

✈ ETIHAD AIRWAYS PILOT APTITUDE TEST

MATHEMATICS — PRACTICE PAPER

COMPASS System | 50 Questions | Time Allowed: 40 Minutes | No Calculator Permitted

INSTRUCTIONS

- 1. This paper contains 50 questions across 11 mathematical topics tested in the Etihad Airways COMPASS pilot aptitude assessment.
- 2. Select the one best answer from the four options (A, B, C, D) for each question.
- 3. No calculator is permitted. All calculations must be performed mentally or on rough paper.
- 4. Time allowed is 40 minutes. Aim to spend no more than 48 seconds per question.
- 5. Attempt all questions. There is no negative marking.
- 6. A full Answer Key with Explanations is provided at the end of this paper.

SECTION 1: Fractions & Percentages

Q1. An aircraft fuel tank holds 4,800 litres. After a flight, 37.5% of the fuel remains. How many litres remain?

- A) 1,600 L
- B) 1,800 L
- C) 2,000 L
- D) 3,000 L

Q2. Express $\frac{7}{8}$ as a percentage.

- A) 78.5%
- B) 87.5%
- C) 80.0%
- D) 75.0%

Q3. A pilot earns AED 45,000/month. He receives a 12% pay rise. What is his new monthly salary?

- A) AED 49,400
- B) AED 50,400
- C) AED 51,000
- D) AED 50,000

Q4. Simplify: $\frac{3}{4} + \frac{5}{6}$

- A) $\frac{8}{10}$
- B) $\frac{19}{12}$
- C) $\frac{17}{12}$
- D) $\frac{3}{2}$

Q5. A flight carries 280 passengers. 35% are business class. How many are in economy?

- A) 182
- B) 196
- C) 98
- D) 175

SECTION 2: Speed, Distance & Time

Q6. An aircraft travels at 480 knots for 2 hours 30 minutes. What distance does it cover?

- A) 960 NM
- B) 1,100 NM
- C) 1,200 NM
- D) 1,050 NM

Q7. A plane covers 1,750 km in 3.5 hours. What is its average speed?

- A) 450 km/h
- B) 475 km/h
- C) 500 km/h
- D) 525 km/h

Q8. Convert 250 knots to km/h. (1 knot = 1.852 km/h)

- A) 435 km/h
- B) 463 km/h
- C) 480 km/h
- D) 500 km/h

Q9. A flight from Abu Dhabi to London is 5,500 km. The aircraft flies at 880 km/h. How long is the flight?

- A) 5 h 45 min
- B) 6 h 15 min
- C) 6 h 30 min
- D) 7 h 00 min

Q10. An aircraft descends from 36,000 ft to 0 ft at a rate of 1,800 ft/min. How long does the descent take?

- A) 18 min
- B) 20 min
- C) 22 min
- D) 24 min

SECTION 3: Ratios & Scales

Q11. On a navigation chart, the scale is 1:500,000. A route measures 8 cm on the chart. What is the actual distance?

- A) 40 km
- B) 400 km
- C) 4 km
- D) 4,000 km

Q12. Fuel and oil are mixed in the ratio 7:1. If 56 litres of fuel are used, how much oil is needed?

- A) 6 L
- B) 7 L
- C) 8 L
- D) 9 L

Q13. Three crew members share a bonus of AED 12,600 in the ratio 3:2:1. What is the largest share?

- A) AED 4,200
- B) AED 5,600
- C) AED 6,300
- D) AED 7,000

Q14. If 5 engineers can service 15 aircraft in 3 days, how many aircraft can 8 engineers service in 3 days?

- A) 20
- B) 22
- C) 24
- D) 28

Q15. A map shows a runway as 6 cm long. The actual runway is 3 km. What is the map scale?

