Maths Key Skills **Stage 11: Skill Check 14 Answers**

Name: ..... Date: ..... Class/Group: .....

A: Number & Algebra

1. Simplify: $2\sqrt{5} \times \sqrt{10}$ *11:1*

$2\sqrt{50}$

$=10\sqrt{2}$

2. Expand & simplify: $(\sqrt{3}+\sqrt{2})^2$ *11:2*

$5+2\sqrt{6}$

$(\sqrt{3} + \sqrt{2})(\sqrt{3} + \sqrt{2})$
$=3+2\sqrt{6}+2$
$=5+2\sqrt{6}$

3. A sack contains 20kg of chicken pellets (to nearest kg).Each day the chickens are given 800g (to the nearest 10g). Work out the minimum number of days the pellets last?(to nearest day) *11:3*

$19500 \div 805$
≈ 24days

4. Simplify the following fraction: *11:4*

$\frac{2}{x+3} - \frac{5}{(x+3)^2}$

$\frac{2x+1}{(x+3)^2}$

$\frac{2(x+3)-5}{(x+3)^2}$
$\frac{2x+1}{(x+3)^2}$

5. Solve: *11:5*

$\frac{x+5}{x-3} = x$

x=5 or -1

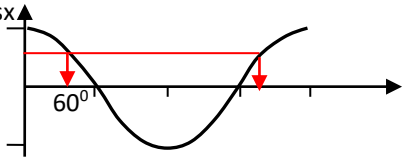
$x+5 = x^2-3x$
$x^2-4x-5=0$
$(x-5)(x+1)=0$
x=5 or -1

B: Algebra, Proportion, Geometry & Measure

11. Make (**m**) the new subject of : $p = \frac{m^2+3}{m^2+2}$

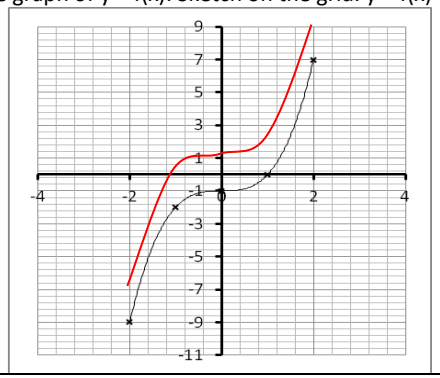
$pm^2+2p=m^2+3$
$m^2(p-1)=3-2p$; $m=\sqrt{\frac{3-2p}{p-1}}$

12. This the graph of y = cosx
Give two solutions for cosx = 0.5 *11:14*

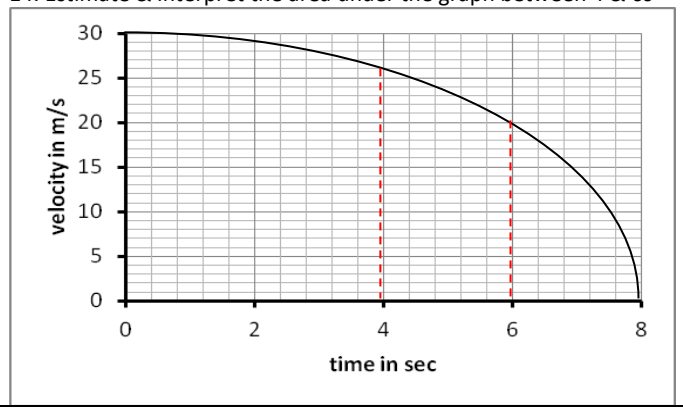


60^0
270+30
$=300^0$

13. This is the graph of y = f(x). Sketch on the grid: y = f(x)+2 *11:15*



14. Estimate & interpret the area under the graph between 4 & 6s *11:16*



Displace-ment

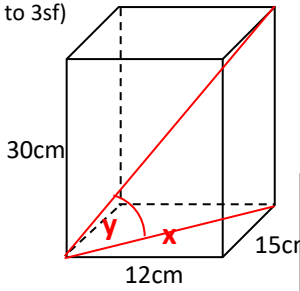
46
46m
between 4 & 6s

15. Write down the equation of the tangent at (5,2) on the circle with centre (4,4) *11:18*

$m_{radius} = (2-4) \div (5-4) = \mathbf{-2}$ $m_{tangent} = \mathbf{1/2}$
Equation of tangent: $y = 1/2x+c$
(5,2): $2 = 1/2\ (5)+c$; $c = -1/2$
Equation: $y = 1/2x - 1/2$ **or $2y=x-1$**

C: Geometry & Measure & Statistics

21. Work out the angle that the diagonal makes with the base (correct to 3sf) *11:26*

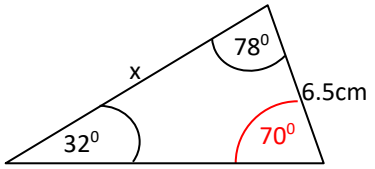


$x=\sqrt{369}$

57.4^0

$\tan y = 30 \div \sqrt{369}$
$\tan y = 1.561...$
$y = 57.4^0$

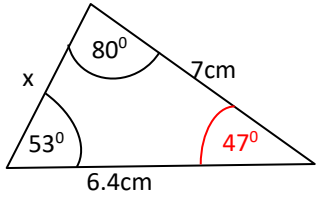
22. Find the length 'x'? (1dp) *11:27*



11.5cm

$\frac{x}{\sin 70} = \frac{6.5}{\sin 32}$
$x = \frac{6.5 \sin 70}{\sin 32}$
$x = 11.526....$
$= 11.5$cm

