



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

## SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD

FEMSSISA

(SAJMO)

GRADE EIGHT

ROUND ONE

DATE: 29 JULY - 2 AUGUST 2019

TIME: 90 MINUTES

### Instructions:

1. This booklet has 20 multiple choice questions.
2. Use the answer sheet provided.  
Circle the letter corresponding to your answer.
3. All working details must be done in the space provided.
3. Calculators are not permitted.
4. Diagrams are not necessarily drawn to scale.
5. The first 15 problems carry one mark each and the next 5 carry 2 marks each.  
In order to qualify for the final round you need 7 out of 25 marks.
6. You have 90 minutes for the paper which works out to an average of 4.5 minutes per question.
7. Read the questions carefully before answering.
8. Visit the website: [www.femssisa.org.za](http://www.femssisa.org.za)

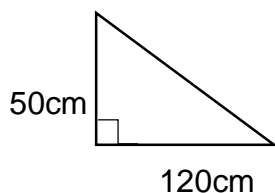


NON PROFIT COMPANY  
REGISTRATION NO: 2015/050119/08



**Grade Eight Mathematics Olympiad 2019**

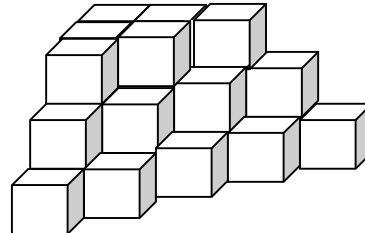
1. What is the value of  $:20 \times 19 - 19 \times 18 - 19 \times 2$  ?  
(A) 8            (B) 6            (C) 4            (D) 2            (E) 0
2. What is 24% of R3000 + 36% of R3000?  
(A) R1400    (B) R1600    (C) R1800    (D) R2000    (E) R2200
3. If  $\frac{5}{9}$  of the cans produced by a manufacturer is 3000 then find what is  $\frac{2}{3}$  of the number of the cans?  
(A) 3600    (B) 388    (C) 402    (D) 406    (E) 410
4. The complement of an angle is  $36^\circ$ . What is  $200^\circ$  – the supplement of the angle?  
(A)  $28^\circ$     (B)  $48^\circ$     (C)  $56^\circ$     (D)  $74^\circ$     (E)  $108^\circ$
5. Which one of the following is an irrational number?  
(A)  $\frac{1}{2}$     (B)  $\frac{-3}{4}$     (C)  $\frac{-7}{3}$     (D)  $\frac{\sqrt{3}}{2}$     (E)  $\sqrt{25}$
6. The value of  $(4n-3)(3-4n)$  when  $n = -4$   
(A) -361    (B) 361    (C) 160    (D) -84    (E) 90
7. Determine the perimeter of the triangular bracket in cm.



- (A) 240    (B) 300    (C) 320    (D) 340    (E) 360
8. For what values of n will  $6723n$  is divisible by 18?  
(A) 8    (B) 6    (C) 4    (D) 2    (E) 0
  9. If 9 August falls on Friday in 2019 then in which earliest year will 9 August fall on a Friday again?  
(A) 2020    (B) 2021    (C) 2022    (D) 2024    (E) 2026
  10. Which one of the numbers is a term of the sequence?  
7; 13; 19; 25; .....

(A) 193    (B) 194    (C) 195    (D) 196    (E) 197

11. The LCM of 2 numbers which are in the ratio 3:5 is 120. Find the sum of the 2 numbers.  
 (A) 56      (B) 60      (C) 64      (D) 68      (E) 72
12. Identical cubes are stacked in the corner as shown. How many cubes must be added to form one large 4 by 4 by 4 cube?  
 (A) 32      (B) 33      (C) 34      (D) 35      (E) 36



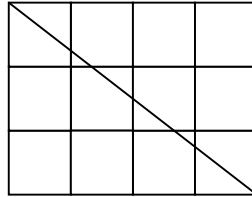
13. Consider the following sequence:-

1  
 3    5  
 7    9    11  
 .....