- A) 1:5,000
- B) 1:50,000
- C) 1:500,000
- D) 1:5,000,000

SECTION 4: Unit Conversions

Q16. Convert 15,000 feet to metres. (1 ft = 0.3048 m)

- A) 4,267 m
- B) 4,572 m
- C) 5,000 m
- D) 3,900 m

Q17. An aircraft weighs 75,000 kg. Convert this to pounds. (1 kg = 2.205 lb)

- A) 155,250 lb
- B) 162,000 lb
- C) 165,375 lb
- D) 170,000 lb

Q18. Convert 120°C to Fahrenheit. ($F = \frac{9}{5} \times C + 32$)

- A) 228°F
- B) 238°F
- C) 248°F
- D) 258°F

Q19. A fuel load of 18,000 lbs is required. Convert to kg. (1 lb = 0.4536 kg)

- A) 7,865 kg
- B) 8,165 kg

- C) 8,465 kg
- D) 8,765 kg

Q20. Convert 0.75 nautical miles to metres. (1 NM = 1,852 m)

- A) 1,200 m
- B) 1,389 m
- C) 1,500 m
- D) 1,852 m

SECTION 5: Powers, Roots & Surds

Q21. Calculate: 2^8

- A) 128
- B) 256
- C) 512
- D) 64

Q22. Simplify: $\sqrt{(144)} + \sqrt{(81)}$

- A) 20
- B) 21
- C) 22
- D) 23

Q23. What is $5^3 - 4^2$?

- A) 105
- B) 109
- C) 111
- D) 113

Q24. Evaluate: $(3^2)^3$

- A) 27
- B) 81
- C) 243
- D) 729

Q25. Simplify: $\sqrt{(0.0049)}$

- A) 0.007
- B) 0.07
- C) 0.7
- D) 0.049

SECTION 6: Areas, Volumes & Spaces

Q26. A rectangular aircraft hangar is 120 m long and 45 m wide. What is its floor area?

- A) 4,800 m²
- B) 5,200 m²
- C) 5,400 m²
- D) 6,000 m²

Q27. A cylindrical fuel tank has radius 2 m and height 5 m. What is its volume? ($\pi \approx 3.14$)

- A) 56.52 m³
- B) 62.8 m³
- C) 65.0 m³
- D) 70.0 m³

Q28. A triangular taxiway marking has base 6 m and height 4 m. What is its area?

- A) 10 m²
- B) 12 m²
- C) 14 m²
- D) 24 m²

Q29. The wingspan of an aircraft is 64 m. What is the radius of the circle swept by the wingtip?

- A) 16 m
- B) 32 m
- C) 64 m
- D) 128 m

Q30. A cargo container is $4\text{ m} \times 3\text{ m} \times 2.5\text{ m}$. What is its volume?

- A) 24 m^3
- B) 28 m^3
- C) 30 m^3
- D) 32 m^3

SECTION 7: Probability & Statistics

Q31. A bag contains 5 red, 3 blue and 2 green balls. What is the probability of picking a blue ball?

- A) $1/5$
- B) $3/10$
- C) $2/5$
- D) $1/3$

Q32. The scores of 5 cadets are: 72, 85, 91, 68, 79. What is the mean score?

- A) 77
- B) 78
- C) 79
- D) 80

Q33. A die is rolled twice. What is the probability of getting a 6 on both rolls?

- A) $1/6$
- B) $1/12$
- C) $1/36$
- D) $1/18$

Q34. Find the median of: 14, 22, 9, 31, 18, 27, 5

- A) 14
- B) 18
- C) 22
- D) 27

Q35. In a group of 200 pilots, 40% are captains. How many are First Officers?

- A) 80
- B) 100
- C) 120
- D) 140

SECTION 8: Algebraic Equations

Q36. Solve for x : $3x + 7 = 22$

- A) $x = 3$
- B) $x = 4$
- C) $x = 5$
- D) $x = 6$

Q37. If $2x - 4 = 3x + 1$, find x .

- A) $x = -5$
- B) $x = -3$
- C) $x = 3$
- D) $x = 5$

Q38. Solve: $x^2 - 9 = 0$

- A) $x = 3$ only
- B) $x = \pm 3$
- C) $x = 9$
- D) $x = \pm 9$

Q39. Simplify: $(5x^2 - 3x + 7) - (2x^2 + 4x - 5)$

- A) $3x^2 - 7x + 12$
- B) $3x^2 + x + 2$
- C) $7x^2 - 7x + 2$
- D) $3x^2 - 7x + 2$

Q40. If the area of a square is 196 cm^2 , what is the length of one side?

- A) 12 cm
- B) 13 cm

- C) 14 cm
- D) 16 cm

SECTION 9: Trigonometry

Q41. An aircraft climbs at an angle of 30° over a horizontal distance of 10 km. What is the altitude gained? ($\sin 30^\circ = 0.5$)

- A) 4 km
- B) 5 km
- C) 6 km
- D) 8 km

Q42. In a right triangle, the opposite side is 6 m and the hypotenuse is 10 m. What is $\sin \theta$?

