

Question number	Answer	Notes	Marks																					
11 (a)	<p>substitution into given formula; evaluation of constant;</p> <p>evaluation of constant for a second set of data; conclusion consistent with candidate's evidence; e.g. calculated value of constant doesn't change (much) so formula is justified constant decreases so formula isn't justified</p> <table><tr><th>Distance from centre of Mars in km</th><th>Gravitational field strength in N/kg</th><th>Constant</th></tr><tr><td>4000</td><td>2.66</td><td>42560000</td></tr><tr><td>5000</td><td>1.70</td><td>42500000</td></tr><tr><td>6000</td><td>1.18</td><td>42480000</td></tr><tr><td>7000</td><td>0.87</td><td>42630000</td></tr><tr><td>8000</td><td>0.67</td><td>42880000</td></tr><tr><td>9000</td><td>0.53</td><td>42930000</td></tr></table>	Distance from centre of Mars in km	Gravitational field strength in N/kg	Constant	4000	2.66	42560000	5000	1.70	42500000	6000	1.18	42480000	7000	0.87	42630000	8000	0.67	42880000	9000	0.53	42930000	<p>allow any consistent PoT</p> <p>DOP</p>	4
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(b)	<p>rearrangement of given formula; substitution of constant and distance; evaluation;</p> <p>e.g. gravitational field strength = constant / distance² gravitational field strength = 42 700 000 / 3410²</p> <p>gravitational field strength = 3.67 (N/kg)</p>	<p>allow ecf from (a) allow mean constant condone 3.7</p> <p>allow range of 42 500 000 to 42 900 000 for constant allow range of 3.65-3.69</p>	3																					

Total for Question 11 = 7 marks