Secondary 3 Mathematics 1st Term Pre-exam
Multiple-choice Questions

Time allowed: 75 minutes

Total Mark: 40

Instructions:

1. *ANSWER ALL QUESTIONS. All answers should be marked on the Answer Sheet.*
2. *Note that you may only mark ONE answer to each question. Two or more answers will score no marks.*
3. *The diagrams in this paper are not necessarily drawn to scale.*

1. If $(-3, a) = (3b, 2)$, then
   A. $a = 2, b = 1$.
   B. $a = -2, b = 1$.
   C. $a = -2, b = -1$.
   D. $a = 2, b = -1$.

2. The number of significant figures in the number 66 000 (correct to the nearest hundred) is
   A. 2
   B. 3
   C. 4
   D. 5

3. Which of the following are like surds?
   A. $\sqrt{32}$, $\sqrt{48}$
   B. $\sqrt{12}$, $\sqrt{28}$
   C. $\sqrt{30}$, $\sqrt{60}$
   D. $\sqrt{45}$, $\sqrt{180}$

4. When θ is decreasing from $90°$ to $0°$, which of the following is / are correct?
   I. The value of $\sin\theta$ is increasing.
   II. The value of $\cos\theta$ is increasing.
   III. The value of $\tan\theta$ is increasing.
   A. I only.
   B. II only.
   C. III only.
   D. I and III only.

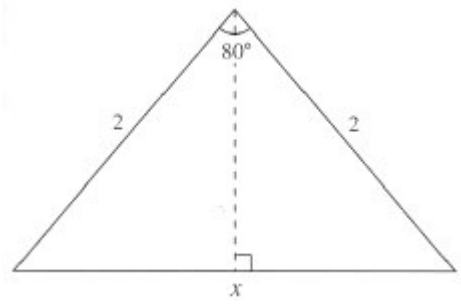
5. $(\sqrt{10}-\sqrt{6})^2=$

A. $4-2\sqrt{15}$
B. $4-4\sqrt{15}$
C. $16-2\sqrt{15}$
D. $16-4\sqrt{15}$

6. If θ is an acute angle, then the value of $1-\cos\theta$ is
A. between 0 and 1.
B. between –1 and 0.
C. between –1 and 1.
D. between 0 and 2.

7. How many significant figures are there in 0.001 370 30?
A. 3
B. 4
C. 5
D. 6

8. In the figure, x =



A. $4\sin 80°$
B. $4\sin 40°$
C. $2\cos 80°$
D. $4\cos 40°$

9. The arithmetic mean of five numbers 213, 231, x, 242 and 250 is x. Find the value of x.
A. 234
B. 234.5
C. 235
D. 235.5

10. The volume of a bottle of wine is measured as 500 mL correct to the nearest 20 mL. What is the relative error?
A. 0.25
B. 0.2
C. 0.04
D. 0.02

11. If the mean of the numbers 8, 5, 7, x and 13 is 10, find the median of these numbers.

A. 5

B. 6

C. 7

D. 8

E. 13

12. $\dfrac{1}{\sqrt{2}+\sqrt{3}} =$

A. $\sqrt{3}+\sqrt{2}$

B. $\sqrt{3}-\sqrt{2}$

C. $\sqrt{2}-\sqrt{3}$

D. $-\sqrt{3}-\sqrt{2}$

13. A wire is 5 cm long correct to the nearest cm. Which of the following cannot be the exact length of the wire?

A. 4.95 cm

B. 5.28 cm

C. 4.5 cm

D. 5.5 cm

14. Which of the following concerning the number 0.004 107 is true?

A. All the zeros are significant.

B. All the zeros are not significant.

C. The three zeros at the beginning are significant.

D. The zero between the digits 1 and 7 is significant.

15. The mean of 5 numbers is x. If each of the numbers is halved and then increased by 2, what is the new mean?

A. $\dfrac{x}{2}+1$

B. $\dfrac{x}{2}+2$

C. $\dfrac{x+1}{2}$

D. $\dfrac{2x+1}{2}$

16. Which of the following points lie(s) in the second quadrant?

I. (–3, 2)

II. (–2, 3)

III. (–3, –2)

A. I only.

B. II only.

C. I and II only.

D. II and III only.

17. Simplify $\sqrt{ab}(\sqrt{a}-\sqrt{b})^2$.

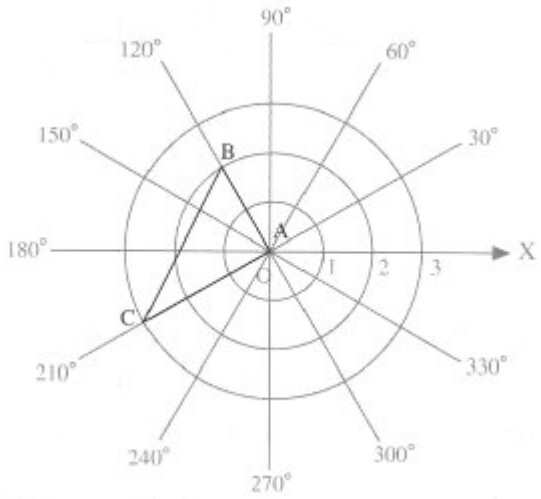
A. $(a-b)\sqrt{ab}$

B. $2a\sqrt{b}-2\sqrt{ab}$

C. $a^2b+ab^2-2a^3b^3$

D. $a\sqrt{ab}+b\sqrt{ab}-2ab$

18. The polar coordinates of the vertices A, B and C of ΔABC are (0, 0°), (2, 120°) and (3, 210°) respectively. Find the area of ΔABC.



