GRADE 11 IeBT
2015

MATHEMATICS

MARKING GUIDELINES

1.	**D**
2.	**C**
3.	**C**
4.	**C**
5.	**C**
6.	**A**
7.	**A**
8.	**B**
9.	**C**
10.	**B**
11.	**D**
12.	**D**
13.	**C**
14.	**D**
15.	**A**
16.	**B**
17.	**C**
18.	**D**
19.	**C**
20.	**D**

21.	**C**
22.	**D**
23.	**B**
24.	**B**
25.	**B**
26.	**D**
27.	**A**
28.	**D**
29.	**A**
30.	**D**
31.	**A**
32.	**D**
33.	**D**
34.	**C**
35.	**C**
36.	**A**
37.	**B**
38.	**A**
39.	**B**
40.	**B**

QUESTION 1

Answer: (D)

QUESTION 2

Answer: (C)

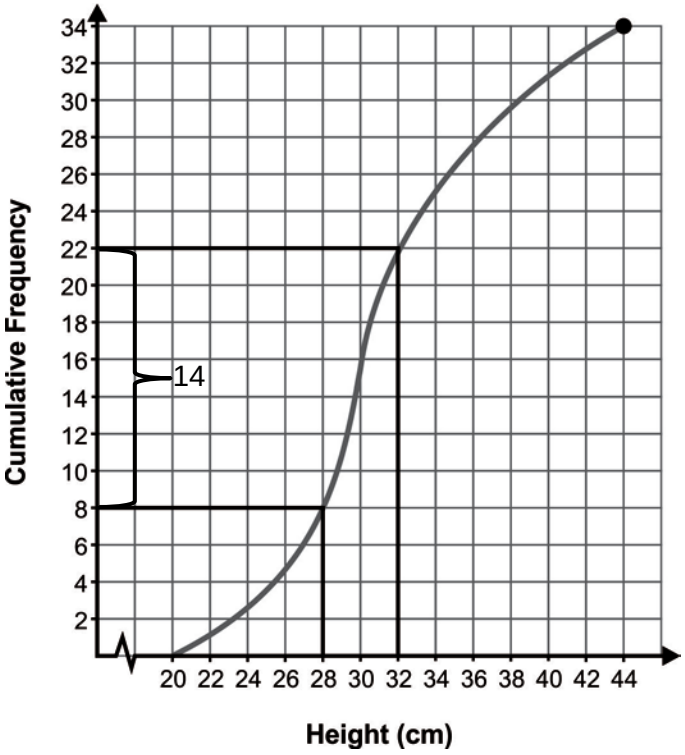
A False IQR Season 1 < IQR Season 2.
B False
C True
D False, 75% of points for Season 1 were below 25 points

QUESTION 3

Answer: (C)

QUESTION 4

Answer: (C)



QUESTION 5

Answer: (C)

$x^2 - 6x + 9 - 9 + 3 = 0$
$(x-3)^2 - 6 = 0$
$\boldsymbol{(x-3)^2 = 6}$

QUESTION 6

Answer: (A)

$\left(5\sqrt{2}\right)^2 = \left(-2-(-3)\right)^2 + (y-4)^2$

$50 = 1 + y^2 - 8y + 16$

$0 = y^2 - 8y - 33$

$0 = (y-11)(y+3)$

$\boldsymbol{y = 11 \text{ or } y = -3}$

QUESTION 7

Answer: (A)

Two periods of compound growth.

QUESTION 8

Answer: (B)

$y = \frac{1}{3}x + c$

$0 = \frac{1}{3}(7) + c \quad c = \frac{-7}{3}$

$y = \frac{1}{3}x - \frac{7}{3}$

$3y = x - 7$

$3y + 7 = x$

QUESTION 9

Answer: (C)

A $= 3^9 \times 3^8 = 3^{17}$

B $= 3^7 \times 3^{12} = 3^{19}$

C $= 3^{28} \div 3^8 = 3^{20}$

D $= 3^{12} \times 3^6 = 3^{18}$

QUESTION 10

Answer: (B)

$= \frac{sinx.sinx}{-tanx.cos^2x}$

$= \frac{sin^2x}{-tanx.cos^2x}$

$= \frac{tan^2x}{-tanx}$

$= -tanx$

QUESTION 11

Answer: (D)

Each toss is independent of the tosses before it.
The Answerwer can also be demonstrated using a tree diagram.

