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Modeling Periodic Phenomena with Trigonometric Functions - Independent Practice Worksheet

Complete all the problems.

1) For each set of data, draw a scatter plot and decide whether or not the data exhibits approximately periodic behavior

a

x	0	1	2	3	4	5	6	7	8	9	10	11	12
y	0	4	8	4	0	-4	-8	-4	0	4	8	4	0

b

x	0	1	2	3	4
y	4.4	2.2	0	2.2	4.4

c

x	0	2	4	6	8	10	12	14
y	0	1	4	3	3.5	4	5	3

d

x	0	1	3	5	7	9	11	13	15
y	0	3	4.1	2.4	3.8	7.5	8	9.5	7

2) The following tabled values show the height above the ground of a point on a train rail as the rail moves along a flat surface.

Distance travelled (cm)	0	10	20	30	40	50	60	70	80	90	100
Height above ground (cm)	0	4	8	12	16	20	24	20	16	12	8

Distance travelled (cm)	110	120	130	140	150	160	170	180	190	200
Height above ground (cm)	4	8	12	16	20	24	20	16	12	4

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a) Plot the graph of height against distance.

b) Is the data periodic? If so, estimate:

i- The equation of the principal axis ii- The maximum value
iii- The period iv- The amplitude

3) For each set of data, draw a scatter plot and decide whether or not the data exhibits approximately periodic behavior

a

x	0	1	2	3	4	5	6	7	8	9	10	11	12
y	0	10	20	10	0	-10	-20	-10	0	10	20	10	0

b

x	0	1	2	3	4
y	7	4	0	4	7

c

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
y	0	3	5	6	4	6.4	2.5	8.1

d

x	0	1	2	3	4	5	6	7	8
y	0	3.5	4.5	2.4	5.5	4.9	6.5	7.6	7.1

4) The following tabled values show the height above the ground of a point on an airplane's landing gear as it moves along a flat surface.

Distance travelled (cm)	0	50	100	150	200	250	300	350	400	450	500
Height above ground (cm)	0	15	30	45	60	45	30	15	30	45	60

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Distance travelled (cm)	550	600	650	700	750	800	850	900	950	1000
Height above ground (cm)	45	30	15	30	45	60	45	30	15	0

a) Plot the graph of height against distance.

b) Is the data periodic? If so, estimate:

i- The equation of the principal axis
ii- The maximum value
iii- The period
iv- The amplitude

5) For each set of data, draw a scatter plot and decide whether or not the data exhibits approximately periodic behavior

a

x	0	1	2	3	4	5	6	7	8	9	10	11	12
y	0	3	6	3	0	-3	-6	-3	0	3	6	3	0

b

x	0	1	2	3	4
y	5	3	0	3	5

c

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
y	0	2.4	4	5.1	4.5	3.9	6.5	5.9

d

x	0	2	3	4	5	6	7	8	9
y	0	35	32	16	26	55	70	85	62

6) The following tabled values show the height above the ground of a point on a bicycle wheel as the bicycle is wheeled along a flat surface.

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Distance travelled (cm)	0	10	20	30	40	50	60	70	80	90	100
Height above ground (cm)	0	30	60	85	100	85	60	30	20	0	20

Distance travelled (cm)	110	120	130	140	150	160	170	180	190	200
Height above ground (cm)	30	40	60	85	100	85	60	30	20	0

a) Plot the graph of height against distance.

b) Is the data periodic? If so, estimate:

i- The equation of the principal axis
ii- The maximum value
iii- The period
iv- The amplitude

7) For each set of data, draw a scatter plot and decide whether or not the data exhibits approximately periodic behavior

a

x	0	1	2	3	4	5	6	7	8	9	10	11	12
y	0	12	13	12	0	-12	-13	-12	0	12	13	12	0

b

x	0	1	2	3	4
y	17	10	0	10	17

c

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
y	0	12	30	35.5	17.5	6.8	9.5	10.5

d

x	0	2	3	4	5	6	7	8	9
y	0	37	42	25	36	67	88	96	74

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8) The following tabled values show the height above the ground of a point on a path of a baseball card that is thrown and runs across a flat surface.

Distance travelled (cm)	0	5	10	15	20	25	30	35	40	45	50
Height above ground (cm)	0	10	40	70	110	70	50	40	10	0	10

Distance travelled (cm)	55	60	65	70	75	80	85	90	95	100
Height above ground (cm)	20	40	70	110	70	50	40	20	10	0

a) Plot the graph of height against distance.

b) Is the data periodic? If so, estimate:

i- The equation of the principal axis ii- The maximum value
iii- The period iv- The amplitude

9) For each set of data, draw a scatter plot and decide whether or not the data exhibits approximately periodic behavior

a

x	0	1	2	3	4	5	6	7	8	9	10	11	12
y	0	40	90	50	0	-50	-90	-40	0	40	90	50	0

b

x	0	1	2	3	4
y	9.9	5	0	5	9.9

c

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
y	0	0.5	2.4	4.1	4.5	3.5	2.2	1.9

d

x	0	2	3	4	5	6	7	8	9
y	0	6.5	8.7	3.5	3.1	9.5	10.9	9.5	7.7

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10) The following tabled values show the height above the table of a point on a foosball moving along a flat table.

Distance travelled (cm)	0	5	10	15	20	25	30	35	40	45	50
Height above ground (cm)	0	10	19	29	39	49	39	29	19	10	0

Distance travelled (cm)	55	60	65	70	75	80	85	90	95	100
Height above ground (cm)	10	19	29	39	49	39	29	19	10	0

a) Plot the graph of height against distance.

b) Is the data periodic? If so, estimate:

i- The equation of the principal axis
ii- The maximum value
iii- The period
iv- The amplitude