

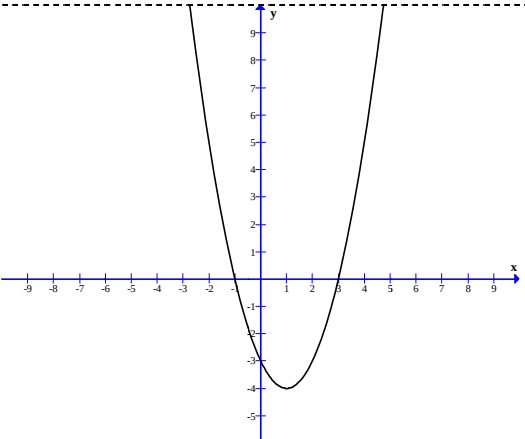
ADEC Examinations 2011-2012
M10Ac Mark-scheme
Mathematics Grade 10 Academic



Multiple Choice Questions (1 mark each; 10 marks in total):

Question	1	2	3	4	5	6	7	8	9	10
Answer	C	D	C	D	B	A	A	C	D	B
Type	II	III	III	III	III	III	II	III	III	III

Student Response Questions: – NO Half Marks

	Answers						Mark Allocation	Total	TYPE
11a		Blood Type A	Blood Type B	Blood Type AB	Blood Type O	TOTAL			
	Male	78	54	12	156	300	[1]	2	III
	Female	52	36	8	104	200			
	TOTAL	130	90	20	260	500	[1]		
11b	$P = \frac{104}{500} = \frac{26}{125}$						[1] correct probability (simplifying not required)	1	III
11c	$P = \frac{90}{500} = \frac{9}{50}$						[1] correct probability (simplifying not required)	1	III
12a	$y = (x + 1)(x - 3)$ x -intercepts are -1 and 3 y -intercept = $(0 + 1)(0 - 3) = -3$						[1] for factorising [1] for both x -intercepts correct [1] for y -intercept correct	3	III
12b	Vertex = $(1, -4)$						[1] for x -coordinate and [1] for y -coordinate	2	III
12c							[1] for both x -intercepts ($x = -1, 3$) [1] for y -intercept ($y = -3$) [1] for vertex $(1, -4)$ [1] for smooth parabola shape	4	IV
13	Parallelograms are quadrilaterals with two sets of opposite sides parallel. All rectangles are also quadrilaterals with two sets of opposite sides parallel, therefore all rectangles are parallelograms. Rectangles are parallelograms with one right angle. Not all parallelograms contain right angles; therefore not all parallelograms are rectangles.						[1] for defining parallelograms [1] for justifying why rectangles meet this definition [1] for defining rectangles [1] for justifying why not all parallelograms meet this definition	4	II

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14	Need to show 2 of these pairs of matching angles: $\angle ABE = \angle ACD$ (corresponding angles on // lines) $\angle AEB = \angle ADC$ (corresponding angles on // lines) $\angle EAB = \angle DAC$ (shared angle) $\therefore \triangle ABE$ and $\triangle ACD$ are similar (AAA)	[1] <i>statement A</i> + [1] <i>for reason</i> [1] <i>statement B</i> + [1] <i>for reason</i> [1] <i>conclusion</i> + [1] <i>for naming AAA test</i>	6	II
15	Answers will vary. Possible examples: - The probability of getting heads on a coin and a 4 on a dice - The probability that your first two children home from school will be one of your two daughters and one of your six sons	[1] <i>for a correct event with</i> $P = \frac{1}{2}$ [1] <i>for a correct event with</i> $P = \frac{1}{6}$ [1] <i>for both events happening (linking events with "and")</i>	3	I
16a		[1] <i>for correct vertex</i> [1] <i>for correct shape (exact x-intercepts not required)</i>	2	IV
16b	$y = (x - 2)^2 - 4$	[1] <i>for correct a in equation</i> [1] <i>for correct k in equation</i>	2	I
17	Students' drawings will vary. Scale diagrams are not required but the triangles should look approximately the same shape and different sizes.	[1] <i>for two triangles which look similar</i> [1] <i>for congruent angles which add to 180°</i> [1] <i>for all lengths marked and showing a scale factor of 3</i>	3	I
18a	Find radius: $8^2 + 15^2 = r^2$ $r = 17$ $x^2 + y^2 = 17^2$ OR $x^2 + y^2 = 289$	[1] <i>correct Pythagoras statement</i> [1] <i>correct radius</i> [1] <i>correct equation of circle</i>	3	I
18b	The two circles have the same radius The two circles have different centres (0, 0) and (-1, 4)	[1] <i>for correct comparison of radius</i> [1] <i>for correct comparison of centre (coordinates not required)</i>	2	II
19	$AB \equiv FG \equiv AH \equiv CD$ (sides of congruent parallelograms) $AB \parallel EH$ and $AH \parallel BE$ (parts of parallel sides) $\therefore ABEH$ is a rhombus (4 congruent sides & 2 pairs parallel)	[1] <i>for statement</i> + [1] <i>for reason</i> [1] <i>for statement</i> + [1] <i>for reason</i> [1] <i>for statement</i> + [1] <i>for reason</i>	6	I

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20a	$h = -0.03(3 - 10)^2 + 3$ $h = 1.53$ metres	[1] for substituting $d = 3$ [1] correct answer	2	III
20b	3 metres	[1] correct answer	1	III
20c	$-0.03(d - 10)^2 + 3 = 0$ $-0.03(d^2 - 20d + 100) + 3 = 0$ $-0.03d^2 + 0.6d - 3 + 3 = 0$ $-0.03d(d - 20) = 0$ $d = 0$ or 20 The total distance is 20 metres OR $-0.03(d - 10)^2 + 3 = 0$ $-0.03(d - 10)^2 = -3$ $(d - 10)^2 = \frac{-3}{-0.03}$ $(d - 10)^2 = 100$ $d - 10 = \pm 10$ $d = 0$ or 20 The total distance is 20 metres	[1] for setting equation = 0 [1] for fully expanding [1] for reaching factorised form [1] for correct answer in this context [1] for setting equation = 0 [1] for simplifying [1] for taking the square root [1] for correct answer in this context	4	III
20d	The football cannot go below ground level so h cannot be negative	[1] for valid reason in this context	1	IV
20e	At $d = 15$, $h = -0.03(15 - 10)^2 + 3$ $h = 2.25$ metres Yes, the ball will go into the goal.	[1] for substituting $h = 15$ [1] for solving [1] for yes/no decision	3	IV
20f	First kick Second kick Goal No Goal Goal No Goal	[3] – [1] for each correct pair of complementary probabilities	3	IV
20g	$P = 0.4 \times 0.6$ $= 0.24$	[1] working required (using their values from the tree) [1] correct answer	2	III