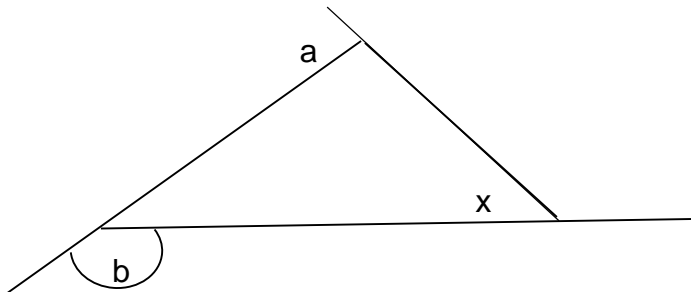
What is the 5<sup>th</sup> number of the 22<sup>nd</sup> row?

- (A) 377      (B) 399      (C) 417      (D) 439      (E) 471.
14. Consider this operation on two numbers a and b.  
 $5@3 = 4$   
 $7@2 = 25$   
 $7@3 = 16$   
 What is the value of  $18@(5@1)$ ?  
 (A) 8      (B) -6      (C) 6      (D) 4      (E) -4.
15. The sum of 3 whole numbers is equal to 60. What is the greatest possible product of these 3 numbers?  
 (A) 6 000      (B) 8 000      (C) 10 000      (D) 12 000      (E) 14 000
16. 27 equal size matchsticks are used to form triangles.  
 What is the highest number of triangles that can be formed using all the matchsticks each time?  
 (A) 19      (B) 8      (C) 9      (D) 10      (E) 11

17. The rectangle is divided into equal squares. The diagonal passes through 6 squares of this rectangle. If the rectangle has length  $(t+5)$  units and the width of  $y$  units then determine  $y$  in terms of  $t$  if the diagonal passes through  $(2t + 6)$  squares.



- (A)  $t - 1$       (B)  $t + 1$       (C)  $t + 2$       (D)  $2t + 1$       (E)  $2t - 1$
18. A train 300 metre long passes through a tunnel  $d$  km long. The train travels at a speed of 90km per hour. If the train takes 90 seconds to travel through the tunnel then the value of ' $d$ ' is.....
- (A) 1.75      (B) 1.80      (C) 1.85      (D) 1.95      (E) 2.00
19. Find the value of  $x$  if  $a + b = 250^\circ$  and all the sides of the triangle are produced.



- (A)  $70^\circ$       (B)  $65^\circ$       (C)  $60^\circ$       (D)  $55^\circ$       (E)  $50^\circ$
20. Two numbers from a set of natural numbers from 9 to 27 (19 consecutive numbers) are selected such that the sum is always divisible by 9. What is the least number of numbers that must be removed such that no two numbers is divisible by 9?
- (A) 13      (B) 12      (C) 11      (D) 10      (E) 9

MARKS: 1-15:  $15 \times 1 = 15$

16-20:  $5 \times 2 = 10$

TOTAL: 25



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

## SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD

FEMSSISA  
(SAJMO)  
GRADE NINE  
ROUND ONE

DATE: 29 JULY-2 AUGUST 2019

TIME: 90 MINUTES

### INSTRUCTIONS

1. This booklet has 20 multiple choice questions.
2. Use the answer sheet provided.  
Circle the letter corresponding to your answer.
3. All working details must be done in the space provided.
3. Calculators are not permitted.
4. Diagrams are not necessarily drawn to scale.
5. The first 15 problems carry one mark each and the next 5 carry 2 marks each.  
In order to qualify for the final round you need 7 out of 25 marks.
6. You have 90 minutes for the paper which works out to an average of 4.5 minutes per question.
7. Read the questions carefully before answering.
8. Visit the websites: [www.femssisa.org.za](http://www.femssisa.org.za) and [www.femssisa.org.za](http://www.femssisa.org.za)