QUESTION 12

Answer: (D)

$\frac{x}{6} = 50 \quad x = 300$

$\frac{300 - 75}{5} = 45$

QUESTION 13

Answer: (C)

A $\frac{\sqrt{12}}{3} \times \frac{\sqrt{12}}{\sqrt{12}} = \frac{12}{3\sqrt{12}} = \frac{4}{\sqrt{12}}$

B $\frac{2\sqrt{3}}{3} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2 \times 3}{3\sqrt{3}} = \frac{2}{\sqrt{3}} \times \frac{2}{2} = \frac{4}{2\sqrt{3}} = \frac{4}{\sqrt{12}}$

C Incorrect

D $\frac{2}{\sqrt{3}} \times \frac{2}{2} = \frac{4}{2\sqrt{3}} = \frac{4}{\sqrt{12}}t$

QUESTION 14

Answer: (D)

$2; 4; 6; 10; 10$

Mean = 6.4

SD = 3.2

$6; 8; 10; 14; 14$

Mean = 10.4

SD = 3.2

Mean will increase with 4 and SD will stay the same

QUESTION 15

Answer: (A)

$2^x 5^y = 2^3 \times 2^8 \times 5^8$
$2^x 5^y = 2^{11} \times 5^8$
$\therefore \; x = 11 \; and \; y = 8$
$\therefore \; x - y = \mathbf{3}$

QUESTION 16

Answer: (B)

$A\hat{C}D = 30° \; (isos \; \Delta)$

$$\frac{AC}{sin120°} = \frac{10}{sin30°}$$

$$AC = \frac{sin60°.10}{sin30°}$$

$$AC = \frac{\frac{\sqrt{3}}{2}.10}{\frac{1}{2}}$$

$$AC = 10\sqrt{3}$$

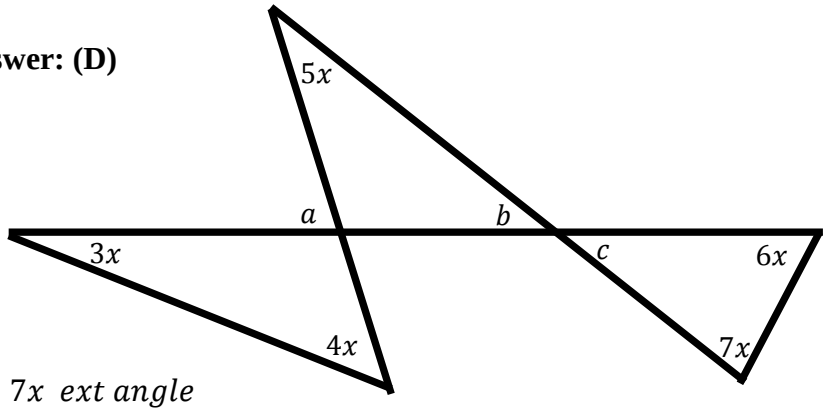
QUESTION 17

Answer: (C)

$$x^2 - 9 = x + 3$$
$$x^2 - x - 12 = 0$$
$$(x + 3)(x - 4) = 0$$
$$\boldsymbol{x = -3 \text{ or } x = 4}$$

QUESTION 18

Answer: (D)



$a = 7x \ \ ext\ angle$
$b = 2x \ \ ext\ angle$
$c = 2x \ \ vert\ opp\ angles$
$2x + 6x + 7x = 180° \ \ angle\ sum\ \Delta$
$\boldsymbol{x = 12°}$

QUESTION 19

Answer: (C)

$f(1) = 9\left(\frac{4}{3}\right)^1 = 12 \qquad f(0) = 9\left(\frac{4}{3}\right)^0 = 9$

QUESTION 20

Answer: (D)

$\hat{C}B = 90°(\angle\ in\ semi\ circle)$

$A\hat{B}C = 60°(int\ \angle's\ of\ \Delta)$

$D\hat{A}C = 60°(\tan\ chord\ theorem)$

$DA = DC(tangents\ from\ common\ pt)$

$D\hat{C}A = 60°(= \angle's\ opp = sides)$

$\boldsymbol{A\hat{D}C = 60°}(int\ \angle's\ of\ triangle)$

QUESTION 21

Answer: (C)

$$= \frac{\frac{a}{b} - \frac{b}{a}}{\frac{1}{a} + \frac{1}{b}}$$

$$= \frac{\frac{a^2 - b^2}{ab}}{\frac{b + a}{ab}}$$

$$= \frac{(a + b)(a - b)}{(b + a)}$$

$$= \boldsymbol{a - b}$$

QUESTION 22

Answer: (D)