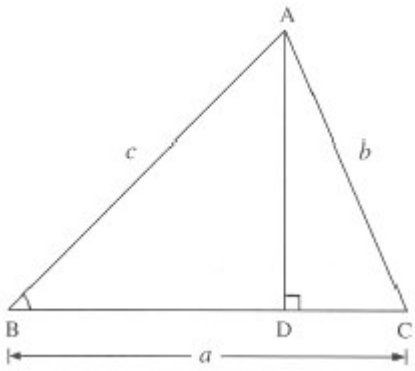
A. 2

B. 3

C. 6

D. 8

19. In the figure, the area of ΔABC is



A. $\frac{1}{2}ac\sin B$

B. $\frac{1}{2}bc\sin B$

C. $\frac{1}{2}ac\tan B$

D. $\frac{1}{2}ac\cos B$

20. A set of numbers is arranged in ascending order of magnitude: –10, –7, 0, x, 8, 9. If the median of the numbers is 2, find the value of x.

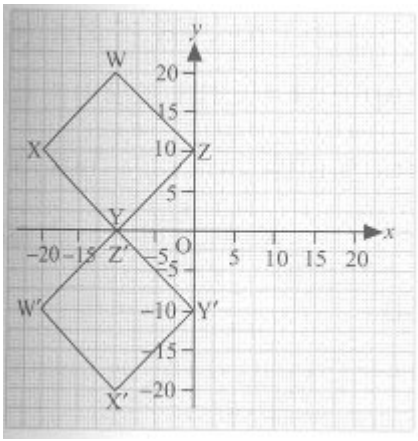
A. –2

B. 1

C. 2

D. 4

21. In the figure, rhombus WXYZ forms the image W'X'Y'Z' after transformation. Which of the following can represent the transformation?



A. $(x, y) \rightarrow (x, -y)$

B. $(x, y) \rightarrow (x, y - 20)$

C. $(x, y) \rightarrow (-y, x)$

D. $(x, y) \rightarrow (y, -x)$

22. Which of the following is incorrect?

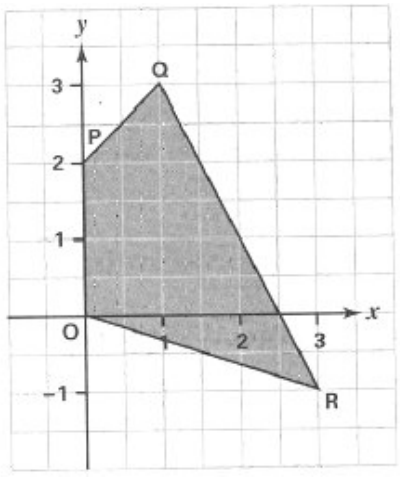
A. The median of the sample may not be related to that of the population.

B. The mean is the best representation of a given set of data in any situation.

C. The median is not affected by extreme values.

D. A set of data may have more than one mode.

23. Referring to the figure, the area of quadrilateral OPQR is



A. 12 sq. units

B. 10.5 sq. units

C. 8 sq. units

D. 6 sq. units

24. The image of a figure after translation T_1: $(x, y) \rightarrow (x + 4, y - 5)$ and then translation T_2 coincides with the original figure. Which of the following represents translation T_2?

A. $(x, y) \rightarrow (-x, -y)$

B. $(x, y) \rightarrow (x + 4, y - 5)$

C. $(x, y) \rightarrow (x + 5, y - 4)$

D. $(x, y) \rightarrow (x - 4, y + 5)$

25. Which of the following is not true?

I. The sum of a rational number and an irrational number must be irrational.

II. The product of a rational number and an irrational number must be irrational.

III. The sum of two irrational numbers must be irrational.

A. I only.

B. III only.

C. I and II only.

D. II and III only.

26. $\dfrac{\overbrace{a \times a \times a \times \ldots \times a}^{10}}{\underbrace{a + a + a + \ldots + a}_{10}} =$