NON PROFIT COMPANY  
REGISTRATION NO: 2015/050119/08



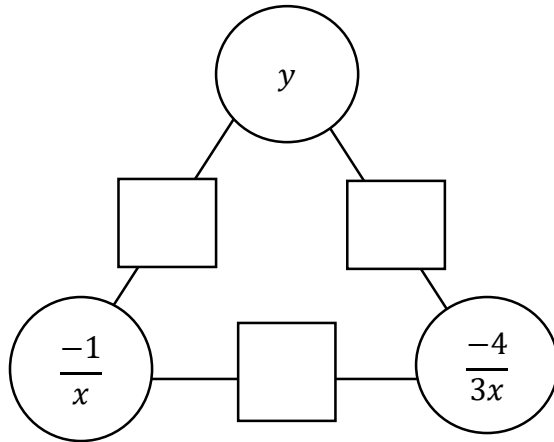
**Grade Nine Mathematics Olympiad 2019**

1. Find the value of  $2 \div (0.1)^2$   
(A) 160      (B) 180      (C) 200      (D) 220      (E) 240
2. Justin beat his 100 m record by 0.06 seconds. If his record was 9.84 seconds then what is his new record in seconds?  
(A) 9.78      (B) 9.79      (C) 9.80      (D) 9.81      (E) 9.82
3. If 80% of the items manufactured is 4000 then what is 30% of the items is.....?  
(A) 2000      (B) 1800      (C) 1700      (D) 1600      (E) 1500
4. If 21 March fell on Thursday in 2019, then in which earliest year will 21 March fall on a Thursday again?  
(A) 2030      (B) 2028      (C) 2026      (D) 2024      (E) 2022
5. How many perfect square natural numbers lie between 50 and 150 ?  
(A) 4      (B) 5      (C) 6      (D) 7      (E) 8
6. Write down the value of  $a \times b$  if  $10x^2 - 6x = a(5x - b)$   
(A)  $4x$       (B)  $5x$       (C)  $6x$       (D)  $-6x$       (E)  $-8x$
7. If  $2a = 3b$  and  $3a = 2c$  then  $c$  is equal to...  
(A)  $\frac{3b}{4}$       (B)  $\frac{9b}{4}$       (C)  $\frac{5b}{4}$       (D)  $\frac{4b}{3}$       (E)  $\frac{3}{4b}$
8. What is the minimum number of golf balls that can be divided equally among 6; 9 or 15 players ?  
(A) 210      (B) 180      (C) 150      (D) 120      (E) 90
9. The table below shows the relationship between  $x$  and  $y$  which is in the form  $y = mx + c$ . The equation is ...

x	-2	0	2
y	10	4	-2

- (A)  $y = -3x + 3$     (B)  $y = 3x + 4$     (C)  $y = -3x + 4$     (D)  $y = -3x$     (E)  $y = 3x + 2$

10.



In the above game the sum of the two expressions in the 2 circles gives the expression in the square between them. The sum of the expressions in the 3 squares is  $\frac{-5}{6x}$ . Determine  $y$  in terms of  $x$ .

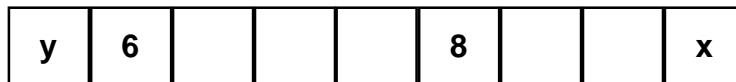
- (A)  $\frac{-1}{6x}$       (B)  $\frac{-7}{12x}$       (C)  $\frac{23}{12x}$       (D)  $\frac{1}{6x}$       (E)  $\frac{7}{12x}$

11. 120 football players were given numbers from 1 to 120. Every 3<sup>rd</sup> player received a football and every 5<sup>th</sup> player received a coaching video from a sports company.

How many football players received neither a football nor a coaching video?

- (A) 60      (B) 64      (C) 68      (D) 72      (E) 96

12. This unique 9 digit card is such that the sum of the digits in the 3 consecutive blocks is 23. Determine the value of  $(x - y)$ .



