

# POLYNOMIAL FUNCTIONS PRACTICE EXAM

## Math 30-2

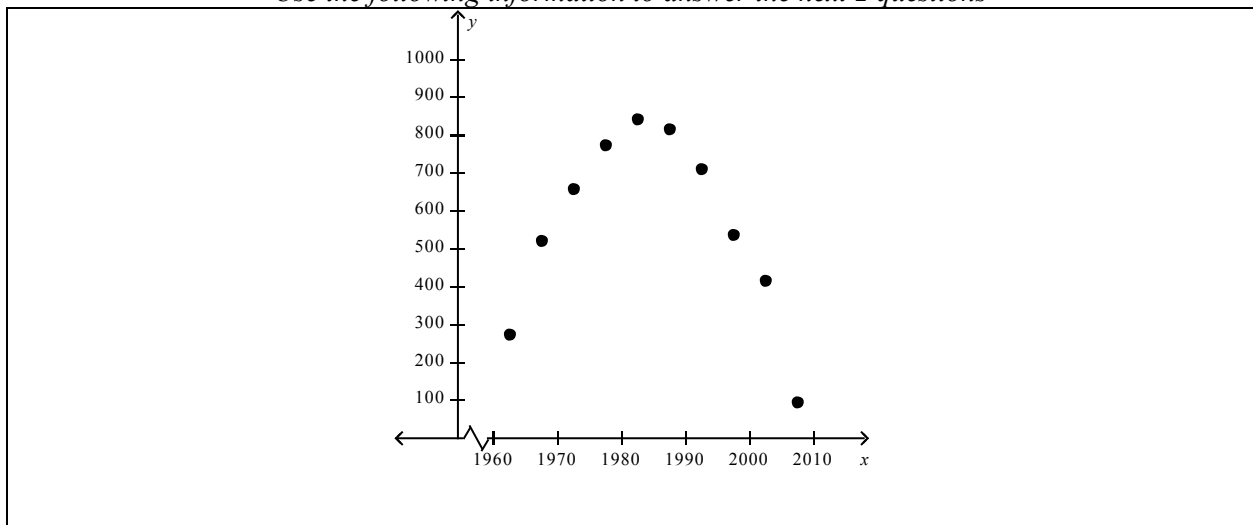
Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Multiple Choice & Numerical Response

Identify the choice that best completes the statement or answers the question. Each question is worth one mark.

Use the following information to answer the next 2 questions



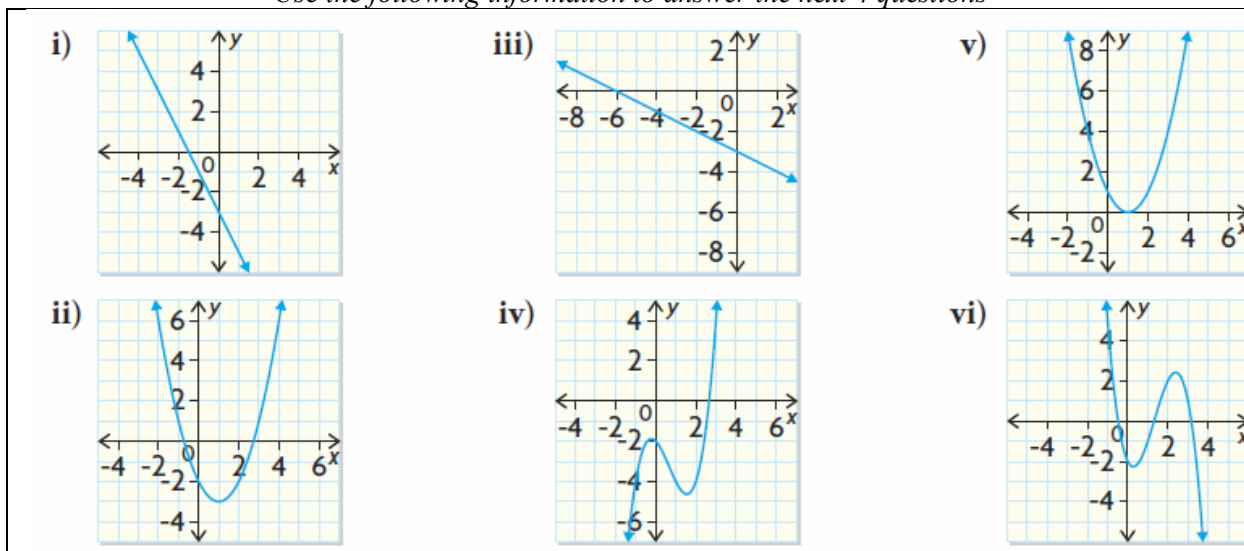
1. Determine the degree of this polynomial function
  - A. 0
  - B. 1
  - C. 2
  - D. 3
2. Determine the number of turning points of this polynomial function
  - A. 0
  - B. 1
  - C. 2
  - D. 3

