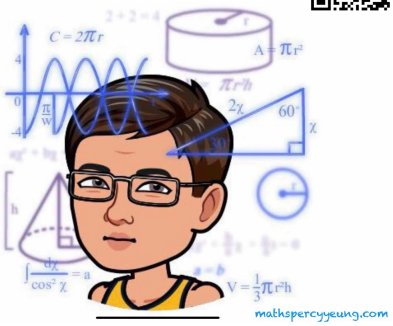
SY 20-21 F.3 Maths Final Exam Paper 2



Final Examination, 2020 – 2021
Mathematics Paper 2

Form 3

- **ANSWER ALL QUESTIONS**.
- The diagrams in this paper are not necessarily drawn to scale.
- Use **HB pencil** to mark your answers on your MC answer sheet.

Time allowed: 1 hour

1. $\left(2a^3\right)^3 =$

   A. $6a^6$. B. $8a^6$. C. $6a^9$. D. $8a^9$.

2. Solve $(1-2x \le 4)$ or $(x > -1.4)$.

   A. $x > -1.4$ B. $x \ge -1.5$
   C. $-1.5 \le x < -1.4$ D. x can be any real numbers

3. It is given that $A=(-2,-1)$ and $B=(22,k)$. If the slope of AB is $\frac{2}{3}$, find the value of k.

   A. 15 B. 16 C. 35 D. 36

4. $x^2-4x-12=$

   A. $(x-8)(x+4)$. B. $(x+8)(x-4)$.
   C. $(x+6)(x-2)$. D. $(x-6)(x+2)$.

5. Make b be the subject of $b=\frac{1-2b}{a}$.

   A. $b=\frac{1}{a+2}$ B. $b=\frac{-1}{a+2}$ C. $b=\frac{1}{a-2}$ D. $b=\frac{-1}{a-2}$

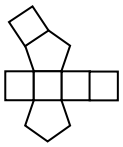
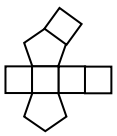
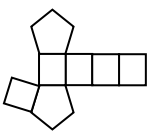
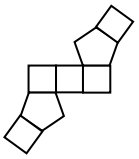
6. A polyhedron has 22 faces, 25 vertices and n edges. Find the value of n.

   A. 44 B. 45 C. 47 D. 49

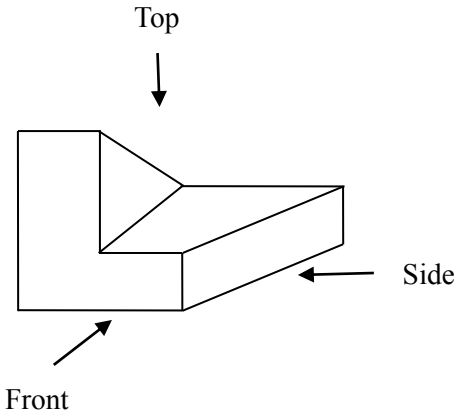
7. A sphere with radius 12 cm is melted and recast into 6 identical right cylinders of base radius 8 cm. Find the height of each cylinder.

   A. 1.5 cm B. 3 cm C. 6 cm D. 12 cm

8. Which of the following cannot be the net of a regular pentagonal prism?

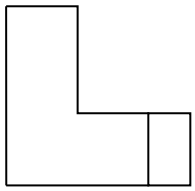
   A. 
   B. 
   C. 
   D. 

9.



Which of the following may be the top view of the solid above?

A.



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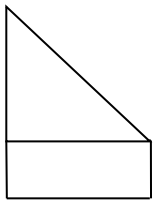
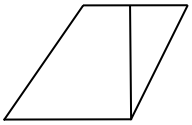
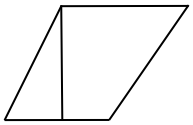


C.



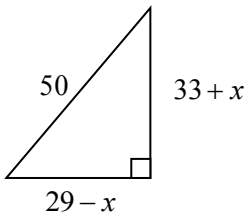
D.



10. A sum of \$10000 is deposited at 4% p.a., compounded quarterly. Find the interest, correct to 1 decimal place, after 2 years.

A. \$800.0 B. \$812.1 C. \$816.0 D. \$828.6

11. In the figure, $x =$
A. -2.
B. 15.
C. -2 or 15.
D. 15 or -19.



12. Which of the following is/are factor(s) of a^6+64?

I. a^2+4
II. a^3+8

A. I only B. II only C. I and II D. None of them

13. The frequency distribution table below show the weight of class 3F.

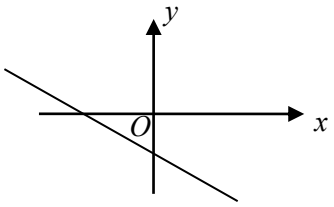
Weight(kg)	51-60	61-70	71-80	81-90
Frequency	9	15	4	2

The mean weight, correct to the nearest 0.1 kg, is

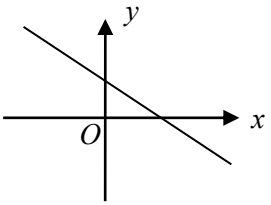
A. 64.7 kg. B. 65.2 kg. C. 69.7 kg. D. 70.5 kg.

