Polynomial and Rational Functions Review: math test solutions, Grade 12 (Free PDF)



The Tests & Solutions book for Grade 12

All the work of Grade 12 in one PDF of 49 pages, to print or keep on your tablet.

See the book

Test solutions polynomial functions grade 12 : test solutions with the detailed point scale. Add up your points and spot what to review.

Key takeaway: Full answer key for the Grade 12 test on Polynomial and Rational Functions Review: each problem is solved with the expected steps and points: end behavior and zeros, synthetic division and factoring and Remainder Theorem. Use it to grade yourself after a timed attempt; free PDF.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 End behavior and zeros / 3 pts

(a) Degree $1+2+1=4$; leading coefficient -1 (1 pt). Even degree and negative coefficient: the graph falls on both ends (0.5 pt).

(b) 0 (multiplicity 1, crosses), 3 (multiplicity 2, touches and turns), -1 (multiplicity 1, crosses) (1.5 pts).

2 Synthetic division and factoring / 4 pts

(a) $P(1)=1-2-5+6=0$ (1 pt).

(b)

$c=1$	1	-2	-5	6
Multiply by c		1	-1	-6
Add	1	-1	-6	0

Quotient x^2-x-6, remainder 0 (1.5 pts).

(c) $x^2-x-6=(x-3)(x+2)$, so $P(x)=(x-1)(x-3)(x+2)$ with zeros $1, 3, -2$ (1.5 pts).

3 Remainder Theorem / 3 pts

(a) $Q(2)=16-4+2k-4=8+2k=6$, so $k=-1$ (1.5 pts).

(b) $Q(x)=2x^3-x^2-x-4$ and $Q(-1)=-2-1+1-4=-6$ (1.5 pts).

4 Real and complex zeros — / 4 pts

(a) $p \in \{\pm 1, \pm 2, \pm 5, \pm 10\}$, $q \in \{1, 2\}$: $\pm 1, \pm 2, \pm 5, \pm 10, \pm \frac{1}{2}, \pm \frac{5}{2}$ (1 pt).

(b) $R(-\frac{1}{2}) = -\frac{1}{4} - \frac{11}{4} - 7 + 10 = 0$, so $-\frac{1}{2}$ is a zero (1 pt).

(c)

$c = -\frac{1}{2}$	2	-11	14	10
Multiply by c		-1	6	-10
Add	2	-12	20	0

The quotient is $2x^2 - 12x + 20$, so
$R(x) = (x + \frac{1}{2})(2x^2 - 12x + 20) = (2x + 1)(x^2 - 6x + 10)$ (1 pt).

(d) $x^2 - 6x + 10 = 0$ gives $x = \dfrac{6 \pm \sqrt{36 - 40}}{2} = 3 \pm i$. The zeros are $-\frac{1}{2}$, $3 + i$, and $3 - i$ (1 pt).

5 Asymptotes and intercepts — / 3 pts

(a) $x^2 - x - 6 = (x - 3)(x + 2)$ and nothing cancels with $4(x - 2)$: vertical asymptotes $x = 3$ and $x = -2$ (1 pt).

(b) The numerator has degree 1 and the denominator degree 2: $y = 0$ (1 pt).

(c) x-intercept: $4x - 8 = 0$, so $x = 2$. y-intercept: $g(0) = \dfrac{-8}{-6} = \frac{4}{3}$ (1 pt).

6 Rational inequality — / 3 pts

Critical numbers: -2 and 3 (excluded), 2 (included) (1 pt). Signs of g on $(-\infty, -2)$, $(-2, 2)$, $(2, 3)$, $(3, \infty)$: $-, +, -, +$ (1 pt).

The solution is $(-2, 2] \cup (3, \infty)$ (1 pt).



The Tests & Solutions book for Grade 12

All the work of Grade 12 in one PDF of 49 pages, to print or keep on your tablet.

See the book

Test yourself: quick challenge for Grade 12

Change level

Level : **Grade 12**

6 random questions, instant feedback.

🚀 Start the challenge

🚀 Keep exploring with Zyro



📝 **Math tests**

Polynomial and Rational Functions Review: math test, Grade 12 (Free PDF)



📘 **Math lessons**

Polynomial and Rational Functions Review: math lesson, Grade 12 (Free PDF)



🎯 **Math quizzes**

Polynomial and Rational Functions Review: math quiz, Grade 12



📝 **Math tests**

Exponential and Logarithmic Functions: math test, Grade 12 (Free PDF)



📝 **Math tests**

Function Composition and Inverses: math test, Grade 12 (Free PDF)



📘 **Math lessons**

Exponential and Logarithmic Functions: math lesson, Grade 12 (Free PDF)

Zyro takes you to our partner sites

Blast off to other planets of knowledge and their apps.

Lift off