- (A) -2      (B) 2      (C) 1      (D) -1      (E) 0

13. The product of  $(3x + 2y)(9x^2 - 6xy + 4y^2)$  is ...

- (A)  $27x^3 + 8y^3$     (B)  $27x^3 - y^3$     (C)  $18x^3 + y^3$     (D)  $27x^3 - 12x^2y + 12xy^2 + 8y^2$     (E)  $27x^3$

14. The sum of four consecutive numbers is 'p'. The smallest number in terms of 'p' is...

- (A)  $\frac{p}{4}$       (B)  $\frac{p+2}{4}$       (C)  $\frac{p-6}{4}$       (D)  $\frac{p+6}{4}$       (E)  $\frac{2p-6}{4}$

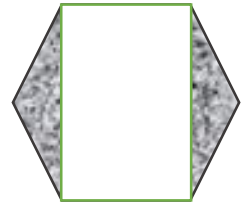
15. What is the value of :-

$$2^{224} \times 2^{223} - 2^{221} \times 2^{222} ?$$

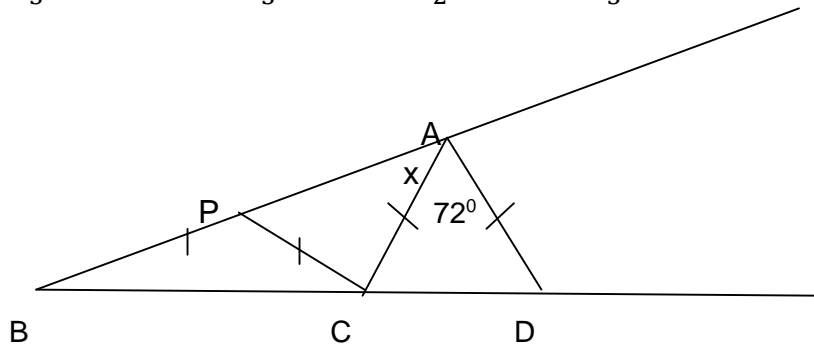
- (A) 8 200      (B) 8 400      (C) 8 860      (D) 8 880      (E) 8 890

16. If the area of the shaded region of a regular hexagon is  $2t \text{ cm}^2$  then determine  
 In terms of  $t$  the area of the non-shaded hexagon in  $\text{cm}^2$  is...

- (A)  $\frac{t+3}{3}$       (B)  $\frac{2t}{3}$       (C)  $\frac{3t}{2}$       (D)  $\frac{4t}{3}$       (E)  $\frac{5t}{2}$



17.



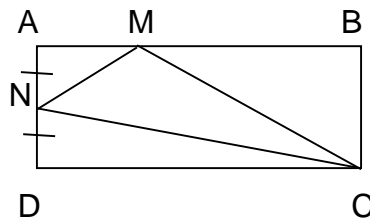
In the above figure  $PB = PC = AC = AD$ .  $\angle CAD = 72^\circ$   
 Determine the measurement of  $x$

- (A)  $18^\circ$       (B)  $30^\circ$       (C)  $36^\circ$       (D)  $48^\circ$       (E)  $54^\circ$

18. For what values of  $m$  will  $64m3m$  will this 5-digit number be divisible by 22?

- (A) 9      (B) 8      (C) 7      (D) 6      (E) 5

19. Rectangle ABCD has M on AB such that MB is twice AM. N is the midpoint of AD.  
 If the area of  $\triangle MNC = 12 \text{ cm}^2$  then find the area of ABCD in  $\text{cm}^2$ .



- (A) 24      (B) 27      (C) 30      (D) 33      (E) 36

20. Sarah used 4 different digits  $3; x; 6; y$  to make 2 digit numbers with different digits.  
 If the sum of all such 2 digit numbers is 825 then find  $x + y$

- (A) 20      (B) 19      (C) 18      (D) 17      (E) 16

MARKS: 1-15:  $15 \times 1 = 15$

16-20:  $5 \times 2 = 10$

TOTAL: 25





science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

## SOUTHERN AFRICAN SENIOR MATHEMATICS OLYMPIAD

FEMSSISA  
GRADE TEN  
ROUND ONE

DATE: 29 JULY-2 AUGUST 2019

TIME: 90 MINUTES

### INSTRUCTIONS

1. This booklet has 20 multiple choice questions.

2. Use the answer sheet provided.

Circle the letter corresponding to your answer.

3. All working details must be done in the space provided.

4. Calculators are not permitted.

5. Diagrams are not necessarily drawn to scale.

6. The first 15 problems carry one mark each and the next 5 carry 2 marks each.

In order to qualify for the final round you need 7 out of 25 marks.

