

Maths Key Skills

Name:

Date:

Stage 11: Skill Check 7 Answers

Class/Group:

A: Number & Algebra		B: Algebra, Proportion, Geometry & Measure		C: Geometry & Measure & Statistics	
<p>1. Simplify $\sqrt{2} \times \sqrt{10}$</p> <p>11:1</p> <p>$2\sqrt{5}$</p>		<p>11. Make (b) the new subject of :</p> <p>$W = \frac{3ab}{a-b}$</p> <p>$wa - wb = 3ab \Rightarrow 3ab + wb = wa \Rightarrow b(3a+w) = wa \Rightarrow b = \frac{wa}{3a+w}$</p>	11:12	<p>21. Work out the angle that BE makes with the plane CDEF. (correct to 3sf)</p> <p>11:26</p> <p>12.2°</p>	
<p>2. Rationalise & simplify to the form: $p+q\sqrt{2}$:</p> <p>$\frac{\sqrt{18+10}}{\sqrt{2}}$</p> <p>11:2</p> <p>$3+5\sqrt{2}$</p> <p>$\frac{\sqrt{18+10}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{6+10\sqrt{2}}{2} = 3+5\sqrt{2}$</p>		<p>12. One solution for $\sin x = 0.326$ is $x = 19^\circ$. Use the graph to find another solution.</p> <p>11:14</p> <p>$180^\circ - 19^\circ = 161^\circ$</p>		<p>22. Find the size of angle 'x'?</p> <p>11:27</p> <p>24.1°</p> <p>$\frac{\sin x}{3.5} = \frac{\sin 40}{5.5}$ $\sin x = \frac{3.5 \sin 40}{5.5}$ $\sin x = 0.409...$ $x = 24.144...$</p>	
<p>3. If $x=16.4$(1dp) and $y=4.7$(1dp)</p> <p>Work out minimum value of $x \div y$ (correct to 2dp)</p> <p>11:3</p> <p>$16.35 \div 4.75$</p> <p>$=3.44$</p>		<p>13. This is the graph of $y = f(x)$. Sketch on the grid: $y = f(-x)$</p> <p>11:15</p>		<p>23. Find the length of the side 'x'?</p> <p>11:28</p> <p>3.7cm</p> <p>$x^2 = 7^2 + 9^2 - 2(7)(9)\cos 23$ $= 14.016...$ $x = 3.7\text{cm}$</p>	
<p>4. Simplify the following fraction:</p> <p>$\frac{x^2 + 5x + 4}{4x + 16}$</p> <p>11:4</p> <p>$\frac{x+1}{4}$</p> <p>$\frac{(x+4)(x+1)}{4(x+4)} = \frac{x+1}{4}$</p>		<p>14. Estimate the area under the graph between $x = 2$ and 5</p> <p>11:16</p> <p>$1.5+3.5+7.5 = 12.5$ units²</p>			
<p>5. Solve:</p> <p>$\frac{8}{x+2} - \frac{3}{x-2} = \frac{3x}{x^2-4}$</p> <p>11:5</p> <p>$x=11$</p> <p>$\frac{8(x-2) - 3(x+2)}{x^2-4} = \frac{3x}{x^2-4}$ $8x-16-3x-6=3x$ $2x-22=0$ $2x=22$ $x=11$</p>		<p>15. Find equation of tangent at the point P(1, -4) on a circle with centre (2,-2)</p> <p>$m_{\text{radius}} = (-4-(-2)) \div (1-2) = 2$ $m_{\text{tangent}} = -\frac{1}{2}$</p> <p>Equation of tangent: $y = -\frac{1}{2}x + c$</p> <p>(1,4): $-4 = -\frac{1}{2}(1) + c$; $c = -7/2$</p> <p>Equation of tangent: $y = -\frac{1}{2}x - 7/2$ or $2y + x + 7 = 0$</p> <p>11:18</p>			

6. If $f(x) = 3x$ and $g(x) = 2x^2 - 5$, find $g(f(1))$

11:7
13

$2(3x)^2 - 5$
 $18x^2 - 5$
 $18(1)^2 - 5$
 13

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

11:8
(-1, 4)

