

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Describe the characteristics of the trend in the data.

x	2	5	8	10	12	14	17	20
y	135	120	115	102	92	85	78	64

- A. increasing
 - B. decreasing
 - C. constant
 - D. no trend
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2. The growth of a tree can be modelled by the function

$$h(t) = 2.3t - 0.45$$

where h represents the height in metres and t represents the time in years.

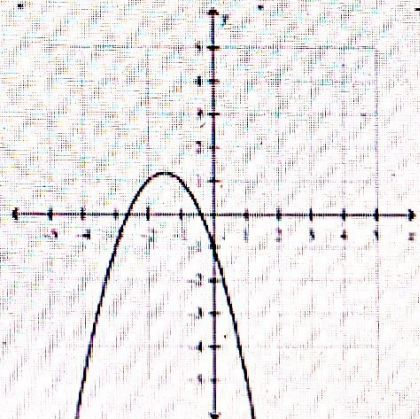
Approximately how long will it take the tree to grow 32 m tall?

- A. 13 years
 - B. 14 years
 - C. 15 years
 - D. 16 years
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3. Fill in the blanks to describe the end behaviour of this polynomial function:

The curve extends from quadrant ____ to quadrant ____.

- A. II; I
- B. II; IV
- C. III; I
- D. III; IV



4. The path of a shot put thrown at a track and field meet is modelled by the quadratic function:

$$h(d) = -0.048(d^2 - 20.7d - 26.28)$$

where, h is the height in metres and d is the horizontal distance in metres.

WINDOW SETTINGS x : $[-5, 30, 5]$ y : $[-5, 10, 1]$

How far has the shot put travelled when it finally hits the ground?

- A. 20.9 m
- B. 21.4 m
- C. 21.9 m
- D. 22.4 m

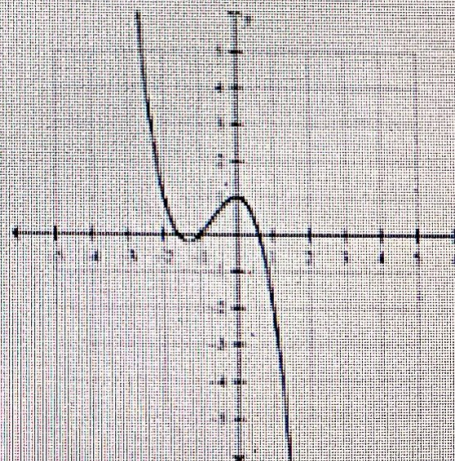
5. Determine the equation of the linear regression for the data.

x	2	5	8	10	12	14	17	20
y	135	120	115	102	92	85	78	64

- A. $y = -5x + 135$
- B. $y = -4.5x + 139.5$
- C. $y = -3.9x + 141.8$
- D. $y = -3.2x + 142.7$

6. Determine the equation of this polynomial function.

- A. $f(x) = -x^2 - 3x - 1$
- B. $g(x) = x^2 - 2x + 1$
- C. $h(x) = -x^3 - 2x^2 + 1$
- D. $j(x) = x^3 + 2x$



7. Determine the equation of the cubic regression for the data.

x	0	2	3	3	6	8	11	12	12
y	18.5	26.7	31.3	32.8	41.5	45.0	48.3	47.6	49.1

- A. $y = 1.4x^3 + 0.2x^2 - 5.1x + 18.3$
 B. $y = -1.4x^3 + 0.2x^2 + 5.1x + 18.3$
 C. $y = 1.4x^3 - 0.2x^2 - 5.1x + 18.3$
 D. $y = -1.4x^3 - 0.2x^2 + 5.1x + 18.3$
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8. Use quadratic regression to interpolate the value of y when $x = 5$.

x	0	2	3	3	4	6	7	7
y	17.5	30.3	30.8	31.5	25.0	8.3	-7.6	-9.1

- A. 17.1
 B. 18.1
 C. 19.1
 D. 20.1
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9. The average retail price of gas in Canada from 1979 to 2008 can be modelled by the function

$$P(y) = 0.008y^3 - 0.307y^2 + 4.830y + 25.720$$

where P is the price of gas in cents per litre and y is the number of years after 1979.

Determine the average price of gas in 2002.