7. You have 90 minutes for the paper which works out to an average of 4.5 minutes per question.

8. Read the questions carefully before answering.

9. Visit the websites: [www.femssisa.org.za](http://www.femssisa.org.za) and [www.femssisa.org.za](http://www.femssisa.org.za)



FEMSSISA

NON PROFIT COMPANY  
REGISTRATION NO: 2015/050119/08



Grade Ten Mathematics Olympiad 2019

- What is the value of  $4 \div (0.2)^2$   
 (A) 400 (B) 200 (C) 120 (D) 100 (E) 80
- If  $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$  and  $a = 3; b = -7; c = -6$  then value of  $x$  is ...  
 (A) 6 (B) -4 (C) -3 (D) 4 (E) 3
- If  $f(x) = 2x^2 - x$  then the simplification of  $\frac{f(x+h) - f(x)}{h}$  if  $h \neq 0$  is equal to ...  
 (A)  $4x + 2h - 1$  (B)  $4x + h$  (C)  $4x$  (D)  $4x + 2h + 1$  (E)  $4x + 3h - 1$
- What is the minimum number of muffins that can be shared equally among 24 ;32 or 56 people?  
 (A) 640 (B) 672 (C) 960 (D) 1 080 (E) 1 240

5. The table below shows the relationship between  $x$  and  $y$  which is in the form

$$y = \frac{a}{x+p} + q$$

$a + p + q$  is ... ..

x	-1	0	2
y	3	-3	-2

- (A) -3 (B) -4 (C) -5 (D) -7 (E) -8
- The equation of the line perpendicular to  $2x - 4y + 5 = 0$  and passing through  $P(1;-3)$  is...  
 (A)  $y = -2x$  (B)  $y = -2x + 2$  (C)  $y = 2x + 1$  (D)  $y = 2x$  (E)  $y = -2x - 1$
  - What is the units digit of  $6^{100} + 2^{303} - 5^{100}$ ?  
 (A) 7 (B) 8 (C) 9 (D) 10 (E) 11
  - Factorize  $(7x + 3)^2 - (2 - 3x)^2$   
 (A)  $(2x-9)(x+1)$  (B)  $(5x-9)(6x-1)$  (C)  $(5x-1)(x+5)$  (D)  $(4x+5)(10x+1)$  (E)  $(4x-1)(x+4)$
  - Candice is 4 years more than half of Desiree's age. In 6 year's time Candice will be 3 quarters of Desiree's present age. What is Desiree's age when Candice was born ?  
 (A) 22 (B) 20 (C) 18 (D) 16 (E) 14

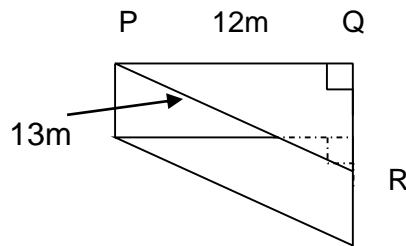
10. Two towns Edge and Fernwood are 90km apart. Two cars A and B leave Edge and Fernwood at the same time travelling in the same direction meet after 9 hours. If they travel in opposite direction at the same average speed they meet after  $\frac{9}{7}$  hours. Determine the speed of car A in km/h

- (A) 90      (B) 60      (C) 48      (D) 44      (E) 40

11. If  $27^{1+x} = t$  then write  $3^x$  in terms of t

- (A)  $\frac{\sqrt{t}}{3}$       (B)  $\frac{\sqrt[3]{t}}{3}$       (C)  $\frac{\sqrt[3]{t}}{2}$       (D)  $\frac{\sqrt[3]{t}}{4}$       (E)  $\frac{t}{3}$

12. A right triangular prism has PQ = 12m and PR = 13m and a uniform height of 6m. Determine the cost of painting the exterior at R40m<sup>2</sup>



- (A) R9 600      (B) R9 000      (C) R8 400      (D) R7 200      (E) R6 000

13. 5000 football tickets were sold at R60 and R40 each.

