

554.

AN ELLIPTIC-TRANSCENDENT IDENTITY.

[From the *Messenger of Mathematics*, vol. II. (1873), p. 179.]

THE following is a singular identity:

$$\begin{aligned}
 & (1+q)(1+q^2)(1+q^4)(1+q^8)(1+q^{16}) \dots \\
 & - (1-q)(1-q^2)(1-q^4)(1-q^8)(1-q^{16}) \dots \\
 & = 2q(1+q^2)(1+q^4)(1+q^8)(1+q^{16})(1+q^{32})(1+q^{64})(1+q^{128}) \dots,
 \end{aligned}$$

where in each of the three terms every factor has the exponent 1 or 2 according as the exponent of q is not, or is, divisible by 7.

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THE following is a singular identity:

$$\begin{aligned} & (1+q)(1+q^3)(1+q^5)(1+q^7)^2(1+q^9) \dots \\ & - (1-q)(1-q^3)(1-q^5)(1-q^7)^2(1-q^9) \dots \\ & = 2q(1+q^2)(1+q^4)(1+q^6)(1+q^8)(1+q^{10})(1+q^{12})(1+q^{14})^2(1+q^{16}) \dots, \end{aligned}$$

where in each of the three terms every factor has the exponent 1 or 2 according as the exponent of q is not, or is, divisible by 7.