

# Gold Level

## Mark Scheme 9

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Mark Scheme 9

**Time Allowed:** 52 minutes

**Score:** /43

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

Question	Working	Answer	Mark	Notes
1		Blocks at heights 2.4, 6.8, 3 squares	3	B3 for all 3 blocks correct (B2 for any 2 blocks correct) (B1 for any one block correct <b>or</b> for correct frequency density calculated or marked ((0.8), 1.2, 3.4 and 1.5) <b>or</b> 1 square = 2.5 people stated <b>or</b> 1 person = 10 squares)
				<b>Total 3 marks</b>
2	168.5 - 121.5	47	2	M1 for 168.5 <b>or or</b> 168.499... <b>or</b> 121.5 A1 for 47 with no incorrect working
				<b>Total 2 marks</b>
3	$t^2 = \text{---}$ $nt^2 = n + 3$  $nt^2 - n = 3$ $n(t^2 - 1) = 3$	$n = \text{---}$	4	M1 squaring both sides  M1 isolating terms in $n$ M1 factorising  A1 <b>or</b> $n = \frac{3}{(t+1)(t-1)}$ <b>or</b> $n = \frac{-3}{1-t^2}$ <b>or</b> $n = \frac{-3}{(1-t)(1+t)}$
				<b>Total 4 marks</b>

4 (a)	$1 - \frac{1}{2} - \frac{1}{3} \left( = \frac{1}{6} \right)$	correct fractions on branches	3	M1 A1 for $\frac{1}{6}$ oe A1 correct values in correct places on full tree <i>Note:</i> (simplest form of fractions is <b>not</b> necessary) (accept $\frac{1}{6}$ and/or $\frac{1}{3}$ rounded or truncated to 2 or more decimal places eg 0.16 , 0.17 , 0.33 etc) <b>SC</b> : If M1 cannot be awarded then award B1 if top two branches in 2nd and 3rd games are <b>correct</b>
(b)	$\frac{1}{3} + \frac{1}{2} \times \frac{1}{3} + \frac{1}{2} \times \frac{1}{2} \times \frac{1}{3}$	$\frac{7}{12}$	3	M2 M1 for $\frac{1}{2} \times \frac{1}{3}$ or $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{3}$ A1 accept 0.583... rounded or truncated to 2 or more sf
	<b>Alternative method for (b)</b> $1 - \left( \frac{1}{6} + \frac{1}{2} \times \frac{1}{6} + \frac{1}{2} \times \frac{1}{6} \times \frac{1}{6} + \frac{1}{2} \times \frac{1}{2} \times \frac{1}{6} \right)$	$\frac{7}{12}$		M1 for $\frac{1}{2} \times \frac{1}{6}$ or $\frac{1}{2} \times \frac{1}{6} \times \frac{1}{6}$ or $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{6}$ A1 accept 0.583... rounded or truncated to 2 or more sf
<b>Total 6 marks</b>				

5 (a)		$(v =) 18t - 3t$	2	B2 for $18t - 3t^2$ oe seen as final answer B1 for $18t$ or or
(b)		$(a =) "18 - 6t" (=0)$  $(t =) 3$	2	M1ft ft if differentiating correctly a quadratic with 2 or 3 terms A1ft
<b>Total 4 marks</b>				

6	$10 \times x = 3 \times 15$ or $(x =) 3 \times 15 \div 10$ oe	4.5 oe	2	M1 A1
<b>Total 2 marks</b>				

7 (a)	$\frac{7}{x} \times \frac{6}{x+1} = 0.2$ $42 = 0.2x(x-1)$ $210 = x^2 - x$	$x^2 - x - 210 (=0)$	2	M1 for $\frac{7}{x} \times \frac{6}{x-1} = 0.2$ <b>or</b> $\frac{7}{x} \times \frac{6}{x-1} = \frac{1}{5}$  A1* * answer given; sufficient steps must be seen to get to correct quadratic	
(b)	$(x - 15)(x + 14) (=0)$	$-14, 15$	3	M2 M1 for $(x \pm 15)(x \pm 14)$  A1 (dep on M2) for $-14, 15$ <b>or</b> $15$	M1 $\frac{-(-1) \pm \sqrt{(-1)^2 - 4 \times 1 \times (-210)}}{2}$ (may be partially evaluated, condone no brackets around negative numbers, accept $1^2$ )  M1 (indep) for $\sqrt{841}$ or 29 A1 (dep on M1) for $-14, 15$ <b>or</b> $15$
<b>Total 5 marks</b>					