The revenue realized was R256000. How many R60 tickets were sold?

- (A) 3 600      (B) 3 000      (C) 2 800      (D) 2 600      (E) 2

14. Solve for x

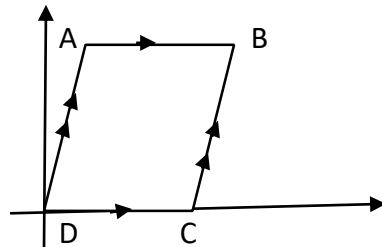
$$\frac{x+1}{7} = \frac{4}{2x+1}$$

- (A) -3 only      (B)  $-\frac{9}{2}$  only      (C) 3 only      (D)  $-\frac{9}{2}$  or  $x = 3$       (E)  $\frac{9}{2}$  or  $x = -3$

15. If  $T = 2\pi\sqrt{\frac{M}{K}}$  then  $K = \dots\dots\dots$

- (A)  $\frac{2M\pi^2}{T^2}$       (B)  $\frac{M\pi^2}{T^2}$       (C)  $\frac{4M\pi^2}{T}$       (D)  $\frac{4M\pi}{T^2}$       (E)  $\frac{4M\pi^2}{T^2}$

16.



ABCD is a parallelogram having equation of BC  $y = 4x - 24$  and DC at the origin. If the area of ABCD = 48cm<sup>2</sup> then determine the coordinates of A.

- (A) (2; 8)      (B) (2;6)      (C) (-2;8)      (D) (-2;6)      (E) (2;-8)

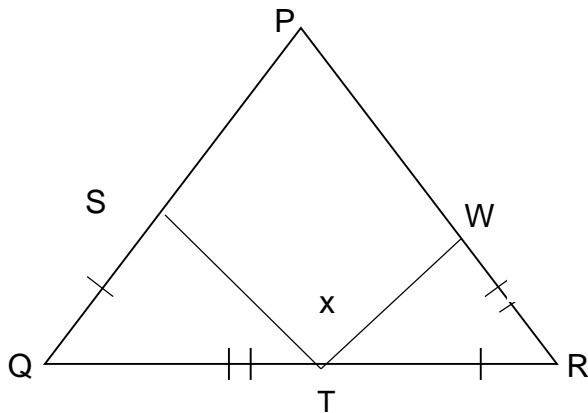
17. Solve for x

$$-3 \leq 7 - 2x \leq 5$$

- (A)  $-5 \leq x \leq 1$  (B)  $\frac{5}{3} \leq x \leq 5$  (C)  $1 \leq x \leq 5$  (D)  $-1 \leq x \leq 5$  (E)  $x \leq 5$

18. In the figure below PQR is a triangle. SQ = TR; QT = WR.  $\widehat{STW} = x$ .

If  $\widehat{P} = 84^\circ$  and PQ = PR then the value of x is ,,,,,



- (A)  $70^\circ$  (B)  $60^\circ$  (C)  $52^\circ$  (D)  $50^\circ$  (E)  $48^\circ$

19. An item was marked up by x % during a sale. One month later the article was marked down by 10% to bring it to its original price. Determine x

- (A)  $11\frac{4}{9}$  (B)  $11\frac{2}{9}$  (C)  $11\frac{1}{9}$  (D) 11 (E) 10

20. Four digit numbers are made from the digits 2; 4; 5; 6; 7 and 8. How many of these numbers (no digits are repeated) are divisible by 12?

- (A) 26 (B) 27 (C) 28 (D) 29 (E) 30

MARKS: 1-15: 15 X 1 = 15

16-20: 5 X 2 = 10

TOTAL: 25



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

## SOUTHERN AFRICAN SENIOR MATHEMATICS OLYMPIAD

FEMSSISA  
GRADE ELEVEN  
ROUND ONE

DATE: 29 JULY-2 AUGUST 2019

TIME: 90 MINUTES

### INSTRUCTIONS

1. This booklet has 20 multiple choice questions.

2. Use the answer sheet provided.

Circle the letter corresponding to your answer.

