Polynomial and rational functions Worksheet

Precalculus

Name _____ Date _____

Warm-up

1. How many zeros does $x(x-6)(x+5)$ have?

2. Find the vertical asymptote of $y = \dfrac{1}{x-4}$.

3. Find $\sum_{k=1}^{3} 7k$.

4. Where do the ends of $y = x^2$ go?
   (A) Both down (B) Down left, up right (C) Up left, down right (D) Both up

5. Find the vertical asymptote of $y = \dfrac{1}{x+1}$.

Practice

6. Where do the ends of $y = -2x^3 + x$ go?
   (A) Down left, up right (B) Up left, down right (C) Both up (D) Both down

7. Find the horizontal asymptote of $y = \dfrac{12x-1}{2x+5}$.

8. Add $3 + 6 + 12 + 24$.

9. What's the y-intercept of $(x-7)(x-2)$?

© No Limit Math. Free for personal and classroom use.

10. $y = \dfrac{x^2 - 9}{x - 3}$ has a hole at $x = 3$. What's y there?

11. Find the sum to infinity: first term 1, ratio $\dfrac{1}{2}$.

12. What's the largest zero of $(x - 4)(x + 1)$?

13. Find the horizontal asymptote of $y = \dfrac{9x}{x^2 + 1}$.

Challenge

14. $p(x)$ is cubic with zeros 0, 5 and 3, and leading coefficient 1. Find $p(1)$.

15. How many vertical asymptotes does $y = \dfrac{1}{x^2 - 16}$ have?

16. How many terms does $1, 3, \ldots, 21$ have?

17. Find the remainder when $x^2 + 2x + 4$ is divided by $x - 3$.

18. Which has no horizontal asymptote?

    (A) $\dfrac{x}{x + 1}$ (B) $\dfrac{x}{x^2 + 1}$ (C) $\dfrac{1}{x + 1}$ (D) $\dfrac{x^2}{x + 1}$

© No Limit Math. Free for personal and classroom use.

Polynomial and rational functions Worksheet: Answer Key

Precalculus

1. 3

   One for each factor.

2. 4

   The denominator is 0 at $x = 4$.

3. 42

   $7 + 14 + 21$.

4. (D) Both up

   Even degree, positive sign.

5. -1

   $x + 1 = 0$.

6. (B) Up left, down right

   Odd degree, negative sign.

7. 6

   $\frac{12}{2}$.

8. 45

   Geometric, with $r = 2$.

9. 14

   Set $x = 0$.

10. 6

    It cancels to $x + 3$.

11. 2

    $\frac{1}{1 - 1/2}$.

12. 4

    The zeros are 4 and -1.

13. 0

    The bottom's degree is larger.

14. 8

    $p(x) = x(x - 5)(x - 3)$.

15. 2

    $x = \pm 4$.

© No Limit Math. Free for personal and classroom use.

16. 11

    $\frac{21-1}{2}+1$.

17. 19

    The remainder is the value at $x = 3$.

18. (D) $\frac{x^2}{x+1}$

    Top degree is larger.

Stuck on something? Book a free 20-minute consultation at nolimitmath.com/book.