

Unit 3, Review 2

Determine the end behavior of the graph of each polynomial function.

1. $y = x^2 - 2x + 3$

2. $y = x^3 - 2x$

3. $y = -x^{12} + 6x^6 - 36$

$x \rightarrow -\infty \quad y \rightarrow$
 $x \rightarrow \infty \quad y \rightarrow$

$x \rightarrow -\infty \quad y \rightarrow$
 $x \rightarrow \infty \quad y \rightarrow$

$x \rightarrow -\infty \quad y \rightarrow$
 $x \rightarrow \infty \quad y \rightarrow$

Write each polynomial in factored form.

4. $x^3 + 5x$

5. $x^3 + x^2 - 6x$

6. $6x^3 - 7x^2 - 3x$

& factored form

Write a polynomial function in standard form with the given zeros.

7. $x = 3, 2, -1$

8. $x = 1$ (mult 2), 2

9. $x = 0$ (mult 2), 2, 3

Find the zeros of each function. State the multiplicity of multiple zeros.

10. $y = (x + 1)(x - 8)(x - 9)$

11. $y = x^2(x + 1)$

12. Find the relative maximum and minimum of the graph of $f(x) = x^3 - 3x^2 + 2$.

Solve each equation by factoring.

13. $t^3 - 3t^2 - 10t = 0$

14. $2c^3 - 7c^2 - 4c = 0$

Determine whether each binomial is a factor of $x^3 - 5x^2 - 2x + 24$. Explain why.

15. $x + 2$

16. $x - 3$

17. $x + 4$

Divide using long division.

18. $(x^3 - 3x^2 + 2) \div (x - 1)$

Divide using synthetic division.

19. $(2x^3 + 10x^2 + 8x) \div (x + 4)$

Write a third degree polynomial function in standard form with the given zeros.

10, 13, i

21. $-4, \sqrt{5}$

Find all the zeros of each function.

23. $g(x) = 3x^3 - 3x^2 + x - 1$

25. Sketch:

$y = -2(x-3)^2(x+4)(x+1)^2$

24. $h(x) = x^4 - 5x^3 - 8x + 40$

Unit 3, Review 2

Determine the end behavior of the graph of each polynomial function.

- | | | |
|--|---|---|
| 1. $y = x^2 - 2x + 3$
$x \rightarrow -\infty, y \rightarrow \infty$
$x \rightarrow \infty, y \rightarrow \infty$ | 2. $y = x^3 - 2x$
$x \rightarrow -\infty, y \rightarrow -\infty$
$x \rightarrow \infty, y \rightarrow \infty$ | 3. $y = -x^{12} + 6x^6 - 36$
$x \rightarrow -\infty, y \rightarrow -\infty$
$x \rightarrow \infty, y \rightarrow -\infty$ |
|--|---|---|

Write each polynomial in factored form.

- | | | |
|---------------------------------|--------------------------------------|--|
| 4. $x^3 + 5x$
$x^2(x^2 + 5)$ | 5. $x^3 + x^2 - 6x$
$x(x+3)(x-2)$ | 6. $6x^3 - 7x^2 - 3x$
$x(3x+1)(2x-3)$ |
|---------------------------------|--------------------------------------|--|

Write a polynomial function in standard form with the given zeros.

- | | | |
|---|---|--|
| 7. $x = 3, 2, -1$
$y = x^3 - 4x^2 + x + 6$ | 8. $x = 1$ (mult 2), 2
$y = x^3 - 4x^2 + 5x - 2$ | 9. $x = 0$ (mult 2), 2, 3
$y = x^4 - 5x^3 + 6x^2$ |
|---|---|--|

Find the zeros of each function. State the multiplicity of multiple zeros.

- | | |
|---|---|
| 10. $y = (x+1)(x-8)(x-9)$
$x = -1, 8, 9$ | 11. $y = x^2(x+1)$
$x = 0$ m 2, -1 |
|---|---|

12. Find the relative maximum and minimum of the graph of $f(x) = x^3 - 3x^2 + 2$.

Solve each equation by factoring.

- | | |
|---|--|
| 13. $t^3 - 3t^2 - 10t = 0$
$t(t-5)(t+2) = 0$
$t = 0, 5, -2$ | 14. $2c^3 - 7c^2 - 4c = 0$
$c(2c+1)(c-4) = 0$
$c = 0, -1/2, 4$ |
|---|--|

Determine whether each binomial is a factor of $x^3 - 5x^2 - 2x + 24$.

- | | | |
|--|--|---|
| 15. $x+2$
$-2 \overline{) 1 \ -5 \ -2 \ 24}$
$\underline{-2 \ 14 \ -24}$
$1 \ -7 \ 12 \ 0$
Yes | 16. $x-3$
$3 \overline{) 1 \ -5 \ -2 \ 24}$
$\underline{3 \ -6 \ -24}$
$1 \ -2 \ -8 \ 0$
Yes | 17. $x+4$
$-4 \overline{) 1 \ -5 \ -2 \ 24}$
$\underline{-4 \ 36 \ -136}$
$1 \ -9 \ 34 \ -112$
No |
|--|--|---|

Divide using long division.

18. $(x^3 - 3x^2 + 2) \div (x - 1)$
 $x^2 - 2x - 2$

Divide using synthetic division.

19. $(2x^3 + 10x^2 + 8x) \div (x + 4)$
 $-4 \overline{) 2 \ 10 \ 8 \ 0}$
 $\underline{-8 \ -8 \ 0}$
 $2 \ 2 \ 0 \ 0$
 $2x^2 + 2x$

Write a third degree polynomial function in standard form with the given zeros.

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|--|---|
| 20. $1, 3-i, 3+i$
$x^3 - 7x^2 + 16x - 10$ | 21. $-4, \sqrt{5}, -\sqrt{5}$
$x^3 + 4x^2 - 5x - 20$ |
|--|---|

Find all the zeros of each function.

23. $g(x) = 3x^3 - 3x^2 + x - 1$ $x = 1, \frac{\pm i}{\sqrt{3}}$
24. $h(x) = x^4 - 5x^3 - 8x + 40$
 $x = 2, 5, -1 \pm i\sqrt{3}$

