Myfuture CBC Revision

core mathematics - Grade 10

Question Paper

1. A vehicle starts at 8 m/s and accelerates uniformly at 2 m/s^2 for 5 s. What is its final speed?

A. 18 m/s

B. 5 m/s

C. 10 m/s

D. 8 m/s

2. A transformation maps triangle ABC to A'B'C' by a rotation. Which property must be true?

A. Angles at corresponding vertices are equal and corresponding sides are equal

B. Lengths AB and A'B' need not be equal

C. Orientation is reversed

D. Only the angles are preserved, sides may change

3. A circular window has radius 3 m. What is the area of the top quarter covered by a metal decoration?

A. 9/2 m²

B. 27/4 m²

C. 3/4 m²

D. 9/4 m²

4. What must be true about the coefficient b in ax^2 + bx + c if the parabola is symmetric about the y-axis?

A. b = 0

B. b = c

C. b = a

D. b = -a

5. You draw one ball from a bag containing 5 white and 5 black balls. You put the ball back and draw again. What is the probability both draws are white?

A. 1/4

B. 1/2

C. 1/10

D. 1/5

6. A train speeds up uniformly from 10 m/s to 30 m/s in 20 s. What is its acceleration?

A. 1 m/s^2

B. 10 m/s^2

C. 20 m/s^2

D. 0.5 m/s^2

7. Runner A completes 100 m in 12 s and Runner B completes 100 m in 10 s. Who has the greater average speed?

A. Runner B

B. They have same speed

C. Cannot determine without direction

D. Runner A

8. If a rotation matrix in the plane has determinant 1, what does this indicate about the transformation?

A. It reverses orientation

B. It preserves orientation and area (is a rotation or rotation+translation)

C. It scales areas by 2

D. It is a reflection

9. If a quadratic has roots 4 and -2, what is a possible quadratic equation with leading coefficient 1?

A. x^2 - 6x + 8 = 0

B. x^2 + 2x - 8 = 0

C. x^2 - 2x - 8 = 0

D. x^2 + 6x + 8 = 0

10. Which statement best distinguishes velocity from speed?

A. Speed is a vector quantity, velocity is scalar

B. Velocity measures distance only, speed includes direction

C. Speed is measured in metres, velocity in seconds

D. Velocity includes direction while speed does not

11. What is a rotation in geometry?

A. A transformation that flips a figure over a line

B. A transformation that turns a figure about a fixed point through a given angle

C. A transformation that changes the size of a figure but keeps angles the same

D. A transformation that slides every point of a figure the same distance in the same direction

12. A vehicle starting from rest reaches 30 m/s under constant acceleration of 3 m/s^2. How far did it travel? (Use v^2 = u^2 + 2as.)

A. 300 m

B. 150 m

C. 900 m

D. 75 m

13. A school has 3 boys and 2 girls on a committee. One student is chosen at random. What is the probability a girl is chosen?

A. 1/2

B. 1/5

C. 2/5

D. 3/5

14. On a distance–time graph, a straight line with constant positive slope indicates:

A. Changing direction

B. Constant speed

C. Increasing acceleration

D. Zero speed

15. In an experiment, probability of rain today is 0.4 and probability of rain tomorrow is 0.5. If events are independent, what is the probability it rains both days?

A. 0.9

B. 0.2

C. 0.45

D. 0.1

16. A student performs an experiment and finds that event A occurred in 30 out of 120 trials. What is the experimental probability of A?

A. 1/2

B. 1/4

C. 1/3

D. 1/5

17. What term is commonly used to describe negative acceleration (speed decreasing) in everyday language?

A. Acceleration

B. Jerk

C. Displacement

D. Deceleration

18. A car travels at a uniform speed of 60 km/h for 2 hours. What distance does it cover?

A. 120 km

B. 30 km

C. 90 km

D. 180 km

19. A car accelerates uniformly from rest to 20 m/s in 10 s. What is its acceleration?

A. 200 m/s^2

B. 10 m/s^2

C. 2 m/s^2

D. 0.5 m/s^2

20. If one root of 2x^2 - 3x + 1 = 0 is 1, what is the other root?

A. 2

B. 1/2

C. 3/2

D. -1

21. A matatu travels 150 km in 3 hours. What is its average speed?

A. 30 km/h

B. 45 km/h

C. 75 km/h

D. 50 km/h

22. The position of a particle is given by $s(t) = 3t^2 + 2t$ (s in metres, t in seconds). What is its velocity at t = 2 s?