3. All working details must be done in the space provided.

4. Calculators are not permitted.

5. Diagrams are not necessarily drawn to scale.

6. The first 15 problems carry one mark each and the next 5 carry 2 marks each.

In order to qualify for the final round you need 7 out of 25 marks.

7. You have 90 minutes for the paper which works out to an average of 4.5 minutes per question.

8. Read the questions carefully before answering.

9. Visit the websites: [www.femssisa.org.za](http://www.femssisa.org.za) and [www.femssisa.org.za](http://www.femssisa.org.za)



NON PROFIT COMPANY  
REGISTRATION NO: 2015/050119/08



Grade Eleven Mathematics Olympiad 2019

1. What is the value of  $2. x^{\frac{5}{2}} = 64$

- (A) 1      (B) 2      (C) 4      (D) 8      (E) 16

2. If  $x = \frac{-b+\sqrt{b^2-4ac}}{2a}$  and  $y = \frac{-b-\sqrt{b^2-4ac}}{2a}$  then  $\frac{x.y}{3} = \dots$

- (A)  $\frac{c}{6a}$       (B)  $\frac{-c}{3a}$       (C)  $\frac{-c}{2a}$       (D)  $\frac{c}{3a}$       (E)  $\frac{c}{2a}$

3. If  $f(x) = (2 - x)(3 + x)$  then simplify  $\frac{f(x+h)-f(x)}{h}$ ;  $h \neq 0$

- (A)  $-2x - h - 1$     (B)  $-2x - 1$     (C)  $2x - h$     (D)  $-2x - 2h + 1$     (E)  $2x + 1$

4. If  $f(x) = ax^n$  then  $g(x) = nax^{n-1}$

Given  $f(x) = (4 - 3x)(4 + 3x)$  then  $g(x) = \dots\dots\dots$

- (A)  $18x - 12$     (B)  $-18x$     (C)  $18x$     (D)  $4x$     (E)  $8x$

5. Points A(-2; 0) ; B(0;  $\frac{-4}{3}$ ) and C(-1;-1) are on  $y = q + \frac{a}{x-p}$ . Write down  
The value of  $a+p+q$

- (A) 5      (B) -4      (C) 4      (D) -3      (E) 3

6. The equation of the line perpendicular to  $2y - x = 4$  and passing through P(-2;1) is...

- (A)  $y = -2x - 3$     (B)  $y = -2x + 3$     (C)  $2y = -2x - 3$     (D)  $2y = -2x - 2$     (E)  $2y = -2x + 1$

7. Solve for x

$$\frac{2x+1}{1-x} \leq 3$$

- (A)  $x \leq \frac{2}{5}$  or  $x > 1$     (B)  $x \leq \frac{2}{5}$     (C)  $x > -1$     (D)  $x > 1$       (E)  $x \leq \frac{-2}{5}$  or  $x > 1$

8. If  $xy = 3$  and  $x - 2y = 4$  then find the value of  $x^2 + 4y^2$

- (A) 40      (B) 36      (C) 32      (D) 28      (E) 24

9. Solve for k

$$k^2 + 2k - 2 = \frac{3}{k^2 + 2k}$$

- (A) -1 or 1 only (B) -1 or 1 or -3 only (C) -1 only (D) -1 only (E) 1 or 3 only

10. If  $\sin \theta = \cos \theta$  then  $2 \tan^2 \theta + \sin^2 \theta - 1 = \dots$

- (A) 0 (B) 1 (C)  $\frac{3}{2}$  (D) 3 (E)  $-\frac{3}{2}$

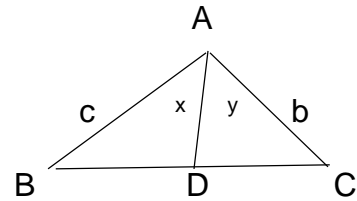
11. a and b are roots of the quadratic equation  $x^2 + px + 12 = 0$ . If  $a - b = 1$  then the value(s) of p is ...