8	$(\sqrt{a})^2 + (\sqrt{8a})^2 + 2\sqrt{a}\sqrt{8a}$ $a + 8a + 2a\sqrt{8}$ $9a + 4a\sqrt{2}$	$a = 6 \quad b = 24$	3	M1 for correct expansion of brackets  A1 for $9a + 4a\sqrt{2}$  A1
<b>Total 3 marks</b>				

9 (a) (i)		$\frac{1}{2} \mathbf{y} - \mathbf{x}$	1	B1 <b>or</b> $-\mathbf{x} + \frac{1}{2} \mathbf{y}$ oe eg $\mathbf{y} - \mathbf{x} - \frac{1}{2} \mathbf{y}$
(ii)		$\mathbf{y} - 2\mathbf{x}$	1	B1 <b>or</b> $-2\mathbf{x} + \mathbf{y}$ oe eg $\mathbf{x} + \mathbf{y} - 3\mathbf{x}$
(b)		$OD$ is parallel to $AM$ $OD$ is twice length of $AM$ oe	2	B1 B1 both marks dependent on a(i) <b>and</b> a(ii) correct and simplified
<b>Total 4 marks</b>				

10	$(FH^2 =) 5^2 + 5^2 (=50)$ $\sqrt{50}$ <b>or</b> $5\sqrt{2}$ (= 7.07..)  $\tan x = \frac{5}{\sqrt{50}}$	35.3	4	<p>M1 or correct Pythagoras statement to find any diagonal            A1 for <math>\sqrt{50}</math> <b>or</b> <math>5\sqrt{2}</math> <b>or</b> awrt 7.1</p> <p>M1 dep on previous M1  <b>or</b> <math>\sin x = \frac{5}{\sqrt{75}}</math> <b>or</b> <math>\cos x = \frac{\sqrt{50}}{\sqrt{75}}</math> <b>or</b>            correct statement using Sine or Cosine rule with angle <math>AHF</math> as the only unknown</p> <p>(NB. <math>\sqrt{75}</math> may be <math>5\sqrt{3}</math> <b>or</b> awrt 8.7 may be used for <math>AH</math> if any other value used then it must clearly come from correct method to find <math>AH</math> )            A1 35.264... awrt 35.3</p>
	<p><b>Alternative scheme</b>  <math>(AH^2 =) 5^2 + 5^2 + 5^2 (=75)</math>  <math>\sqrt{75}</math> <b>or</b> <math>5\sqrt{3}</math> (= 8.66..)</p> $\sin x = \frac{5}{\sqrt{75}}$	35.3	4	<p>M1            A1 for <math>\sqrt{75}</math> <b>or</b> <math>5\sqrt{3}</math> <b>or</b> awrt 8.7            M1 dep on previous M1            A1 35.264... awrt 35.3</p>
<b>Total 4 marks</b>				

11	$x^2 + (3 - 2x)^2 = 26$			M1 or $y^2 + \left(\frac{3-y}{2}\right)^2 = 26$	
	$x^2 + 9 - 6x - 6x + 4x^2 = 26$ or $5x^2 - 12x + 9 = 26$			$y^2 + \left(\frac{9-6y+y^2}{4}\right) = 26$ or $y^2 + \left(\frac{9-3y-3y+y^2}{4}\right) = 26$	
				M1 (indep) for correct expansion of $(3 - 2x)^2$ or $\left(\frac{3-y}{2}\right)^2$ even if unsimplified	
	$5x^2 - 12x - 17 (= 0)$			A1 $5y^2 - 6y - 95 (= 0)$	
	$(5x - 17)(x + 1) (= 0)$ or $\frac{- -12 \pm \sqrt{(-12)^2 - 4 \times 5 \times (-17)}}{2 \times 5}$ (may be partially evaluated; condone lack of brackets around negative numbers) eg. $\frac{12 \pm \sqrt{144 + 340}}{10}$ or $\frac{12 \pm 22}{10}$			M1 $(5y + 19)(y - 5) (= 0)$ oe or $\frac{- -6 \pm \sqrt{(-6)^2 - 4 \times 5 \times (-95)}}{2 \times 5}$ (may be partially evaluated; condone lack of brackets around negative numbers) eg. $\frac{6 \pm \sqrt{1936}}{10}$ or $\frac{6 \pm 44}{10}$	
	$x = 3.4$ oe , $x = - 1$			A1 $y = 5$ , $y = -3.8$ oe	dep on all preceding marks
		$x = 3.4$ oe $x = - 1$ $y = 5$ $y = - 3.8$ oe		A1 <b>NB.</b> No marks for $x = -1$ , $y = 5$ with no working	
					<b>Total 6 marks</b>