14. If $k > 0$, which of the following may represent the graph of the straight line $x - y = k$?

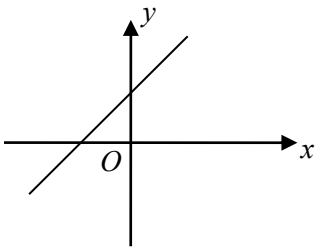
A.



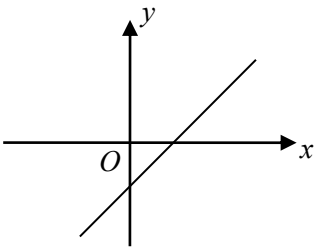
B.



C.



D.



15. Consider the following data set:

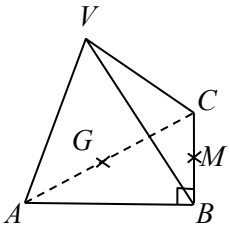
0, 0, 3, 3, 3, 8, 9, 10

Suppose one datum '0' is removed from the data set. Which of the following is correct?

I. The mean increases.
II. The mode remains unchanged.

A. I only B. II only C. I and II D. None of them

16. ABC is a triangle on the horizontal plane with $\angle ABC = 90^\circ$. It is given that G and M are mid-points of AC and BC respectively. If V is a point vertically above G and $VB = VC$, which of the following can represent the angle between plane ABC and plane VBC?



A. $\angle VBA$ B. $\angle VMG$

C. $\angle VBG$ D. $\angle VMA$

17. How many axes of rotational symmetry of order 3 are there in a cube?

A. 0 B. 2 C. 4 D. 6

18. It is given that $A = (0,4)$ and $B = (6,0)$. The equation of the perpendicular bisector of AB is

A. $2x - 3y = 0$. B. $2x + 3y - 12 = 0$.
C. $3x - 2y - 5 = 0$. D. $6x - 4y - 5 = 0$.

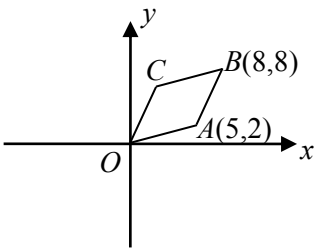
19. It is given that $x = y^2 z$. If y is decreased by 10% and z is increased by 25%, then x is

A. increased by 1.25%. B. increased by 5%.
C. increased by 15%. D. decreased by 5%.

20. $\left(\frac{1}{8}\right)^{-n} =$

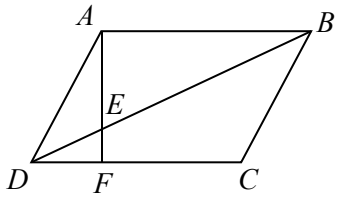
A. 4^{3n-2}. B. $4^{\frac{-3n}{2}}$. C. 4^{-3n-2}. D. $4^{\frac{3n}{2}}$.

21. In the figure, *OABC* is a parallelogram, find the length of *AC*.



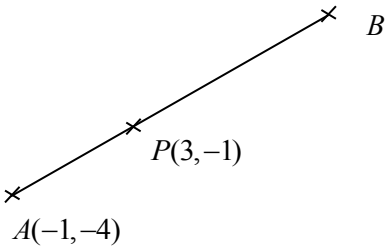
A. $2\sqrt{5}$ B. $\sqrt{29}$
C. $3\sqrt{5}$ D. $8\sqrt{2}$

22. In the figure, *ABCD* is a parallelogram. *F* lies on *DC* such that *DF* : *FC* = 1: 3 and *AF* cuts *BD* at *E*. It is given that the area of $\Delta ADE = 12\ \text{cm}^2$. The area of *ABCD* =



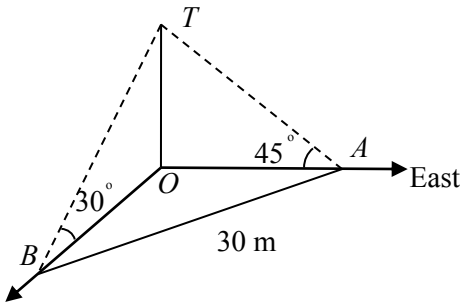
A. $48\ \text{cm}^2$. B. $60\ \text{cm}^2$.
C. $96\ \text{cm}^2$. D. $120\ \text{cm}^2$.

23. *APB* is a straight line and *PB* = 10. The coordinates of *B* are



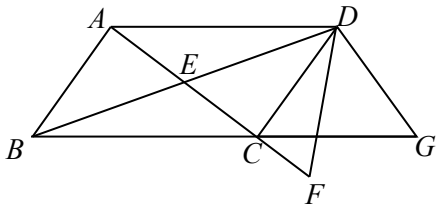
A. $(9,\ 7)$.
B. $(7,\ 2)$.
C. $(13,\ 9)$.
D. $(11,\ 5)$.

