

VIRTUAL WORK INTEGRATION TABLE (v.i.o)

The values in the table represent the integration of the product of the two shapes with a common length L :

$$\int_0^L M Q dx$$

Note: Direction is important (i.e. which side of the shape is the low end and which is the high end).
For trapezoids, either left or right side may be high (depending on the value of M_a / M_b)

	Rectangle	Triangle	Triangle	Trapezoid	
Rectangle		LMQ	$\frac{LMQ}{2}$	$\frac{LMQ}{2}$	$\frac{LM}{2}(Q_a + Q_b)$
Triangle		$\frac{LMQ}{2}$	$\frac{LMQ}{3}$	$\frac{LMQ}{6}$	$\frac{LM}{6}(Q_a + 2Q_b)$
Triangle		$\frac{LMQ}{2}$	$\frac{LMQ}{6}$	$\frac{LMQ}{3}$	$\frac{LM}{6}(2Q_a + Q_b)$
Triangle		$\frac{LMQ}{2}$	$\frac{MQ}{6}(L + a)$	$\frac{MQ}{6}(L + b)$	$\frac{M}{6} [Q_a(L + b) + Q_b(L + a)]$
Trapezoid		$\frac{LQ}{2}(M_a + M_b)$	$\frac{LQ}{6}(M_a + 2M_b)$	$\frac{LQ}{6}(2M_a + M_b)$	$\frac{L}{6} [Q_a(2M_a + M_b) + Q_b(M_a + 2M_b)]$
Parabola		$\frac{2LMQ}{3}$	$\frac{5LMQ}{12}$	$\frac{LMQ}{4}$	$\frac{LM}{12}(3Q_a + 5Q_b)$
Parabola		$\frac{2LMQ}{3}$	$\frac{LMQ}{4}$	$\frac{5LMQ}{12}$	$\frac{LM}{12}(5Q_a + 3Q_b)$
Parabola		$\frac{LMQ}{3}$	$\frac{LMQ}{4}$	$\frac{LMQ}{12}$	$\frac{LM}{12}(Q_a + 3Q_b)$
Parabola		$\frac{LMQ}{3}$	$\frac{LMQ}{12}$	$\frac{LMQ}{4}$	$\frac{LM}{12}(3Q_a + Q_b)$