- A) 0.4
- B) 0.5
- C) 0.6
- D) 0.8

Q43. What is $\cos 60^\circ$?

- A) 0
- B) 0.5
- C) $\sqrt{3}/2$
- D) 1

Q44. An aircraft is 8 km away horizontally and 6 km high. What is the straight-line distance to the aircraft?

- A) 9 km
- B) 10 km
- C) 11 km
- D) 14 km

Q45. What is $\tan 45^\circ$?

- A) 0
- B) 0.5

- C) 1
- D) $\sqrt{2}$

SECTION 10: Complex Operations

Q46. Calculate: $(48 \times 25) \div (16 \times 15)$

- A) 4
- B) 5
- C) 6
- D) 8

Q47. A pilot flies 3 sectors: 2h 20min, 1h 45min, and 3h 10min. What is the total flight time?

- A) 7h 05min
- B) 7h 10min
- C) 7h 15min
- D) 7h 20min

Q48. An aircraft burns 2,400 kg of fuel per hour. How much fuel is burned in 2h 45min?

- A) 5,800 kg
- B) 6,200 kg
- C) 6,600 kg
- D) 7,200 kg

SECTION 11: Word Problems

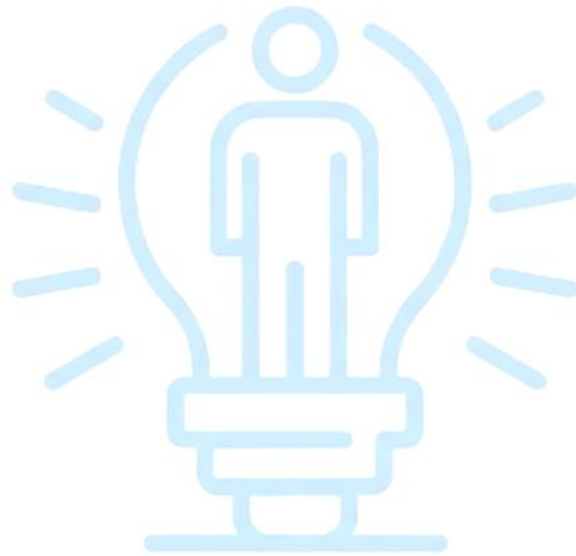
Q49. A cadet completes ground school in 18 weeks. He studies 6 days a week, 4 hours per day. How many total study hours does he complete?

- A) 388 h
- B) 408 h
- C) 432 h
- D) 456 h

Q50. An aircraft takes off at 08:45 and lands at 14:20 on the same day. The crew has a 35-minute stopover. What is the total airborne time?

- A) 4h 55min

- B) 5h 00min
- C) 5h 20min
- D) 5h 35min



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ANSWER KEY & EXPLANATIONS**SECTION 1: Fractions & Percentages**

Q1. An aircraft fuel tank holds 4,800 litres. After a flight, 37.5% of the fuel remains. How many litres remain?

✓ **Correct Answer: B) 1,800 L**

Explanation: $4,800 \times 0.375 = 1,800 \text{ L}$

Q2. Express $\frac{7}{8}$ as a percentage.

✓ **Correct Answer: B) 87.5%**

Explanation: $7 \div 8 = 0.875 \rightarrow 87.5\%$

Q3. A pilot earns AED 45,000/month. He receives a 12% pay rise. What is his new monthly salary?

✓ **Correct Answer: B) AED 50,400**

Explanation: $45,000 \times 1.12 = 50,400$

Q4. Simplify: $\frac{3}{4} + \frac{5}{6}$

✓ **Correct Answer: B) $\frac{19}{12}$**

Explanation: $LCM(4,6)=12 \rightarrow \frac{9}{12} + \frac{10}{12} = \frac{19}{12}$

Q5. A flight carries 280 passengers. 35% are business class. How many are in economy?

✓ **Correct Answer: A) 182**

Explanation: $280 \times 0.65 = 182 \text{ economy passengers}$

SECTION 2: Speed, Distance & Time

Q6. An aircraft travels at 480 knots for 2 hours 30 minutes. What distance does it cover?

