

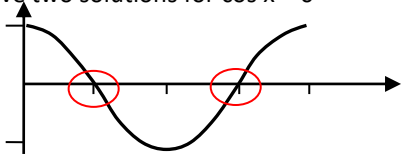
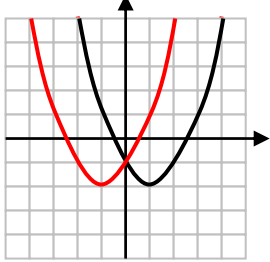
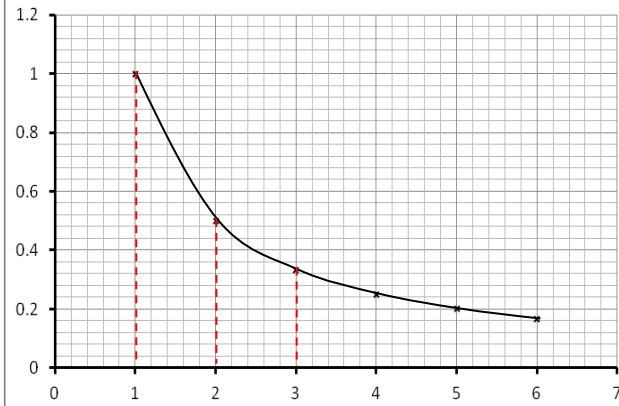
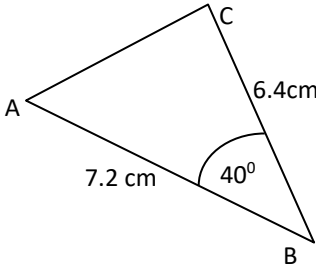
Maths Key Skills

Name:

Date:

Stage 11: Skill Check 4 Answers

Class/Group:

A: Number & Algebra		B: Algebra, Proportion, Geometry & Measure		C: Geometry & Measure & Statistics	
1. Simplify: $\sqrt{18} - \sqrt{8}$	11:1 $3\sqrt{2} - 2\sqrt{2}$ = $\sqrt{2}$	11. Make (g) the new subject of : $f = 3g - 4 + gh$	$3g + gh = f + 4$ $g(3+h) = f + 4$	11:12 $g = \frac{f + 4}{h + 3}$	21. Work out the angle that base makes with the broken line. (correct to 3sf)
2. Expand & simplify: $(3 + \sqrt{2})(4 + \sqrt{2})$	11:2 $12 + 7\sqrt{2} + 2$ = $14 + 7\sqrt{2}$	12. This is the graph of $y = \cos x$ Give two solutions for $\cos x = 0$		11:14 90° 270°	11:26 $y = \sqrt{160}$ $\tan x = \frac{3}{\sqrt{160}}$ $x = 13.3^\circ$
3. If $x = 3.8$ (1dp) and $y = 4.60$ (2dp) Work out minimum value of: $y - x$	11:3 $4.595 - 3.85$ = -0.745	13. Sketch on the grid: $y = f(-x)$		11:15	22. Work out the length y (1dp)
4. Simplify the following fraction: $\frac{5x}{x-3} - \frac{2x}{x+4}$	11:4 $\frac{3x^2 + 26x}{(x-3)(x+4)}$	14. Estimate the area under the graph between $x = 1$ and $x = 3$		11:16 $\approx \frac{1}{2}x(1+0.5)x1$ $+ \frac{1}{2}x(0.5+0.33)x1$ $= 0.75 + 0.415$ = 1.165	11:27 70.3°
5. Solve: $\frac{x+5}{x-3} = x$	11:5 $x = 5$ or -1	15. Write down the equation of the tangent at (2,1) on the circle $x^2 + y^2 = 5$	$m_{\text{radius}} = (1-0) \div (2-0) = \frac{1}{2}$ $m_{\text{tangent}} = -2$; Equation of tangent: $y = -2x + c$ (2, 1): $1 = -2(2) + c$ so $c = 5$ Equation of tangent: $y = -2x + 5$	11:18	23. Work out the side AC (3sf)
	$x + 5 = x^2 - 3x$ $x^2 - 4x - 5 = 0$ $(x-5)(x+1) = 0$ $x = 5$ or -1				11:28 4.71cm
					 $AC^2 = 7.2^2 + 6.4^2 - 2 \times 7.2 \times 6.4 \times \cos 40^\circ$ $AC^2 = 22.20134412$

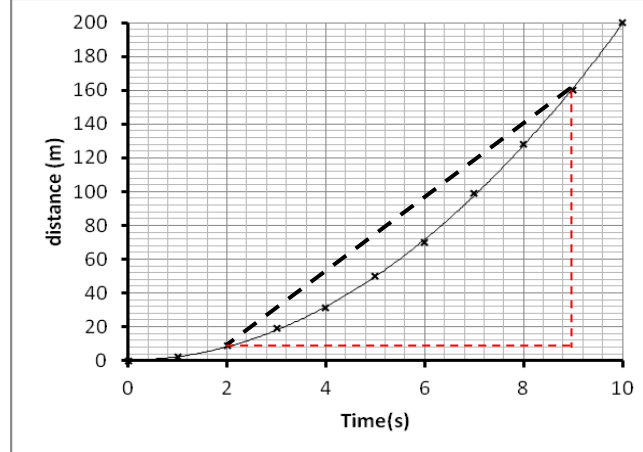
6. If $f(x) = x^2 - 4x$, solve $f(x) = 0$