3. Determine which statement is **false**.
- A. The maximum number of x-intercepts the graph may have is equal to the degree of the function
  - B. The maximum number of turning points a graph may have is equal to one less than the degree of the function
  - C. The degree and leading coefficient of the equation of a polynomial function indicate the end behavior of the graph of the function
  - D. The constant term in the equation of a polynomial function is the x-intercept of its graph.
4. If the leading coefficient of a cubic function is positive, then the graph of the function extends from:
- A. Quadrant II to Quadrant I
  - B. Quadrant II to Quadrant IV
  - C. Quadrant III to Quadrant I
  - D. Quadrant III to Quadrant II
5. If the leading coefficient of a quadratic function is negative, then the graph of the function extends from:
- A. Quadrant II to Quadrant I
  - B. Quadrant II to Quadrant IV
  - C. Quadrant III to Quadrant I
  - D. Quadrant III to Quadrant IV
6. Kyle described the characteristics of  $f(x) = -3x^3 + 5x^2 + 11x$ , but there is an error. Identify the error.
- A. This is a polynomial function of degree 3, so I know that the graph will have two turning points
  - B. The leading coefficient of this cubic function is negative, so I know that the graph extends from QII to QIV
  - C. There is no constant term, so there is one y-intercept.
  - D. The domain is  $y \in R$
7. Determine the highest degree of this polynomial function:  $f(x) = 10x^3(5x + 3)$
- A. 1
  - B. 2
  - C. 3
  - D. 4

### Numerical Response 1

The distance a marathon runner covers can be modeled by the function  $d(t) = 153.8t + 86$ , where  $d$  represents the distance in meters and  $t$  represents the time in minutes. To the nearest kilometer, the distance she has run after twenty minutes is \_\_\_\_\_.

Use the following information to answer the next 4 questions



8. The polynomial function of  $j(x) = x^2 - 2x + 1$  is represented by the graph:
- A. I
  - B. II
  - C. V
  - D. VI
9. The polynomial function of  $g(x) = 4x^2 - 2x - x^3 - 2$  is represented by the graph:
- A. III
  - B. IV
  - C. V
  - D. VI
10. The polynomial function of  $k(x) = -\frac{1x}{2} - 3$  is represented by the graph:
- A. I
  - B. II
  - C. III
  - D. IV

**Numerical Response 2**

A quadratic function will have \_\_\_\_\_ turning point(s) and \_\_\_\_\_ y-intercept(s).

11. The growth of a tree can be modeled by the function  $h(t) = 2.3t + 0.45$ , where  $h$  represents the height in meters and  $t$  represents the time in years. Approximately how tall will the tree be in 7 years?

A. 18.85 m  
B. 17.15 m  
C. 19.55 m  
D. 16.55 m

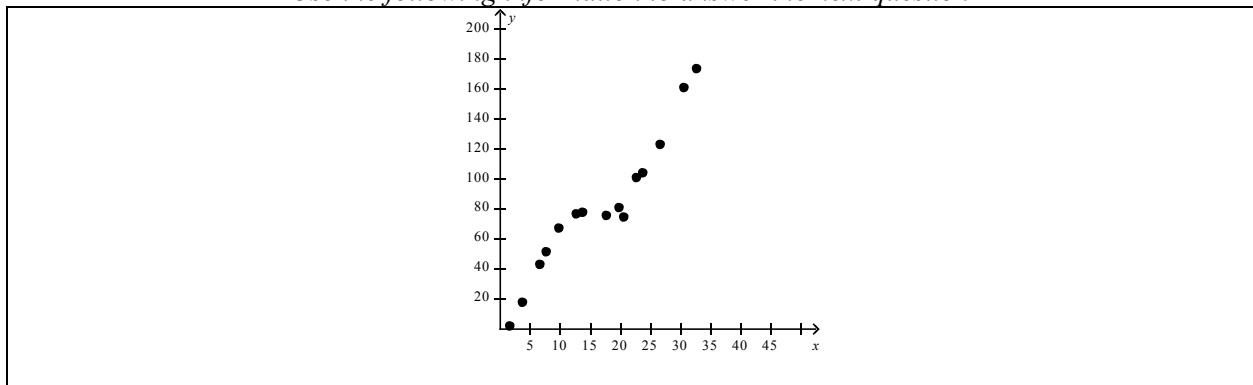
*Use the following information to answer the next question*