✓ **Correct Answer: C) 1,200 NM**

Explanation: $480 \times 2.5 = 1,200 \text{ NM}$

Q7. A plane covers 1,750 km in 3.5 hours. What is its average speed?

✓ **Correct Answer: C) 500 km/h**

Explanation: $1,750 \div 3.5 = 500 \text{ km/h}$

Q8. Convert 250 knots to km/h. (1 knot = 1.852 km/h)

✓ **Correct Answer: B) 463 km/h**

Explanation: $250 \times 1.852 = 463 \text{ km/h}$

Q9. A flight from Abu Dhabi to London is 5,500 km. The aircraft flies at 880 km/h. How long is the flight?

✓ **Correct Answer: B) 6 h 15 min**

Explanation: $5,500 \div 880 = 6.25 \text{ h} = 6 \text{ h } 15 \text{ min}$

Q10. An aircraft descends from 36,000 ft to 0 ft at a rate of 1,800 ft/min. How long does the descent take?

✓ **Correct Answer: B) 20 min**

Explanation: $36,000 \div 1,800 = 20 \text{ minutes}$

SECTION 3: Ratios & Scales

Q11. On a navigation chart, the scale is 1:500,000. A route measures 8 cm on the chart. What is the actual distance?

✓ **Correct Answer: A) 40 km**

Explanation: $8 \times 500,000 = 4,000,000 \text{ cm} = 40 \text{ km}$

Q12. Fuel and oil are mixed in the ratio 7:1. If 56 litres of fuel are used, how much oil is needed?

✓ **Correct Answer: C) 8 L**

Explanation: $56 \div 7 = 8 \text{ litres of oil}$

Q13. Three crew members share a bonus of AED 12,600 in the ratio 3:2:1. What is the largest share?

✓ **Correct Answer: C) AED 6,300**

Explanation: Total parts = 6; largest = $\frac{3}{6} \times 12,600 = 6,300$

Q14. If 5 engineers can service 15 aircraft in 3 days, how many aircraft can 8 engineers service in 3 days?

✓ **Correct Answer: C) 24**

Explanation: Rate = 3 aircraft/engineer; $8 \times 3 = 24$

Q15. A map shows a runway as 6 cm long. The actual runway is 3 km. What is the map scale?

✓ **Correct Answer: B) 1:50,000**

Explanation: 3 km = 300,000 cm; $300,000 \div 6 = 50,000 \rightarrow 1:50,000$

SECTION 4: Unit Conversions

Q16. Convert 15,000 feet to metres. (1 ft = 0.3048 m)

✓ **Correct Answer: B) 4,572 m**

Explanation: $15,000 \times 0.3048 = 4,572$ m

Q17. An aircraft weighs 75,000 kg. Convert this to pounds. (1 kg = 2.205 lb)

✓ **Correct Answer: C) 165,375 lb**

Explanation: $75,000 \times 2.205 = 165,375$ lb

Q18. Convert 120°C to Fahrenheit. ($F = \frac{9}{5} \times C + 32$)

✓ **Correct Answer: C) 248°F**

Explanation: $\frac{9}{5} \times 120 + 32 = 216 + 32 = 248^\circ F$

Q19. A fuel load of 18,000 lbs is required. Convert to kg. (1 lb = 0.4536 kg)

✓ **Correct Answer: B) 8,165 kg**

Explanation: $18,000 \times 0.4536 \approx 8,165 \text{ kg}$

Q20. Convert 0.75 nautical miles to metres. (1 NM = 1,852 m)

✓ **Correct Answer: B) 1,389 m**

Explanation: $0.75 \times 1,852 = 1,389 \text{ m}$

SECTION 5: Powers, Roots & Surds

Q21. Calculate: 2^8

✓ **Correct Answer: B) 256**

Explanation: $2^8 = 256$

Q22. Simplify: $\sqrt{144} + \sqrt{81}$

✓ **Correct Answer: B) 21**

Explanation: $\sqrt{144} = 12$, $\sqrt{81} = 9$; $12 + 9 = 21$

Q23. What is $5^3 - 4^2$?

