on the grid: $y = f(x+2)$		22. Find the length of the side 'x'? (1dp)	11:27 6.4cm
4. Simplify the following fraction: $\frac{2x^2+9x-5}{4x^2+20x}$	11:4 $\frac{2x-1}{4x}$	14. Estimate the area under the graph from $x=5$ to 8	 11:16 0.55+ 0.45+ 0.375 ≈ 1.375	 $\frac{x}{\sin 65} = \frac{6.8}{\sin 74}$ $x = \frac{6.8 \sin 65}{\sin 74} = 6.4 \text{ cm}$	
5. Solve: $\frac{3}{x+1} + \frac{1}{2x-1} = 2$	11:5 $x = 0$ or 1.25	15. Write down the equation of the tangent at (3,-1) on the circle $x^2+y^2 = 10$	$m_{\text{radius}} = (-1-0)/(3-0) = -1/3$ $m_{\text{tangent}} = 3$ Equation of tangent: $y = 3x+c$ (3,-1): $-1 = 3(3)+c$; $c = -10$ Equation of tangent: $y = 3x-10$	23. Find the length of the side 'x'? (2sf)	11:28 14cm
	$6x-3+x+1=2(2x^2+x-1)$ $6x-3+x+1=4x^2+2x-2$ $4x^2-5x=0$ $x(4x-5)=0$ $x=0$ or 1.25			 $x^2 = 11^2 + 15^2 - 2(11)(15)\cos 63^\circ$ $x = \sqrt{196.18\dots}$ $x = 14 \text{ cm}$	

6. If $h(x) = x^2 - 2x + 3$
Work out: $h(x+3)$

11:7
 x^2+4x+6

$$(x+3)^2 - 2(x+3) + 3$$

$$x^2 + 6x + 9 - 2x - 6 + 3$$

$$x^2 + 4x + 6$$

7. Find the turning point of:
 $y = x^2 - 4x - 7$

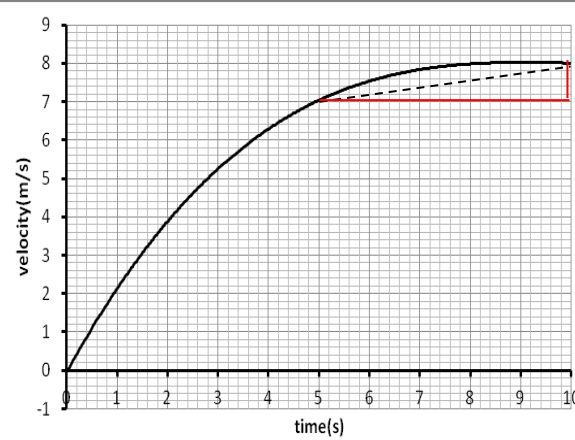
11:8
(2, -11)

$$(x-2)^2 - 4 - 7$$

$$(x-2)^2 - 11$$

(2, -11)

16. Estimate & interpret the gradient of the chord.



11:20
Average acceleration of 0.2m/s^2 over 5-10 sec

24. $\vec{AB} = \underline{a} - \frac{3}{4}\underline{b}$
 $\vec{CD} = 8\underline{a} - 6\underline{b}$

Show clearly that AB and CD are parallel

Working out

$$\vec{AB} = \frac{1}{4}(4\underline{a} - 3\underline{b})$$

$$\vec{CD} = 2(4\underline{a} - 3\underline{b})$$

Same vector so AB and CD are parallel

8. Solve by completing the square: $x^2 - 6x + 2 = 0$
(Write down the EXACT values)

11:9
 $x=3+\sqrt{7}$
or $3-\sqrt{7}$

$$(x-3)^2 - 9 + 2 = 0$$

$$(x-3)^2 - 7 = 0$$

$$x-3 = \pm\sqrt{7}$$

$$x=3+\sqrt{7} \text{ or } 3-\sqrt{7}$$

17. $x^2 - 3x - 8 = 0$ can be solved using the iteration formula:

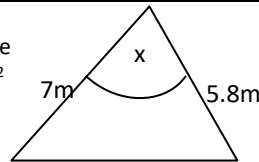
$$x_{n+1} = \sqrt{3x_n + 8}$$



11:21
4.7

Start with $x_1 = 4$ & work out an approximation for x by finding x_5 Correct to 1dp

18. Work out the angle x of this triangle
With an area of 16m^2
(Correct to 2sf)



11:22
 52°

$$16 = 0.5 \times 7 \times 5.8 \times \sin x$$

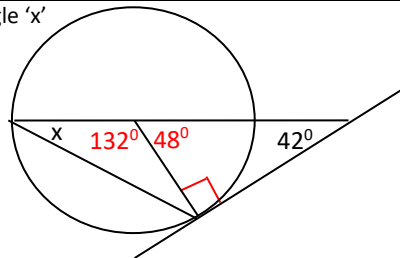
$$\sin x = 16 \div (0.5 \times 7 \times 5.8)$$

$$\sin x = 0.788\dots$$

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

11:10
 $4 \pm \sqrt{76}$
6

19. Find the size of angle 'x'

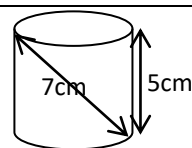


11:23
 $\frac{1}{2}(180 - 132)$
 $= 24^\circ$

10. Write down the solution set for: $(2x-1)(x+3) < 0$

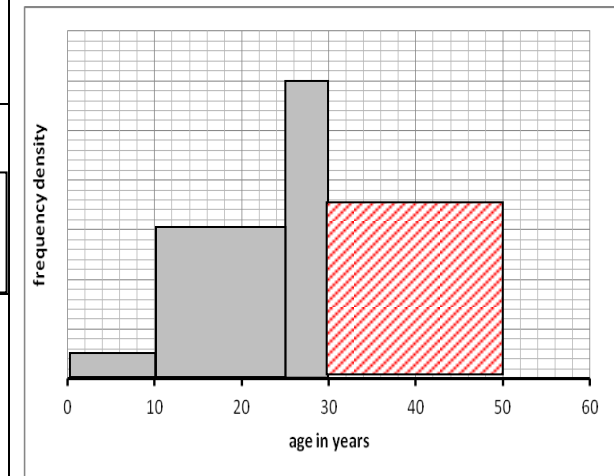
11:11
{x: $-3 < x < 0.5$ }

20. Work out the diameter of this cylinder (1dp)



11:24
 $\sqrt{7^2 - 5^2}$
 $= 4.9\text{cm}$

25. Complete the table & histogram :



Age(years)	Frequency
$0 < t \leq 10$	5
$10 < t \leq 25$	45
$25 < t \leq 30$	30
$30 < t \leq 50$	70

11:29

11:30

Total (A)

Total (B)

Total (C)

Test Total (A+B+C)

R (0-9)

Y (10-19)

G (20-25)