Mathsbase Exam Mini Mock 55 Minutes

1) Expand and simplify $(2x + 3)(x - 4)$. (2 marks)

Answer: _____

2) Factorize the expression $9x^2 - 4$. (3 marks)

Answer: _____

3) Solve the inequality $2x^2 + 5x - 3 > 0$. (4 marks)

Answer: _____

4) If $\sin\theta = 0.6$, find the value of $\cos\theta$. (2 marks)

Answer: _____

5) Given that $\sin\alpha = 3/5$, find the value of $\cos\alpha$. (3 marks)

Answer: _____

6) In a triangle, angle A is 60 degrees and angle B is 40 degrees. Find angle C. (2 marks)

Answer: _____

7) In a right-angled triangle ABC, where angle A = 30 degrees and the hypotenuse length is 8 cm, find the length of side BC. (4 marks)

Answer: _____

8) Two similar triangles have corresponding sides in the ratio 3:4. If the smaller triangle has a perimeter of 36 cm, find the perimeter of the larger triangle. (3 marks)

Answer: _____

9) A quantity increases by 20%, and then the increased quantity decreases by 10%. Find the overall percentage change. (2 marks)

Answer: _____

10) If the price of a product increased by 25% and then decreased by 20%, what is the overall percentage change in the price? (3 marks)

Answer: _____

11) Find the value of sin(60 degrees) + cos(30 degrees) - tan(45 degrees). (4 marks)

Answer: _____

12) Given a circle with radius 5 cm, find the length of an arc that subtends an angle of 45 degrees at the center of the circle. (3 marks)

Answer: _____

13) In a circle, if the measure of an arc is equal to one-fourth of the circumference, find the measure of the central angle. (4 marks)

Answer: _____

14) Given vector A = 2i + 3j and vector B = -3i + 5j, find the dot product of A and B. (3 marks)

Answer: _____

15) Given vector A = i + 2j - 3k and vector B = 2i + 3j + k, find the vector product of A and B. (4 marks)

Answer: _____

16) Expand and simplify (a + b)^3. (3 marks)

Answer: _____

17) Factorize the expression 16x^2 - 9y^2. (4 marks)

Answer: _____

18) Solve the quadratic inequality $x^2 - 4x + 3 > 0$. (3 marks)

Answer: _____

19) In triangle ABC, the lengths of the sides are a = 5 cm, b = 9 cm, and c = 12 cm. Determine whether the triangle is acute, obtuse or right-angled. (4 marks)

Answer: _____

20) In a quadrilateral ABCD, the angles are given as follows: ∠A = 70 degrees, ∠B = 100 degrees, ∠C = 80 degrees. Find the measure of ∠D. (3 marks)

Answer: _____

21) Given a parallelogram ABCD with side lengths AB = 6 cm and BC = 8 cm, find the length of the diagonal BD. (4 marks)

Answer: _____

22) In a kite-shaped figure ABCD, diagonals AC and BD intersect at point O. If ∠AOC = 120 degrees, find the measure of ∠BOC. (3 marks) Mark Scheme: 1) $(2x + 3)(x - 4) = 2x^2 - 5x - 12$ (1 mark per correct expansion term) 2) $9x^2 - 4 = (3x - 2)(3x + 2)$ (1 mark for correct factorization) 3) $x < -3/2$ or $x > 1/2$ (1 mark for each correct solution and correct

inequality sign) 4) $\cos\theta = \sqrt{(1 - \sin^2\theta)} = \sqrt{(1 - 0.6^2)} = \sqrt{(1 - 0.36)} = \sqrt{0.64} = 0.8$ (1 mark for correct calculation) 5) $\cos\alpha = \sqrt{(1 - \sin^2\alpha)} = \sqrt{(1 - (3/5)^2)} = \sqrt{(1 - 9/25)} = \sqrt{(25/25 - 9/25)} = \sqrt{(16/25)} = 4/5$ (1 mark for correct calculation) 6) Angle C = 180 - Angle A - Angle B = 180 - 60 - 40 = 80 degrees (1 mark for correct calculation) 7) BC = AB * sin(B) = 8 * sin(40 degrees) ≈ 5.13 cm (1 mark for correct calculation) 8) Perimeter of larger triangle = (4/3) * Perimeter of smaller triangle = (4/3) * 36 cm = 48 cm (1 mark for correct calculation) 9) Overall percentage change = (1 + 20/100) * (1 - 10/100) - 1 = 1.08 - 1 = 8% increase (1 mark for correct calculation) 10) Overall percentage change = 25% - 20% = 5% increase (1 mark for correct calculation) 11) sin(60 degrees) + cos(30 degrees) - tan(45 degrees) = $\sqrt{3}/2 + \sqrt{3}/2 - 1 = 2\sqrt{3}/2 - 1$ (1 mark for correct expression) 12) Length of arc = (angle/360) * $2\pi r$ = (45/360) * 2 * π * 5 cm ≈ $\pi/4$ * 5 cm ≈ 3.93 cm (1 mark for correct calculation) 13) Measure of central angle = (arc length/circumference) * 360 = (1/4) * 360 = 90 degrees (1 mark for correct calculation) 14) Dot product of A and B = 2*(-3) + 3*5 = -6 + 15 = 9 (1 mark for correct calculation) 15) Vector product of A and B = (2i - 3k)*i + (2i - 3k)*2j + (2i - 3k)*k = 3i - 7j + 4k (1 mark for correct calculation) 16) $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ (1 mark for correct expansion terms) 17) $16x^2 - 9y^2 = (4x + 3y)(4x - 3y)$ (1 mark for correct factorization) 18) Solution: x < 1 or x > 3 (1 mark for each correct solution and correct inequality sign) 19) The Triangle ABC is obtuse-angled. (1 mark for correct classification and justification) 20) Angle ∠D = 360 degrees - (∠A + ∠B + ∠C) = 360 degrees - (70 + 100 + 80) = 110 degrees (1 mark for correct calculation) 21) Length of diagonal BD = $\sqrt{(AB^2 + BC^2)} = \sqrt{(6^2 + 8^2)} = \sqrt{(36 + 64)} = \sqrt{100} = 10$ cm (1 mark for correct calculation) 22) ∠BOC = 2 * ∠AOC = 2 * 120 degrees = 240 degrees (1 mark for correct calculation)

Answer: _____