✓ **Correct Answer: B) 109**

Explanation: $5^3 = 125$; $4^2 = 16$; $125 - 16 = 109$

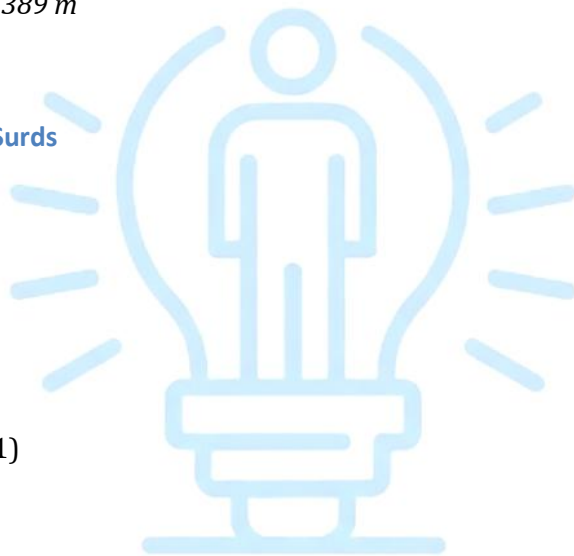
Q24. Evaluate: $(3^2)^3$

✓ **Correct Answer: D) 729**

Explanation: $(3^2)^3 = 3^6 = 729$

Q25. Simplify: $\sqrt{0.0049}$

✓ **Correct Answer: B) 0.07**



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Explanation: $\sqrt{(49/10000)} = 7/100 = 0.07$

SECTION 6: Areas, Volumes & Spaces

Q26. A rectangular aircraft hangar is 120 m long and 45 m wide. What is its floor area?

✓ **Correct Answer: C) 5,400 m²**

Explanation: $120 \times 45 = 5,400 \text{ m}^2$

Q27. A cylindrical fuel tank has radius 2 m and height 5 m. What is its volume? ($\pi \approx 3.14$)

✓ **Correct Answer: B) 62.8 m³**

Explanation: $V = \pi r^2 h = 3.14 \times 4 \times 5 = 62.8 \text{ m}^3$

Q28. A triangular taxiway marking has base 6 m and height 4 m. What is its area?

✓ **Correct Answer: B) 12 m²**

Explanation: $A = \frac{1}{2} \times 6 \times 4 = 12 \text{ m}^2$

Q29. The wingspan of an aircraft is 64 m. What is the radius of the circle swept by the wingtip?

✓ **Correct Answer: B) 32 m**

Explanation: $\text{Radius} = \text{wingspan} \div 2 = 32 \text{ m}$

Q30. A cargo container is 4 m × 3 m × 2.5 m. What is its volume?

✓ **Correct Answer: C) 30 m³**

Explanation: $4 \times 3 \times 2.5 = 30 \text{ m}^3$

SECTION 7: Probability & Statistics

Q31. A bag contains 5 red, 3 blue and 2 green balls. What is the probability of picking a blue ball?

✓ **Correct Answer: B) 3/10**

Explanation: $P(\text{blue}) = 3/10$

Q32. The scores of 5 cadets are: 72, 85, 91, 68, 79. What is the mean score?

✓ **Correct Answer: C) 79**

Explanation: $(72+85+91+68+79) \div 5 = 395 \div 5 = 79$

Q33. A die is rolled twice. What is the probability of getting a 6 on both rolls?

✓ **Correct Answer: C) 1/36**

Explanation: $P(6) \times P(6) = 1/6 \times 1/6 = 1/36$

Q34. Find the median of: 14, 22, 9, 31, 18, 27, 5

✓ **Correct Answer: B) 18**

Explanation: Sorted: 5,9,14,18,22,27,31 $\rightarrow$ middle = 18

Q35. In a group of 200 pilots, 40% are captains. How many are First Officers?

✓ **Correct Answer: C) 120**

Explanation: $200 \times 0.60 = 120$ First Officers

SECTION 8: Algebraic Equations

Q36. Solve for x: $3x + 7 = 22$

✓ **Correct Answer: C) x = 5**

Explanation: $3x = 15 \rightarrow x = 5$

Q37. If $2x - 4 = 3x + 1$, find x.

✓ **Correct Answer: A) x = -5**

Explanation: $2x - 3x = 1 + 4 \rightarrow -x = 5 \rightarrow x = -5$

Q38. Solve: $x^2 - 9 = 0$

✓ **Correct Answer: B) $x = \pm 3$**

Explanation: $x^2 = 9 \rightarrow x = \pm 3$

Q39. Simplify: $(5x^2 - 3x + 7) - (2x^2 + 4x - 5)$

✓ **Correct Answer: A) $3x^2 - 7x + 12$**

Explanation: $5x^2 - 2x^2 = 3x^2$, $-3x - 4x = -7x$, $7 + 5 = 12$

Q40. If the area of a square is 196 cm^2 , what is the length of one side?