$DO = OC(radii)$

$O\hat{D}C = O\hat{C}D\ (= \angle's\ opp = sides)$

$C\hat{D}B = C\hat{B}D = \frac{180° - 110°}{2} = 35°$ (int $\angle's$ of triangle)

$\hat{A} + \hat{C} = 180°\ (opp\ angles\ of\ cyclic\ quad)$

$\hat{A} = 180° - 65° - 35°$

$\hat{A} = 80°$

QUESTION 23

Answer: (B)

From the graph we have:

$(x + 1)(x - 4) \leq 0$

$x^2 - 3x - 4 \leq 0$

$x^2 \leq 3x + 4$

$\boldsymbol{3x + 4 \geq x^2}$

QUESTION 24

Answer: (B)

Amplitude is 3
Cosine graph moved to the right by 20°.
$f(x) = \mathbf{3}\cos(x + (-\mathbf{20}°))$
Sine graph reflected around the *x-axis* and amplitude is 1, thus $\boldsymbol{c = -1}$

QUESTION 25

Answer: (B)

Long method: Solve the quadratic equation to get roots equal to 8 and 1. Substitute either of them into the expression.

Short method: The expression becomes: $x^2 - 9x + 20$
Which can be written as: $(x^2 - 9x + 8) + 12$
Which $= \mathbf{12}$ since $x^2 - 9x + 8 = 0$

QUESTION 26

Answer: (D)

$2cos^2x + cosx - 1 = 0$

$(cosx + 1)(2cosx - 1) = 0$

$cosx = -1 \; or \; cosx = \frac{1}{2}$

$x = 180° + K.360°$

$x = 60° + K.360°$

$x = 300° + K.360°$

QUESTION 27

Answer: (A)

$\frac{f(x+1)}{f(x)+2} = \frac{2(x+1)}{2x+2} = 1$

QUESTION 28

Answer: (D)

Here $f(x) \leq g(x)$ and $f(x) \leq 0$ and $g(x) \geq 0$.

QUESTION 29

Answer: (A)

$g(x) = f(-x) = \frac{-3}{(-x)+2} - 5 \ = \frac{3}{x-2} - 5$

QUESTION 30

Answer: (D)

Equilateral triangle ABC thus all angles are $60°$

$$area = \frac{1}{2}.8.8.sin60°$$

$$= 32.\frac{\sqrt{3}}{2}$$

$$= 16\sqrt{3}$$

QUESTION 31

Answer: (A)

B Compound interest must be multiplied rather than added

C This is the return on two separate amounts of R10 000 being invested.

D Only the compound interest must be multiplied, not the capital invested.

QUESTION 32

Answer: (D)

$tan\theta = \frac{-1}{\sqrt{3}}$

$\theta = 30°$

$B\hat{A}C = 180° - 45°(vert\ opp\ angles) - 30°$ $(\boldsymbol{Int.angles\ of}\ \Delta)$

$B\hat{A}C = 105°$

QUESTION 33

Answer: (D)

$f(x) = \frac{(x+1)+2}{x+1}$

$= 1 + \frac{2}{x+1}$ So vertical asymptote at $x = -1$ and horizontal asymptote at $y = 1$

QUESTION 34

Answer: (C)

$B\left(\frac{-1+5}{2}; \frac{2+18}{2}\right) \qquad B(2; 10)$

$BS = \sqrt{(5-2)^2 + (10-10)^2}$

$BS = 3$

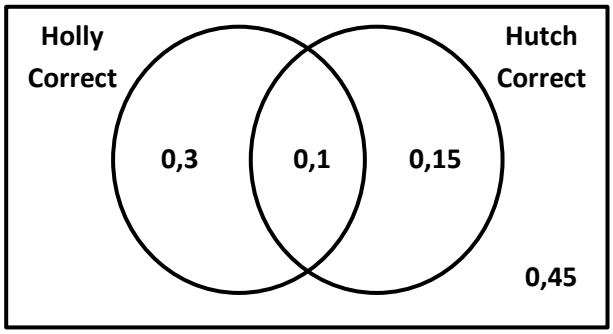
$\frac{TB}{BS} = \frac{3}{2} \qquad \frac{TB}{3} = \frac{3}{2} \qquad \boldsymbol{TB = \frac{9}{2}}$

QUESTION 35

Answer: (C)

The events are independent, so
$P(Holly\ correct) \times P(Hutch\ correct) = 0{,}4 \times 0{,}25 = 0{,}1$

