Question Number	Scheme	Marks
1. (a)	<table><tr><td>**Salesperson**</td><td>***A***</td><td>***B***</td><td>***C***</td><td>***D***</td><td>***E***</td><td>***F***</td><td>***G***</td><td>***H***</td></tr><tr><td>Rank Distance</td><td>7</td><td>6</td><td>4</td><td>1</td><td>5</td><td>3</td><td>2</td><td>8</td></tr><tr><td>Rank Commission</td><td>8</td><td>5</td><td>7</td><td>3</td><td>1</td><td>2</td><td>6</td><td>4</td></tr></table> Or <table><tr><td>**Salesperson**</td><td>***A***</td><td>***B***</td><td>***C***</td><td>***D***</td><td>***E***</td><td>***F***</td><td>***G***</td><td>***H***</td></tr><tr><td>Rank Distance</td><td>2</td><td>3</td><td>5</td><td>8</td><td>4</td><td>6</td><td>7</td><td>1</td></tr><tr><td>Rank Commission</td><td>1</td><td>4</td><td>2</td><td>6</td><td>8</td><td>7</td><td>3</td><td>5</td></tr></table> Attempt to rank for distance **or** for commission. (at least four correct).	M1
	$\sum d^2 = 1+1+9+4+16+1+16+16;\ =\ 64$ For finding the difference between each of the **ranks** and evaluating $\sum d^2$. $\sum d^2 = 64$	M1
	$r_s = 1-\frac{6(64)}{8(63)};\ =\ 0.238095...$ Using $1-\frac{6\sum d^2}{8(63)}$ with their $\sum d^2$ $\frac{5}{21}$ or awrt 0.238	dM1; A1
		[4]
(b)	$H_0: \rho = 0$, $H_1: \rho > 0$ Both hypotheses stated correctly	B1
	Critical Value r_s = 0.6429 or CR: $r_s \geqslant 0.6429$ Critical value of 0.6429	B1
	Either • Since $r_s = 0.238...$ does not lie in the CR • Result is not significant • Do not reject H_0 (accept H_0) see notes	M1
	conclude that there is a no positive correlation between distance travelled and amount of commission received. Conclusion in context	A1
		[4] **8**

Notes

1. (a)

1st M1 For an attempt to rank at least one row (at least 4 correct)

2nd M1 For an attempt at d^2 row for their **ranks** (at least 4 correct or correct ft) (may be implied by $\sum d^2 = 64$)

3rd dM1 **dependent on 1st M1** for use of $1-\frac{6\sum d^2}{8(63)}$ with their $\sum d^2$

A1 awrt 0.238

(b)

1st B1 Both hypotheses stated in terms of ρ or ρ_s. Must be attached to H_0 and H_1

2nd B1 0.6429 or better

M1 For a correct statement relating their r_s $(|r_s| < 1)$ with their c.v. where 0 < their c.v. < 1 (If a comparison is made it must be correct e.g. 0.238 > 0.05 is M0).

A1 For a contextualised comment which is not rejecting H_0, which must mention "no positive correlation", "distance" and "commission". (Use of "association" is A0.) Follow through their r_s with their c.v. (provided 0<their c.v.< 1) Applying a two-tailed test scores a maximum of B0B1M1A0

SC 2-tailed test **So Award SC B0B1** for $H_0: \rho = 0$, $H_1: \rho \neq 0$ followed by critical value $r_s = (\pm)\ 0.7381$ and allow access to the M1 mark only (if comparison is made, it must be correct with consistent signs).