✓ **Correct Answer: C) 14 cm**

Explanation: $\sqrt{196} = 14 \text{ cm}$

SECTION 9: Trigonometry

Q41. An aircraft climbs at an angle of 30° over a horizontal distance of 10 km. What is the altitude gained? ($\sin 30^\circ = 0.5$)

✓ **Correct Answer: B) 5 km**

Explanation: $\tan 30^\circ \approx 0.577$; but using sin: altitude = $10 \times \tan 30^\circ \approx 5.77 \text{ km}$. Using sin rule: opp = hyp $\times$ $\sin 30 = 10 \times 0.5 = 5 \text{ km}$ (horizontal = adjacent)

Q42. In a right triangle, the opposite side is 6 m and the hypotenuse is 10 m. What is $\sin \theta$?

✓ **Correct Answer: C) 0.6**

Explanation: $\sin \theta = \text{opp/hyp} = 6/10 = 0.6$

Q43. What is $\cos 60^\circ$?

✓ **Correct Answer: B) 0.5**

Explanation: $\cos 60^\circ = 0.5$ (standard value)

Q44. An aircraft is 8 km away horizontally and 6 km high. What is the straight-line distance to the aircraft?

✓ **Correct Answer: B) 10 km**

Explanation: $\sqrt{(8^2 + 6^2)} = \sqrt{(64+36)} = \sqrt{100} = 10 \text{ km}$

Q45. What is $\tan 45^\circ$?

✓ **Correct Answer: C) 1**

Explanation: $\tan 45^\circ = 1$ (standard value)

SECTION 10: Complex Operations

Q46. Calculate: $(48 \times 25) \div (16 \times 15)$

✓ **Correct Answer: B) 5**

Explanation: $(48 \times 25) = 1200$; $(16 \times 15) = 240$; $1200 \div 240 = 5$

Q47. A pilot flies 3 sectors: 2h 20min, 1h 45min, and 3h 10min. What is the total flight time?

✓ **Correct Answer: C) 7h 15min**

Explanation: $140 + 105 + 190 = 435 \text{ min} = 7\text{h } 15\text{min}$

Q48. An aircraft burns 2,400 kg of fuel per hour. How much fuel is burned in 2h 45min?

✓ **Correct Answer: C) 6,600 kg**

Explanation: $2.75 \times 2,400 = 6,600 \text{ kg}$

SECTION 11: Word Problems

Q49. A cadet completes ground school in 18 weeks. He studies 6 days a week, 4 hours per day. How many total study hours does he complete?

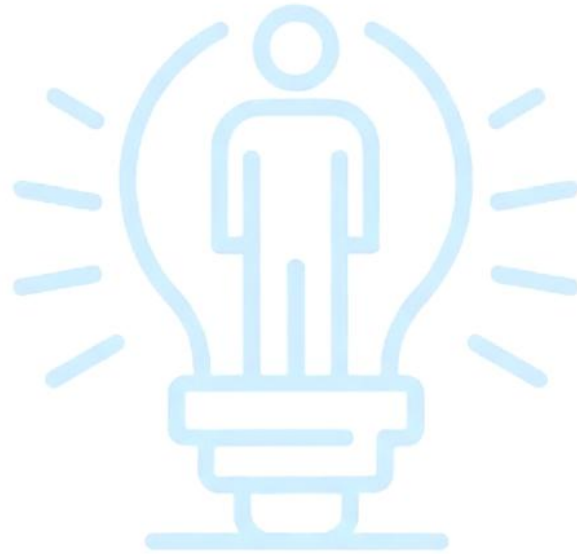
✓ **Correct Answer: C) 432 h**

Explanation: $18 \times 6 \times 4 = 432 \text{ hours}$

Q50. An aircraft takes off at 08:45 and lands at 14:20 on the same day. The crew has a 35-minute stopover. What is the total airborne time?

✓ **Correct Answer: B) 5h 00min**

Explanation: 08:45 to 14:20 = 5h 35min; minus 35min stopover = 5h 00min



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