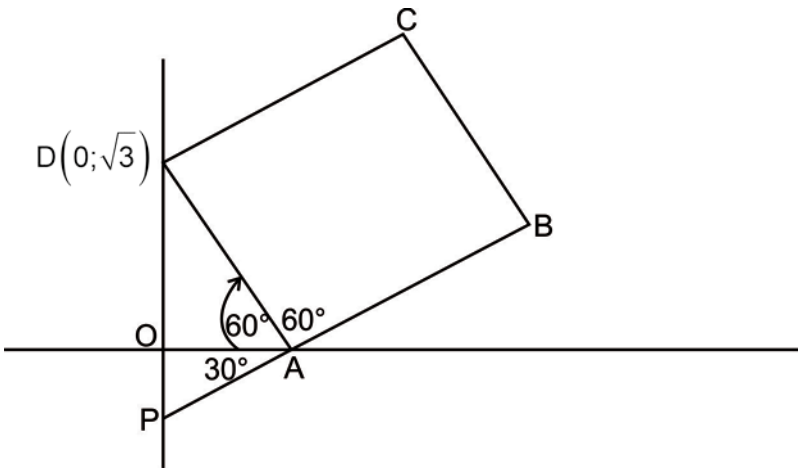
This results in the following Venn Diagram:



The probability that only one of them gets it correct is: $0{,}3 + 0{,}15 = \mathbf{0{,}45}$

QUESTION 36

Answer: (A)



$tan60° = \frac{\sqrt{3}}{OA}$ $P\hat{A}O = 30°$ (*angles on a straight line*) PD = $\sqrt{3} + \frac{1}{\sqrt{3}}$

$\sqrt{3}.OA = \sqrt{3}$ $tan30° = \frac{OP}{1}$ PD = $\frac{4}{\sqrt{3}}$

$OA = 1$ $\frac{1}{\sqrt{3}} = OP$

QUESTION 37

Answer: (B)

Expanding the two expressions and setting them equal to each other:

$f(x) = g(x)$
$a(x^2 - 4x + 4) + c = 2x^2 - (5 + 2b)x + 5b$
$ax^2 - 4ax + (4 + c) = 2x^2 - (5 + 2b)x + 5b$

$\therefore a = 2$
$4a = 5 + 2b$
$4(2) = 5 + 2b$
$\boldsymbol{b = \frac{3}{2}}$

QUESTION 38

Answer: (A)

$E\hat{C}G = D\hat{E}C$ $(alt\ angles\ \ CG//DE)$

$C\hat{E}G = 120°$ $(int\ angles\ of\ triangle)$

$E\hat{D}C = 120°$ $(Tan\ chord\ theorem)$

$C\hat{B}E = 60°$ $(opp.angle\ of\ cyclic\ quad)$

$E\hat{B}A = 28°$ $(angles\ in\ same\ segment)$

$C\hat{B}A = 88°$

QUESTION 39

Answer: (B)

	$\boldsymbol{T_1}$		$\boldsymbol{T_2}$		$\boldsymbol{T_3}$		$\boldsymbol{T_4}$		$\boldsymbol{T_5}$
	1		3		x		1		y
1st diff		2		$x-3$		$1-x$		$y-1$	
2nd diff			$x-5$		$4-2x$		$x+y-2$		

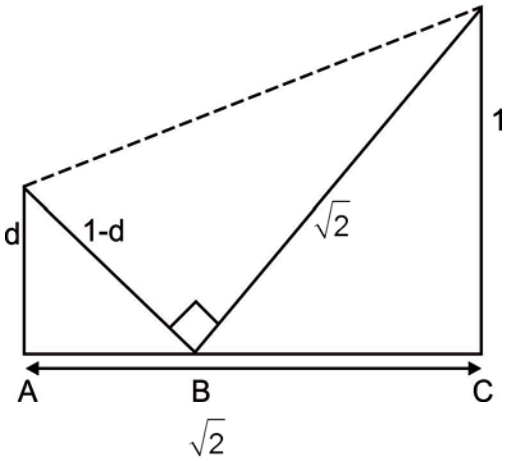
$x - 5 = 4 - 2x$
$x = 3$

$x - 5 = x + y - 2$
$y = -3$

$\boldsymbol{T_3 + T_5 = x + y = 0}$

QUESTION 40

Answer: (B)



$BC^2 = \left(\sqrt{2}\right)^2 - 1$

$BC = \sqrt{2-1}$

$BC = 1$

$AB = \sqrt{2} - 1$

$\left(\sqrt{2}-1\right)^2 + (d)^2 = (1-d)^2$

$2 - 2\sqrt{2} + 1 + d^2 = 1 - 2d + d^2$

$2 - 2\sqrt{2} = -2d$

$-1 + \sqrt{2} = d$