

Brett Robbins Academic Consulting

Math 30-1 Practice Test

Polynomial Functions

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

When $P(x) = 2x^3 - 5x^2 + 3x - 7$ is divided by $(x - 2)$, the remainder is

- A) 3
- B) -13
- C) 11
- D) -5

Question 2

Which of the following binomials is a factor of the polynomial

function $f(x) = x^3 - 2x^2 - 5x + 6$?

- A) $(x + 3)$
- B) $(x - 1)$
- C) $(x - 4)$
- D) $(x + 1)$

Question 3

For the function $f(x) = -3x^4 + 2x^2 - x + 5$, the degree and leading coefficient are

- A) Degree 4, leading coefficient 3
- B) Degree 5, leading coefficient -3
- C) Degree 4, leading coefficient -3
- D) Degree 2, leading coefficient -3

Question 4

If $P(x) = x^3 - 6x^2 + 11x - 6$, then the value of $P(3)$ is

- A) 0
- B) 6
- C) -2
- D) 2

Question 5

The x -intercepts of the graph of $y = 2(x + 3)(x - 1)(x - 4)$ are

A) $-3, 1, -4$

B) $-3, 1, 4$

C) $3, -1, 4$

D) $3, 1, -4$

Question 6

When $2x^3 - 3x^2 - 8x + 12$ is divided by $(x - 2)$, the quotient is

A) $2x^2 - x - 6$

B) $2x^2 + x + 6$

C) $2x^2 + x - 6$

D) $2x^2 - 7x + 6$

Question 7

When $x^3 + kx^2 - 5x + 3$ is divided by $(x + 2)$, the remainder is 13.

The value of k is

A) 2

B) -2

C) 3

D) -3

Question 8

If $(x - 3)$ is a factor of $x^3 - 5x^2 + 2x + k$, then the value of k is

A) -12

B) 8

C) -8

D) 12

Question 9

For the graph of $y = (x - 2)^2(x + 1)^3$, at $x = 2$

- A) The graph crosses the x -axis
at $x = 2$
- B) The graph touches the x -axis
and turns around at $x = 2$
- C) The graph crosses the x -axis
with a point of inflection at $x = 2$
- D) The graph has a vertical asymptote
at $x = 2$

Question 10

A polynomial function of degree 3 has zeros of $-4, 0$, and 5 .

The function could be

- A) $f(x) = x(x + 4)(x - 5)$
- B) $f(x) = x(x - 4)(x + 5)$
- C) $f(x) = x(x + 4)(x + 5)$
- D) $f(x) = x(x - 4)(x - 5)$

Question 11

For the polynomial function $P(x) = x^4 - 2x^3 - 7x^2 + 8x + 12$,

two of the zeros are 3 and -2 . The largest zero of this function is

Question 12

In the process of factoring the polynomial $P(x) = x^3 + 2x^2 - 5x - 6$, a student determines that $(x + 3)$ is a factor. The remaining factor is

- A) $x^2 + x - 2$
- B) $x^2 - x + 2$
- C) $x^2 + 2x - 2$
- D) $x^2 - x - 2$

Question 13

Three statements about the polynomial function $P(x) = 2x^3 - 3x^2 - 11x + 6$ are shown below.

Statement 1 : When $P(x)$ is divided by $(x - 3)$, the remainder is 0.

Statement 2 : $(x - 2)$ is a factor of $P(x)$.

Statement 3 : $P(-2) = 0$, so $(x + 2)$ is a factor of $P(x)$.

The two statements that are correct are

- | | |
|------------|----------------|
| A) 1 and 2 | B) 1 and 3 |
| C) 2 and 3 | D) 1, 2, and 3 |

Question 14

Given $P(x) = a(x - b)^2(x + c)$, where $a > 0$, $b > 0$, and $c > 0$,
the x -intercept with multiplicity 2 is i, and the y -intercept is ii.

A) i: $x = -b$

ii: the y -intercept is positive

B) i: $x = b$

ii: the y -intercept is negative

C) i: $x = b$

ii: the y -intercept is positive

D) i: $x = -c$

ii: the y -intercept is positive

Question 15

A cubic polynomial function has zeros of -1 , 2 , and 4 .

If $P(0) = 16$, then the value of $P(3)$ is

Question 16

Sofia graphed the function $y = a(x + 2)(x - 3)^2$, where $a > 0$.

If she changes the function so that $a < 0$, then there will be a change in the

A) degree

B) domain

C) x -intercepts

D) end behaviour

Question 17

The graph of the function $P(x) = a(x - r)(x + 2)^2$ passes through the point $(0, 8)$. The value of a in terms of r is

- A) $a = \frac{2}{r}$
B) $a = -\frac{2}{r}$
C) $a = -\frac{r}{2}$
D) $a = \frac{8}{r}$

Question 18

The graph of a quartic polynomial function has x -intercepts of -3 , -1 , 2 , and 5 , and a y -intercept of -30 . The value of $P(1)$ is

Question 19

A polynomial function has a factor of $(x - 1)$ with multiplicity 2, a factor of $(x + 4)$, and $P(0) = -24$.

- A) Minimum possible degree : 3

Leading coefficient: -6

- B) Minimum possible degree : 3

Leading coefficient: 6

- C) Minimum possible degree : 4

Leading coefficient: -6

- D) Minimum possible degree : 5

Leading coefficient: -6

Question 20

When $2x^4 - 3x^3 + x - 5$ is divided by $(x + 1)$, the remainder is

Question 21

The solutions to the equation $x^3 - 4x^2 - 11x + 30 = 0$ are

A) $-2, 3, 5$

B) $-3, -2, 5$

C) $-3, 2, 5$

D) $2, 3, -5$

Question 22

The degree of the polynomial function $f(x) = -2x(x - 3)^3(x + 1)^2$ is

Question 23

When $x^4 - 3x^2 + 5x - 2$ is divided by $(x - 2)$, the remainder is

Question 24

A quartic polynomial function has zeros of -2 (multiplicity 2), 1 , and 3 , and its graph passes through the point $(0, 24)$. The value of $P(-1)$ is

Question 25

For the function $f(x) = -x^3 + 4x^2 - 5x + 2$, the behaviour of the graph at $x = 1$ is i, and the end behaviour as $x \rightarrow \infty$ is ii.

A) i: the graph crosses the x -axis

ii: $f(x) \rightarrow -\infty$

B) i: the graph touches the x -axis and turns

ii: $f(x) \rightarrow \infty$

C) i: the graph crosses with a point of inflection

ii: $f(x) \rightarrow -\infty$

D) i: the graph touches the x -axis and turns

ii: $f(x) \rightarrow -\infty$

Answer Key

- | | | |
|------|---------|--------|
| 1. D | 10. A | 19. A |
| 2. B | 11. 3 | 20. -1 |
| 3. C | 12. D | 21. C |
| 4. A | 13. B | 22. 6 |
| 5. B | 14. C | 23. 12 |
| 6. C | 15. -8 | 24. 16 |
| 7. A | 16. D | 25. D |
| 8. D | 17. B | |
| 9. B | 18. -32 | |

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