- A. 68.8¢/L
 B. 69.8¢/L
 C. 70.4¢/L
 D. 71.7¢/L

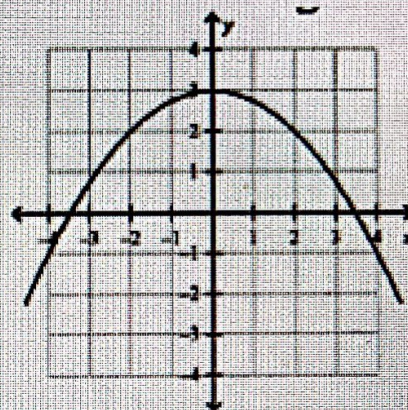
Numeric Response

Clearly indicate your answer in the response grid provided. (1 mark each)

1. Determine the degree of this polynomial function:

Record your answer in the numerical response box below.

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2. The volume of water in a cylindrical water tank being drained can be modelled by the function $v(t) = -3.8t + 225$, where v represents the volume in litres and t represents the time in minutes. How much water is left in the tank after half an hour?

Record your answer in the numerical response box below.

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3. Meghan screen prints T-shirts for sale at concerts. When buying blank T-shirts, the price Meghan must pay is related to the size of the order to create a linear regression. Four of her previous orders are listed in the table below.

Number of Shirts	150	320	360	450
Cost per Shirt (\$)	15.85	15.00	14.80	14.35

Meghan has misplaced the information from her supplier about prices on bulk orders. She would like to get the price per shirt below \$12.50 on her next order. Extrapolate the number of T-shirts she should order.

Record your answer in the numerical response box below.

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4. Describe the graph of $f(x) = -x^3 + 3x^2 + 4$.

a) Number of x - intercepts: ____

b) y - intercept: ____

c) x - coordinate of minimum turning point: ____

d) y - coordinate of maximum turning point: ____



Record your answer in the numerical response box below.

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5. Determine which graph would best represent each scenario below.

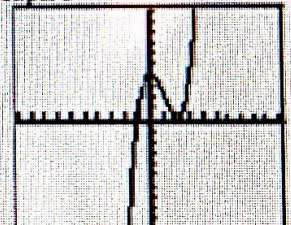
a) degree 3, positive leading coefficient, two x -intercepts, constant term of 4

Graph ____

Graph 1



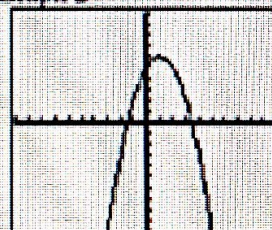
Graph 3



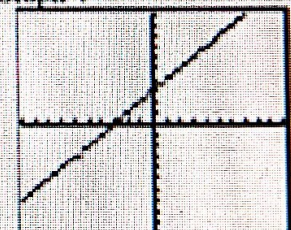
b) two turning points, negative leading coefficient, three x -intercepts.

Graph ____

Graph 2



Graph 4



c) degree 1, positive leading coefficient, constant term of 3

Graph ____

d) quadratic, negative leading coefficient, two x -intercepts.

Graph ____

Record your answer in the numerical response box below.

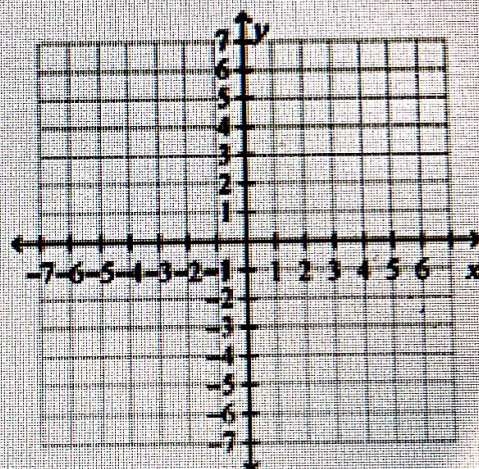
Problem

1. Determine the following characteristics of the polynomial function

$$f(x) = -2(x-1)(x+1)(x-2)$$

Include a sketch. Show your work. (3 marks)

- x-intercepts : _____
 - y-intercept: _____
 - number of turning points: _____
 - end behaviour: _____
 - domain: _____
 - range: _____
- _____



2. Ida hit a golf ball from the top of a hill. The height of the ball above the green can be modelled by the regression equation

$$h(t) = -9.7t^2 + 48.8t + 11.5$$

where h represent the height in metres and t represents the time in seconds.

WINDOW SETTINGS x: [0, 10, 1], y: [0, 100, 20]

a) Use your knowledge of polynomial functions to describe the curve of this function. (2 marks)

- number of possible x-intercepts : _____
- number of possible turning points: _____
- domain: _____
- range: _____

b) Determine the y-intercept. What does it represent in this context? Show your work. (1 mark)

c) The roots of this equation are near $t = -0.2$ and $t = 5.2$. What do these points represent, if anything? (2 marks)