- (A) 7 only (B) -7 only (C) 7 or -7 only (D) 3 (E) -1

12. Did you know? Area of  $\Delta ABC = \frac{1}{2}ab \cdot \sin C$

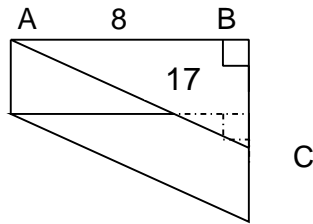
AD is the median of  $\Delta ABC$  with D on BC.

Which one of the following statements is true?



- (A)  $\frac{\sin x}{\sin y} = \frac{c}{b}$  (B)  $\frac{2\sin x}{\sin y} = \frac{b}{c}$  (C)  $\frac{\sin x}{2\sin y} = \frac{b}{c}$  (D)  $\frac{\sin x}{\sin y} = \frac{b}{c}$  (E)  $\frac{\sin y}{\sin x} = \frac{b}{c}$

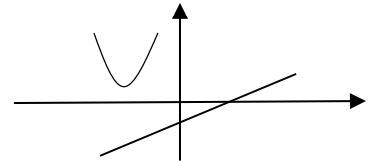
13. If the volume of the right triangular prism with height of h cm is  $720\text{cm}^2$  then find 'h' in cm



- (A) 11 (B) 12 (C) 13 (D) 14 (E) 15

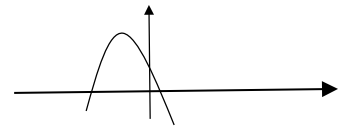
14. The graph of A alongside is defined by  $f:y = x^2 + 4x + 6$  and  $g:y = 2x - 4$

What is the minimum distance between f and g ?



- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

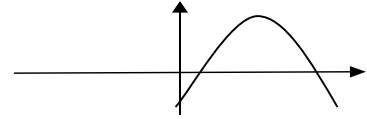
15. Which one of the following statements is true in respect of the parabola  $y = ax^2 + bx + c$



- (A)  $b^2 - 4ac \leq 0$  (B)  $\frac{b}{2a} < 0$  (C)  $c < 0$  (D)  $b^2 - 4ac > 0$  (E)  $a > 0$

16. R6500 was divided equally among a certain number of persons. If 15 more shared this amount then each one would receive R30 less. How many persons are in the initial group?  
 (A) 50 (B) 60 (C) 72 (D) -65 (E) -50

17. The graph B alongside is defined by  $y = -x^2 + 6x - 5$ .  
 The equation of the graph which is reflection of B about the X-axis and translated 2 units to the left is...



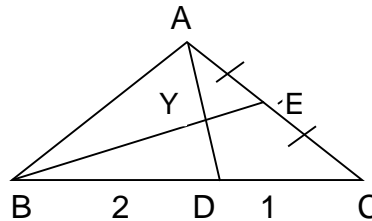
- (A)  $y = -x^2 + 2x$  (B)  $y = -x^2 + 2x$  (C)  $y = -x^2 - 4$  (D)  $y = -x^2 + 4$  (E)  $y = x^2 - 2x - 3$

18. What is the probability that 4 digit numbers formed from the following numbers are divisible by 18?

1; 2; 5; 6; 8; 9

- (A)  $\frac{11}{60}$  (B)  $\frac{1}{30}$  (C)  $\frac{6}{119}$  (D)  $\frac{1}{60}$  (E)  $\frac{17}{120}$

19. BE is a median and  $BD:DC = 2:1$   
 AD intersects BE at Y.



Determine the ratio EY:YB

- (A)  $\frac{1}{5}$  (B)  $\frac{1}{4}$  (C)  $\frac{3}{8}$  (D)  $\frac{5}{8}$  (E)  $\frac{9}{16}$
20. The coordinates of A; B and C of  $\Delta ABC$  are respectively  $(a; b + c)$ ;  $(a; b - c)$  and  $(-a; c)$ . The area of  $\Delta ABC$  is.....

- (A)  $ac$  (B)  $ab$  (C)  $2ac$  (D)  $2bc$  (E)  $2ab$

MARKS: 1-15:  $15 \times 1 = 15$   
 16-20:  $5 \times 2 = 10$   
 TOTAL: 25