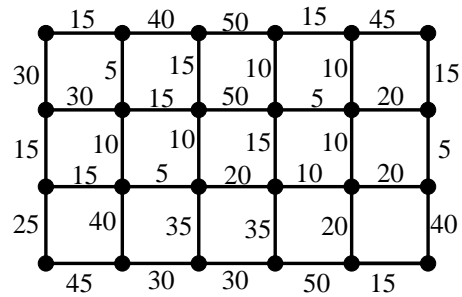(1) ☐ This American mathematician invented a simple method for finding a minimal spanning tree.
(a) Dennis Sullivan
(b) Joe Mitchell
(c) Jack Milnor
(d) James Glimm
(e) Joseph Kruskal

(2) ☐ The "degree of separation" refers to
(a) minimal spanning tree of a graph
(b) the length of the shortest path between two vertices of a graph
(c) tbe number of vertices in a graph
(d) the number of edges in a graph
(e) the maximum degree of any vertex in the graph
(f) none of these

(3) ☐ Which is not a true statement about trees?
(a) a tree has no circuits
(b) a tree has one fewer edges than vertices
(c) a tree is connected
(d) a tree must have a vertex of degree 3
(e) every edge of a tree is a bridge
(f) none of these
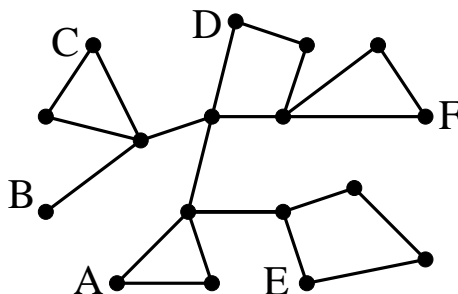
(4) ☐ How many degrees of separation are there between A and E in the graph above?
(a) 1   **(b)** 2   **(c)** 3   **(d)** 4   **(e)** 5   **(f)** 6

(5) ☐ What is the redundancy of this graph?
(a) 1   **(b)** 2   **(c)** 3   **(d)** 4   **(e)** 5   **(f)** 6

2

15 40 50 15 45

30 5 15 10 10 15
   30 15 50 5 20

15 10 10 15 10 5
   15 5 20 10 20

25 40 35 35 20 40

45 30 30 50 15

(6) ☐ What is total weight of the network produced by Kruskal's algorithm for the graph above?

(a) 150   (b) 200   (c) 260   (d) 300   (e) 340

The table below gives distances in miles between six cities. Use this table to answer Problems 7 to 9.

	A	B	C	D	E	F
A	*	400	820	1000	1300	750
B	400	*	650	780	1100	800
C	820	650	*	450	300	320
D	1000	780	450	*	460	700
E	1300	1100	300	460	*	750
F	750	800	320	700	750	*

(7) ☐ What is the weight of the third edge chosen by Kruskal's algorithm?

(a) 200   (b) 300   (c) 400   (d) 450   (e) 530   (f) 650

(8) ☐ What is the weight of the last edge chosen by Kruskal's algorithm?

(a) 200   (b) 250   (c) 300   (d) 400   (e) 450   (f) 650

(9) ☐ What is the weight of the minimal spanning tree for this data?

(a) 1850   (b) 1900   (c) 2010   (d) 2120   (e) 2200   (f) 2250