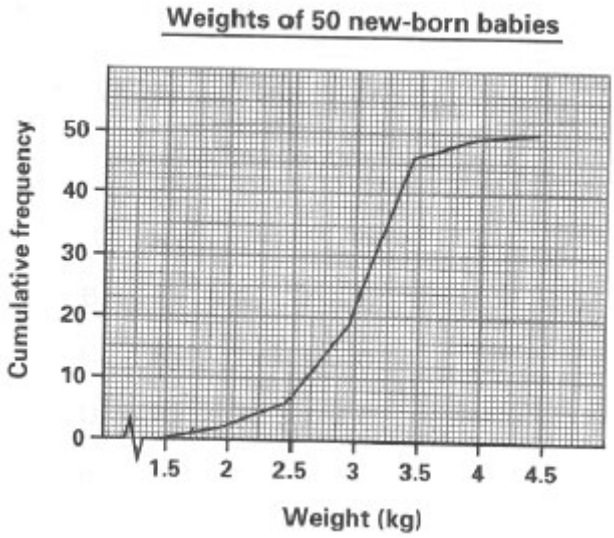
A. a^9

B. $\dfrac{a^9}{10}$

C. 5

D. 1

The weights of 50 new-born babies are represented by the following cumulative frequency polygon. According to the diagram, answer questions 27 and 28.



27. Find the median weight of the babies.

A. 2.85 kg

B. 2.95 kg

C. 3.05 kg

D. 3.2 kg

28. Find the modal class.

A. 2 kg – 2.4 kg

B. 2.4 kg – 2.9 kg

C. 3 kg – 3.4 kg

D. 3.5 kg – 3.9 kg

29. If $(\sqrt{2}+1)\sqrt{x}=3$, then x =

A. $3(\sqrt{2}-1)$

B. $3-2\sqrt{2}$

C. $3+2\sqrt{2}$

D. $27-18\sqrt{2}$

30. Which of the following have the same value of ECD_{16}?

A. 3804_8

B. 4062_8

C. 7315_8

D. 10357_8

31. The percentage error of the measurement of a building is 1%. If the height measured is 40 m, the absolute error is

A. 0.04 m

B. 0.4 m

C. 0.5 m

D. 2.5%

32. If $9^x = 27^4$, then x =

A. 3

B. 4

C. 6

D. 12

33. $(a^{-1}+b^{-1})^{-1}$ can be simplified as

A. $\frac{ab}{a+b}$

B. $\frac{a+b}{ab}$

C. $\frac{1}{a+b}$

D. ab

34. Which of the following expressions must be correct?

I. $x^6 \div [x^3 \div (-x)^2] = x^5$

II. $3y^4 - 2y^3 = y$

III. $(a^{n+1})^2 (a^2)^{n-1} = a^{4n}$

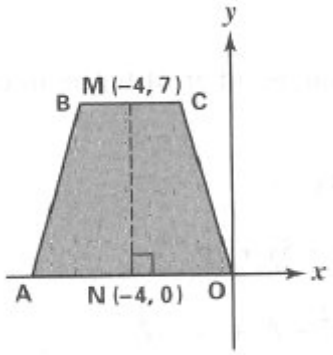
A. I only.

B. I and III only.

C. II and III only.

D. I and II only.

35. Referring to the given figure, MN is the perpendicular bisector of AO. If $BC = \frac{1}{2}AO$, what is the area of the trapezium ABCO?



A. 21 sq. units

B. 42 sq. units

C. 45 sq. units

D. 64 sq. units

36. $(x^{3x})(2x^{2x}) =$

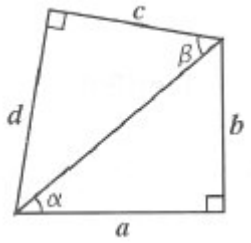
A. $(2x)^{6x}$

B. $2x^{6x}$

C. $(2x)^{5x}$

D. $2x^{5x}$

37. In the figure, if $\sin\alpha = \cos\beta$, then



A. $a = c$

B. $a = b$

C. $c = d$

D. $b = c$

38. Which of the following have the same value as 322333_4?

I. 7277_8

II. 111010111111_2

III. EBF_{16}

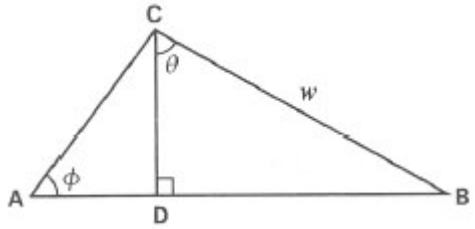
A. II only.

B. I and II only.

C. I and III only.

D. I, II and III.

39. In the figure, AD =



A. $\dfrac{w\cos\theta}{\sin\phi}$

B. $\dfrac{w\cos\theta}{\tan\phi}$

C. $w\sin\theta\tan\phi$

D. $w\sin\theta\sin\phi$

40. A side of a square is measured to be 10 cm. If the percentage error is 10%, between what limits does the area lie?

A. 100 cm^2 and 110 cm^2

B. 90 cm^2 and 110 cm^2

C. 81 cm^2 and 121 cm^2

D. 75 cm^2 and 125 cm^2

End of Paper