	$x$	1	2	3	4	5	6	
	$y$	84	155	241	310	405	478	

12. Using technology, determine the equation of the linear regression function for the data.

A.  $y = 79.7x - 0.07$   
B.  $y = 78.1x - 1.07$   
C.  $y = 79.7x + 0.07$   
D.  $y = 78.1x + 1.07$

*Use the following information to answer the next question*



13. What kind of relationship might there be between the independent and dependent variables in this scatter plot?

A. Linear  
B. Quadratic  
C. Cubic  
D. None of the above

Use the following information to answer the next 2 questions

Mr. Tran hit a golf ball from the top of a hill. The height of the ball above the green is given in the table below

Time (s)	1	2	3	4	5
Height (m)	52.5	73.2	74.6	55.8	16.1

14. Using technology, determine the equation of the quadratic regression function that models the data

- A. *Error*
- B.  $y = -9.02x + 81.5$
- C.  $y = -10.1x^2 + 51.4x + 11$
- D.  $y = -0.13x^3 - 8.9x^2 + 48.3x + 13.2$

15. Using the equation, determine the height of the golf ball at 2.4 seconds

- A. 75.18m
- B. 76.37m
- C. 81.02m
- D. 88.32m

Use the following information to answer the next question

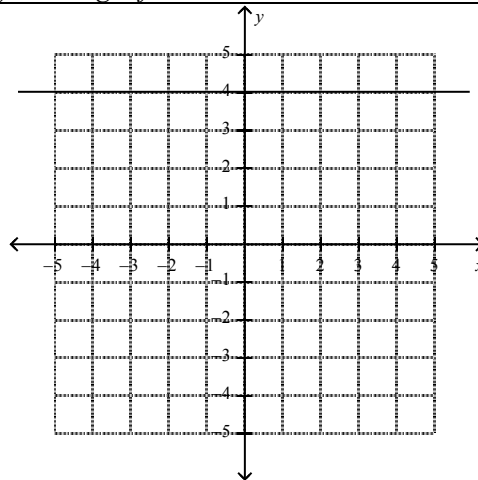
A spherical balloon is being inflated. The volume,  $V$ , in cubic centimetres is related to the time,  $t$ , in seconds.

Volume, $V$ (cm <sup>3</sup> )	33.51	113.10	268.08	523.60	904.78
Time, $t$ (s)	0	1	2	3	4

16. Determine the volume of the balloon at 7 seconds. [hint: change window settings to Xmax = 10]

- A. 3053.7 cm<sup>3</sup>
- B. 7000.3 cm<sup>3</sup>
- C. 7469.5 cm<sup>3</sup>
- D. 8181.5 cm<sup>3</sup>

Use the following information to answer the next question



### Numerical Response 3

The degree of this polynomial function is \_\_\_\_\_

Use the following information to answer the next question

The average retail price of gas in Canada from 1979 to 2008 can be modeled 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 liter and  $y$  is the number of **years after** 1979.

Year	Year(s) after 1979	Year	Year(s) after 1979
1980	1	1986	7
1981	2	1987	8
1982	3	1988	9
1983	4	1989	10
1984	5	1990	11
1985	6	1991	12

17. During which year did the price of gas reach 50¢/L?

- A. 1985
- B. 1987
- C. 1990
- D. 1991

## Written Response

*Complete the question and show all your work for full marks!*

Mr. Tran recorded the following odometer measurements during a single trip in his car:

<b>Distance (km)</b>	2	5	8	10	11	15	20	30	33
<b>Time (min)</b>	2	6	10	13	14	19	23	35	40

- Determine the cubic regression equation [1 mark]
- Use your equation to determine the time it took for Mr. Tran to travel 25km. [1 mark]
- Use your equation to determine the distance it took for Mr. Tran to travel 45 minutes. [1 mark]
- Use your equation to determine the average speed for the trip. [1 mark]

### Answers

1. C
2. B
3. D
4. C
5. D
6. D
7. D
8. C
9. D
10. C
11. D
12. A
13. C
14. C
15. B
16. A
17. B

Nr1 – 3

Nr2 – 11

Nr3 - 0