FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

# N10: Recurring decimals

*Prove and reason with recurring decimals and fractions*

20 marks · 25 minutes · Non-calculator

**1)** Prove that $0.\dot{3} = \frac{1}{3}$

.....

.....

**[Question 1: 2 marks]**

**2)** Prove that $0.\dot{4}\dot{5} = \frac{5}{11}$

.....

.....

.....

**[Question 2: 3 marks]**

**3)** Explain why $\frac{3}{8}$ is a terminating decimal.

.....

.....

**[Question 3: 2 marks]**

---

**4)** Explain why $\frac{1}{7}$ gives a recurring decimal.

.....

**[Question 4: 1 marks]**

---

**5)** Show that $0.\dot{2}\dot{7} + 0.\dot{7}\dot{2} = 1$

**[Question 5: 2 marks]**

---

**6)** Prove that $0.1\dot{3} = \frac{2}{15}$

.....

.....

.....

**[Question 6: 3 marks]**

---

**7)** Jake says $0.\dot{9}$ is less than 1. Show that $0.\dot{9} = 1$

.....

.....

**[Question 7: 2 marks]**

**8)** Show that $\frac{7}{20} = 0.35$

**[Question 8: 1 marks]**

**9)** Explain why $\frac{3}{12}$ is a terminating decimal even though 12 has a factor of 3

.....

.....

**[Question 9: 2 marks]**

**10)** Show that $0.\dot{1} \times 9 = 1$

**[Question 10: 2 marks]**

**End of paper – 20 marks in total**

# Answers and brief mark scheme

| Q | Answer | Method / notes |
|---|---|---|
| 1 | Proof | $10x - x = 3$ (M1); $x = \frac{3}{9} = \frac{1}{3}$ (C1). |
| 2 | Proof | $100x = 45.45\ldots$ (M1); $99x = 45$ (M1); $\frac{45}{99} = \frac{5}{11}$ (C1). |
| 3 | Explanation | $8 = 2^3$ (M1); denominator has only factors 2 and 5 (C1). |
| 4 | Explanation | 7 is a prime factor other than 2 or 5 (C1). |
| 5 | Shown | $\frac{27}{99} + \frac{72}{99}$ (M1); $\frac{99}{99} = 1$ (C1). |
| 6 | Proof | $100x - 10x$ (M1); $90x = 12$ (M1); $\frac{12}{90} = \frac{2}{15}$ (C1). |
| 7 | Proof | $10x - x = 9$ (M1); $x = 1$ (C1). |
| 8 | Shown | $\frac{35}{100}$ (C1). |
| 9 | Explanation | $\frac{3}{12} = \frac{1}{4}$ (M1); 4 has only factor 2 (C1). |
| 10 | Shown | $\frac{1}{9} \times 9$ (M1); 1 (C1). |