$(x+1)^2 - 1 + 5$
 $(x+1)^2 + 4$

8. Solve by completing the square:
 $x^2 - 10x + 3 = 0$
(Write down the EXACT values)

11:9
 $x = 5 + \sqrt{22}$
or $5 - \sqrt{22}$

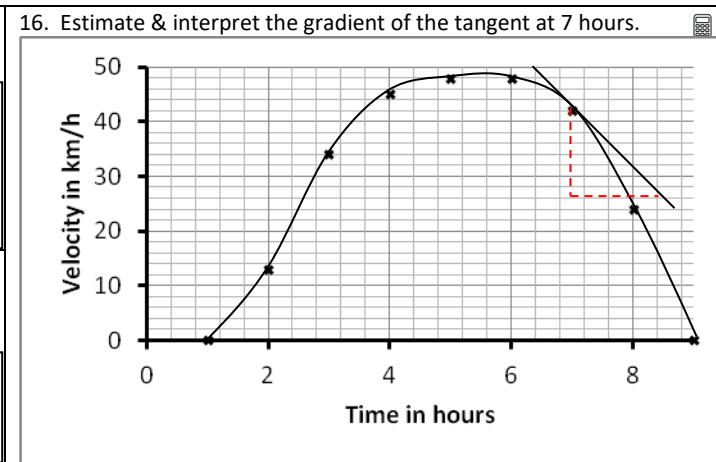
$(x-5)^2 - 25 + 3 = 0$
 $(x-5)^2 - 22 = 0$
 $(x-5)^2 = 22$
 $x-5 = \pm\sqrt{22}$
 $x = 5 + \sqrt{22}$ or $5 - \sqrt{22}$

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

11:10
 $-1 \pm \sqrt{61}$
6

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

11:11
 $\{x: 1.5 \leq x \leq 5\}$



11:20
 $\approx -16 \div 1.4$
 -11 km/h^2
Deceleration of 11 km/h^2 at 7 hours

17. $x^3 - 2x^2 - 4 = 0$ can be solved using the iteration formula:

$x_{n+1} = \sqrt[3]{2x_n^2 + 4}$

Start with $x_1 = 2$ & work out an approximation for x by finding x_5

11:21
2.57

18. Work out the area of this triangle (Correct to 1dp)

5cm
128°
7cm

$A = 0.5 \times 5 \times 7 \sin 128^\circ = 13.790 \dots$

11:22
13.8 cm²

19. O is the centre. Find the size of angle 'x'

O
x
27°
63°
54°

11:23
 $180 - 2(27)$
 $= 126^\circ$

20. Work out the perpendicular height of this square based pyramid. (1dp)

10cm
x
8cm
8cm

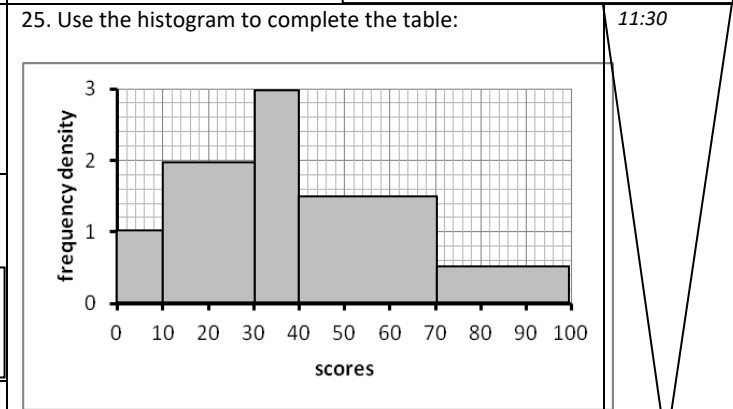
11:24
 $X = \sqrt{84}$
Height = $\sqrt{(\sqrt{84^2 - 4^2})}$
 $= 8.2 \text{ cm}$

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

11:29

Manipulate the vectors to show clearly that AB and CD are parallel

$\vec{AB} = \frac{2}{3}(2\mathbf{a} - 3\mathbf{b})$
 $\vec{CD} = \frac{1}{2}(2\mathbf{a} - 3\mathbf{b})$
Same vectors so parallel



scores	Frequency
$0 < x \leq 10$	10
$10 < x \leq 30$	40
$30 < x \leq 40$	30
$40 < x \leq 70$	45
$70 < x \leq 100$	15

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

Total (B)
R (0-9)

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