23. Find the length 'x'? (1dp) *11:28*



5.4cm

$x^2=7^2+6.4^2-2x7x6.4\cos 47$
$x^2=28.85....$
$x = 5.371....$
$x = 5.4$cm

6. If $f(x) = 3x^2 - 6x$
Solve $f(x) = 0$

$3x^2-6x=0$
$3x(x-2)=0$
$x=0$ or 2

11:7 **x=0 or 2**

7. Find the turning point of:
$y= x^2 +10x + 3$

$(x+5)^2-25+3$
$(x+5)^2-22$
$(-5, -22)$

11:8 **(-5, -22)**

8. Solve by completing the square: $2x^2 + 4x - 8 = 0$
(Write down the EXACT values)

$x^2+2x-4=0$
$(x+1)^2-1-4=0$
$(x+1)^2=\pm\sqrt{5}$

11:9 **$x=-1+\sqrt{5}$ or $-1-\sqrt{5}$**

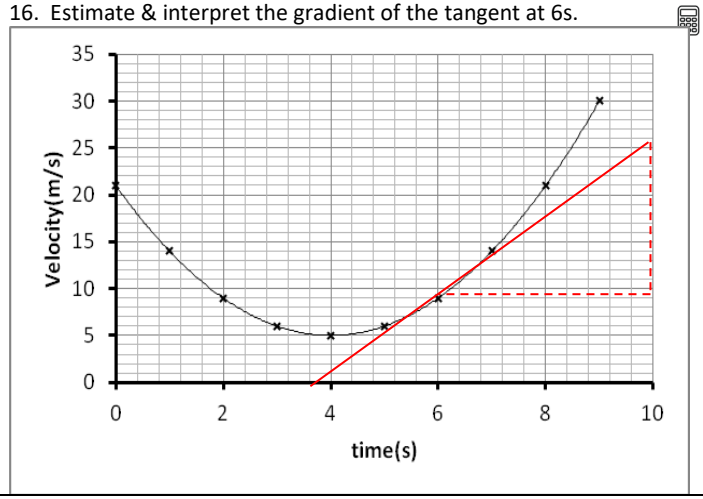
9. To solve: **$6x^2 - 5x = 8$** by formula. Give answers in surd form.

11:10 $\frac{5\pm\sqrt{217}}{12}$

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

11:11 **{x: -2<x<5)**

16. Estimate & interpret the gradient of the tangent at 6s.



11:20 Average acceleration of **$4m/s^2$** at 6s

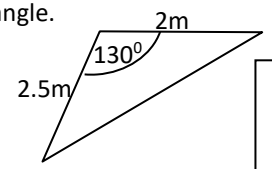
17. $3x^2 - 4x - 7 = 0$ can be solved using the iteration formula: $x_{n+1} = \sqrt{\frac{4x_n+7}{3}}$

Correct to 2dp

Start with $\mathbf{x_1 = 2}$ & work out an approximation for x by finding $\mathbf{x_4}$

11:21 **2.33**

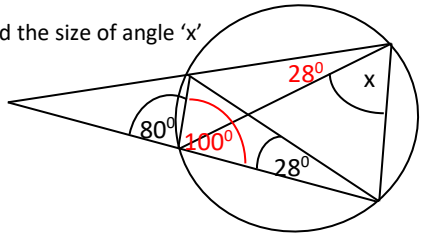
18. Find the area of the triangle. (Correct to 3sf)



$0.5x2x2.5x\sin130^0$
$=1.92m^2$

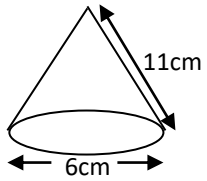
11:22 **$1.92m^2$**

19. Find the size of angle 'x'



11:23 80-28
$=52^0$

20. Work out the perpendicular height of the cone.
(give answer in simplified surd form)



11:24 $\sqrt{11^2 - 3^2}$
$\sqrt{112}$
$4\sqrt{7}$cm

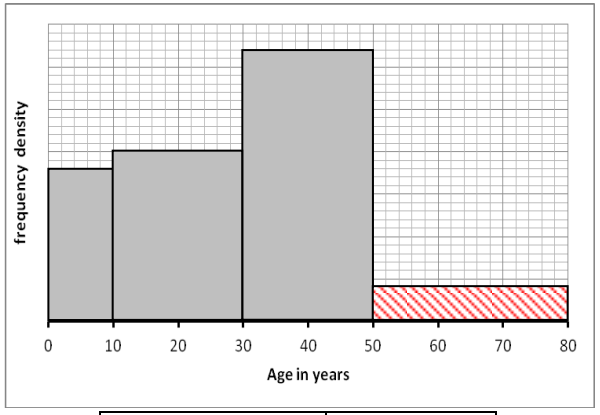
24.
$\overrightarrow{AB} = \frac{2}{3}(3\mathbf{a} - \mathbf{b})$
$\overrightarrow{BD} = 2(\mathbf{b} - 3\mathbf{a})$

What can you deduce from these two vectors?

- Opposite directions and parallel
- common letter so A,B&D are collinear
- BD = 3AB
  AB = ⅓BD

11:29 **Any**

25. Complete the table & histogram:



Age group	Frequency
$0 < n \leq 10$	18
$10 < n \leq 30$	**20**
$30 < n \leq 50$	64
$50 < n \leq 80$	12

11:30

Total (A)		Total (B)		Total (C)	
Test Total (A+B+C)		R (0-9)	Y (10-19)	G (20-25)	