A. 14 m/s

B. 10 m/s

C. 12 m/s

D. 8 m/s

23. Form a quadratic with leading coefficient 1 whose roots are 2 and 5.

A. x^2 + 3x - 10

B. x^2 - 7x + 10

C. x^2 + 7x + 10

D. x^2 - 3x + 10

24. Which of these quadratics has no real roots?

A. x^2 - 6x + 9

B. x^2 + 2x - 3

C. x^2 + 4x + 5

D. x^2 - 4x + 3

25. A chord of a circle of radius 20 cm has length 20 cm. Find the area of the corresponding minor segment.

A. 200/3 1003 cm²

B. 100/3 1003 cm²

C. 200 1003 cm²

D. 400/3 503 cm²

26. Which regular polygon has rotational symmetry of order 5?

A. Regular pentagon

B. Regular hexagon

C. Square

D. Equilateral triangle

27. Given the quadratic y = -x^2 + 4x + 5, what is the maximum value of y?

A. 9

B. 4

C. 5

D. 7

28. What is the smallest positive angle of rotation that maps a regular hexagon onto itself?

A. 45°

B. 120°

C. 60°

D. 90°

29. Find the area of a quarter circle whose diameter is 14 cm.

A. 196/4 cm²

B. 49/4 cm²

C. 49/2 cm²

D. 14 cm²

30. A student travels 30 km in 0.5 hours and then 45 km in 1.0 hour. What is the student's average speed for the whole trip?

A. 60 km/h

B. 30 km/h

C. 45 km/h

D. 50 km/h

31. On a distance-time graph, what does the slope of the line represent?

A. Speed

B. Acceleration

C. Time taken

D. Total distance

32. What is the sample space for tossing two coins once each?

A. H, T

B. HH, HT, TH, TT

C. H, H, T, T

D. HH, HT, TT

33. A runner goes 10 km east then 10 km west back to the start. What is the displacement?

A. 10 km east

B. 10 km west

C. 20 km

D. 0 km

34. If two events are independent, which formula gives P(A and B)?

A. P(A) / P(B)

B. P(A) P(B)

C. P(A) + P(B)

D. P(A) × P(B)

35. A car starts from rest and accelerates uniformly at 2 m/s² for 5 s. What is its final speed?

A. 5 m/s

B. 20 m/s

C. 2.5 m/s

D. 10 m/s

36. Which expression is equivalent to (x + 4)^2?

A. x^2 + 16x + 16

B. x^2 - 8x + 16

C. x^2 + 4x + 4

D. x^2 + 8x + 16

37. Convert 18 m/s to km/h.

A. 64.8 km/h

B. 18 km/h

C. 100 km/h

D. 6.48 km/h

38. A regular decagon (10 sides) is rotated by 36°. Which statement is true?

A. 36° maps it onto itself and it has order 10

B. 36° is not a symmetry rotation

C. Only 72° would map it onto itself

D. It has order 5

39. Which of these is the centre of rotation property?

A. Only points on the axis of reflection stay fixed

B. All points remain fixed

C. The centre moves to a new position after rotation

D. The centre of rotation remains fixed while other points move around it

40. What is the discriminant of $2x^2 - 4x + 1 = 0$, and what does it tell you about the roots?

A. Discriminant = 8; two distinct real roots

B. Discriminant = -8; two complex roots

C. Discriminant = 0; one repeated real root

D. Discriminant = 4; two equal real roots

41. A rectangle has length $(x + 3)$ and width $(x - 1)$. If its area is 15, which quadratic must be solved?

A. $x^2 + 2x + 3 = 0$

B. $x^2 + 2x - 3 = 15$

C. $x^2 - 2x - 3 = 0$

D. $x^2 + 2x - 3 = 0$

42. A bag contains 3 red balls and 2 blue balls. One ball is drawn at random. What is the probability it is blue?

A. 1/2

B. 1/5

C. 2/5

D. 3/5

43. A car moving at 20 m/s decelerates uniformly at 5 m/s² to a stop. How far does it travel before stopping?

A. 100 m

B. 10 m

C. 40 m

D. 20 m

44. An arc length is 7/3 cm on a circle of radius 7 cm. Find the area of the sector formed by this arc.

A. 7/3 cm²

B. 49/6 cm²

C. 49/3 cm²

D. 7/6 cm²

45. From a box of 6 blue and 4 red pens, two pens are taken without replacement. What is the probability both are red?

A. 2/10

B. 1/15

C. 3/15

D. 3/20

46. A stone is dropped from rest and falls with acceleration 2 m/s^2 for 5 s. How far does it fall (use $s = ut + 1/2\ at^2$)?

A. 25 m

B. 10 m

C. 5 m

D. 50 m

47. Point A is at (1, 0). After rotation about the origin it moves to (0, 1). What is the angle and direction of rotation?

A. 90° clockwise

B. 90° anticlockwise

C. 270° clockwise

D. 180° anticlockwise

48. A student walks 5 m east, then 3 m west. What is the student's displacement?

A. 2 m east

B. 8 m

C. 8 m east

D. 2 m west

49. An object starting from rest accelerates uniformly at 4 m/s². How long does it take to reach 20 m/s?

A. 8 s

B. 10 s

C. 5 s

D. 4 s

50. On a speed–time graph, the area under the curve between two times represents:

A. Slope of the distance–time graph

B. Acceleration

C. Distance travelled

D. Instantaneous speed