24. Amy and Betty walk due east and due south from *O* to reach point *A* and point *B* respectively, where *O*, *A* and *B* lie on the horizontal plane. *T* is a point vertically above *O*. The angle of elevation of *T* from *A* and *B* are 45° and 30° respectively. It is known that the *AB* = 30 m. Find the true bearing of *B* from *A*.



A. 210° B. 225°
C. 240° D. 255°

25. In the figure, *ABCD* is a parallelogram, *DEF* and *CDG* . are equilateral triangles. If *BED, BCG* and *AECF* are straight lines and $\angle CDF = \theta$, $\angle CBD =$



A. $\theta - 5^\circ$. B. θ.
C. $\theta + 5^\circ$. D. $\theta + 10^\circ$.

26. Consider the following data:

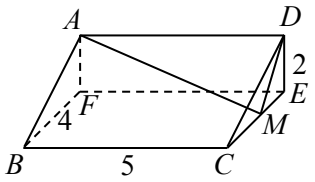
29, 22, 24, 24, 24, 25, 26, m, n

If the median and the mean of the above data are 25. Which of the following must be true?

I. $m+n=51$
II. $n \le 26$

A. I only B. II only C. I and II D. None of them

27. In the figure, $BCEF$ is a rectangle on the horizontal plane, AF and DE are vertical line segments with length 2. M is the mid-point of CE, $BF = 4$ and $BC = 5$. If the angle between the plane MAD and the plane $ABCD$ is θ, find θ correct to the nearest 0.1°



A. 18.4°. B. 26.6°.
C. 63.4°. D. 74.2°.

28. Which of the following sets of numbers cannot be the lengths of a triangle?

A. 3, 4 and 5 B. 6, 5 and 6 C. 11, 5 and 16 D. 17, 6 and 20

29. It is given that G is the orthocentre of ΔABC. Which of the following must be true?

I. G lies inside ΔABC.
II. The orthocentre of ΔABG is C.

A. I only B. II only C. I and II D. None of them

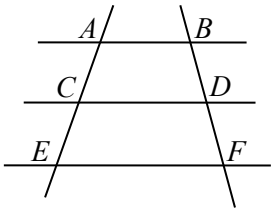
30. If $a < b < 0$, which of the following must be true?

I. $b > 2a$
II. $a^2 < b^2$

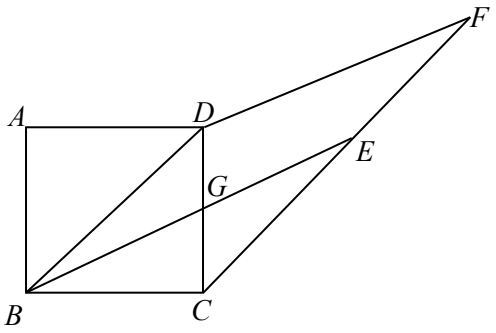
A. I only B. II only C. I and II D. None of them

31. In the figure, $AB//CD//EF$ and $AB : CD : EF = 2 : 3 : 4$.
Area of $ABCD$: Area of $CDEF$ =

A. 1 : 2. B. 9 : 16.
C. 5 : 7. D. 9 : 20.



32. In the figure, *ABCD* is a square, *BEFD* is a parallelogram and *G* is the mid-point of *CD*. If *CEF* and *BGE* are straight lines, which of the following must be true?



I. *BCED* is a parallelogram.
II. Area of *ABCD* = Area of *BEFD*.

A. I only B. II only
C. I and II D. None of them

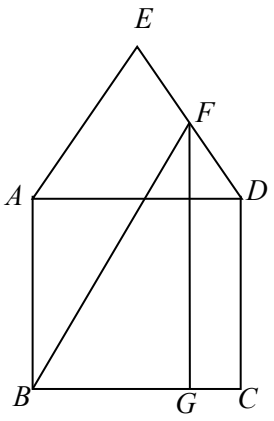
33. The sum of the total surface areas of two solid hemispheres is 675π cm^2. If the ratio of the radius of the smaller hemisphere to that of the larger hemisphere is 3 : 4, then the volume of the larger hemisphere is

A. 486π cm^3. B. 576π cm^3. C. 972π cm^3. D. 1152π cm^3.

34. Amy has 6 times the number of marbles that Bob has. If Amy give Bob 30 marbles, then Bob has more marbles than Amy. Find the maximum number of marbles they have in total.

A. 76 B. 77 C. 83 D. 84

35. In the figure, *ABCD* is a square of length 4 and *ADE* is an equilateral triangle. *F* is the point on *DE* such that *BF*//*AE*. *G* is a point on *BC* such that *FG*//*DC*. Find *FG*.



A. $2+2\sqrt{3}$
B. $3\sqrt{3}$
C. $4+\sqrt{2}$
D. $4+\sqrt{3}$

END OF PAPER