11:7
 $x(x-4)=0$
 $x=0$ or 4

7. Find the turning point of:
 $y = x^2 - 6x - 3$

11:8
 $(x-3)^2 - 9 - 3$
 $= (x-3)^2 - 12$
 $(3, -12)$

16. Estimate the gradient of the chord, give meaning & units



11:20

 Average velocity between 2 & 9 seconds
 $\approx 152 \div 7$
 $= 22 \text{m/s}$

24. If $\overline{AB} = 2\mathbf{b} - 2\mathbf{a}$
 and
 $\overline{CD} = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$
 Prove that AB is parallel to CD

11:29
Same vector therefore parallel

$$\overline{AB} = 2\mathbf{b} - 2\mathbf{a} = 2(\mathbf{b} - \mathbf{a})$$

$$\overline{CD} = \frac{1}{2}(-\mathbf{a} + \mathbf{b}) = \frac{1}{2}(\mathbf{b} - \mathbf{a})$$

8. Solve by completing the square:
 $x^2 + 5x + 2 = 0$
 (Write down the EXACT values)

11:9

$$(x+2.5)^2 - 6.25 + 2 = 0$$

$$(x+2.5)^2 = 4.25$$

$$(x+2.5) = \pm\sqrt{4.25}$$

$$\mathbf{x = -2.5 + \sqrt{4.25}}$$

$$\mathbf{or +2.5 + \sqrt{4.25}}$$

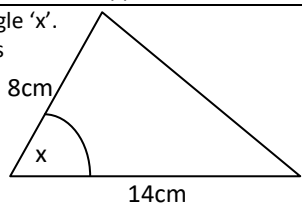
17. $2x^2 - 3x - 1 = 0$ can be solved using the iteration formula:

$$x_{n+1} = \sqrt{\frac{3x_n + 1}{2}}$$

(correct to 1dp)
 Start with $x_1 = 2$ & work out an approximation for x ; find x_3

11:21
1.8

18. Work out the angle 'x' given the area of this triangle is 54cm^2 . (Correct to nearest whole degree)



$$54 = 0.5 \times 8 \times 14 \times \sin x$$

$$\sin x = 54 \div (0.5 \times 8 \times 14)$$

$$\sin x = 54 \div 56 = 0.964\dots$$

11:22
 75°

9. To solve: $2x^2 + x - 3 = 0$ formula.

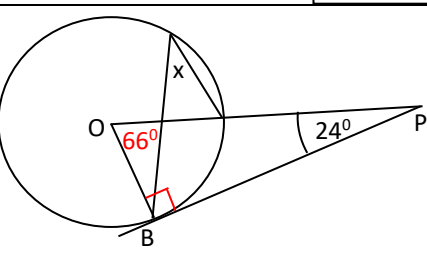
$$a=2, b=1, c=-3$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{-1 \pm \sqrt{25}}{4}$$

$$\mathbf{x = 1 \text{ or } -1.5}$$

19. O is the centre. Work out angle x.

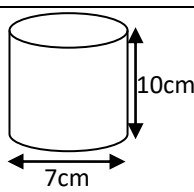


11:23
 33°

10. Write down the solution set for: $(x + 4)(x + 1) > 0$

11:11
 $\{x: x < -4 \text{ or } x > -1\}$

20. Work out the maximum length pencil that will fit inside this cylindrical tin. (correct to 1dp)

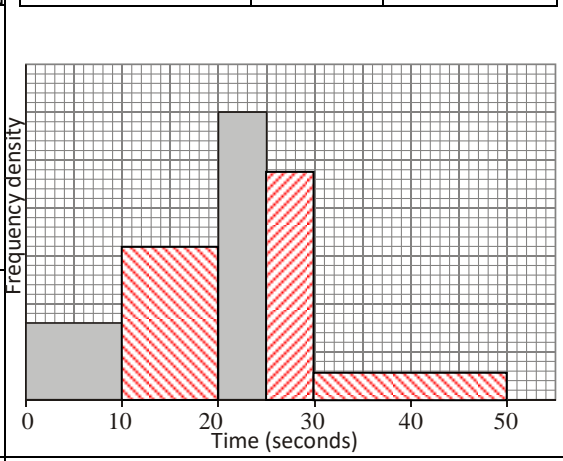


11:24
 $\sqrt{10^2 + 7^2}$
 $= 12.2 \text{cm}$

25. Use the table to complete the histogram:

Time (t s)	f	fd
$0 < t \leq 10$	8	$8 \div 10 = 0.8$
$10 < t \leq 20$	16	$16 \div 10 = 1.6$
$20 < t \leq 25$	15	$15 \div 5 = 3$
$25 < t \leq 30$	12	$12 \div 5 = 2.4$
$30 < t \leq 50$	6	$6 \div 20 = 0.3$

11:30



Total (A)

Total (B)

Total (C)

Test Total (A+B+C)

R (0-9)

Y (10-19)

G (20-25)