UNIT 3 - LESSON 7

READY SET GO

Name Period Date

READY

Topic: Reducing rational numbers and expressions

Reduce the expressions to lowest terms. (Assume no denominator equals 0.)

1. $\frac{3x}{6x^2}$ $= \frac{1}{2x}$

2. $\frac{2 \cdot 5 \cdot x \cdot x \cdot x \cdot y}{3 \cdot 5 \cdot x \cdot y \cdot y}$ $= \frac{2x^2}{3y}$

3. $\frac{7ab^2}{7ab^2}$ $= 1$

4. $\frac{(x+2)(x-9)}{(x+2)(x-9)}$ $= 1$

5. $\frac{(3x-5)(x+4)}{(x-1)(3x-5)}$ $= \frac{x+4}{x-1}$

6. $\frac{(2x-11)(3x+17)}{(2x-11)(3x-5)}$ $= \frac{3x+17}{3x-5}$

7. $\frac{(8x-7)(x+3)}{8x(x+3)(2x-3)}$ $= \frac{8x-7}{8x(2x-3)}$

8. $\frac{3x(2x+7)(x-1)(6x-5)}{x(2x+7)(x-1)(6x-5)}$ $= 3$

9. Why is it important that the instructions say to assume that no denominator equals 0?
If a value of a variable made the denominator equal 0, then the expression would be undefined. (you can't divide by 0)

SET

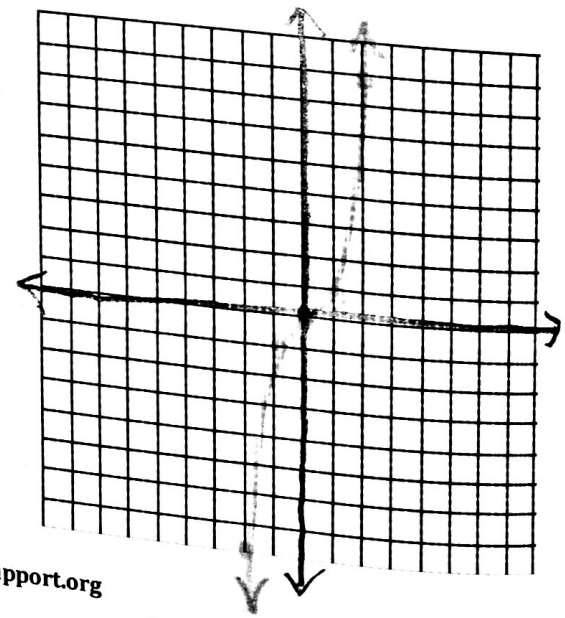
Topic: Reviewing features of polynomials

Some information has been given for each polynomial. Fill in the missing information.

10.

Function: $f(x) = x^3$

Graph:



Function in factored form: $f(x) = x \cdot x \cdot x$

End behavior:

As $x \to -\infty, f(x) \to$ $-\infty$ As $x \to \infty, f(x) \to$ ∞

Roots (with multiplicity): $x = 0$ (mult. 3)

Degree: 3

Value of leading co-efficient: 1

11.

Function in standard form: $g(x) = -x^3 + 6x^2 - 8x$ **Graph:**

Function in factored form: $g(x) = -x(x-2)(x-4)$

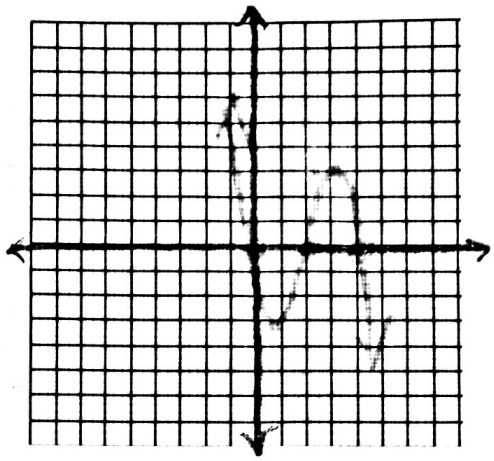
End behavior:

As $x \to -\infty, g(x) \to$ ∞ As $x \to \infty, g(x) \to$ $-\infty$

Roots (with multiplicity): $x = 0, 2, 4$

Degree: 3

Value of leading co-efficient: -1



12.

Function in standard form: $h(x) = x^3 - 2x^2 - 3x$ **Graph:**

Function in factored form: $h(x) = x(x-3)(x+1)$

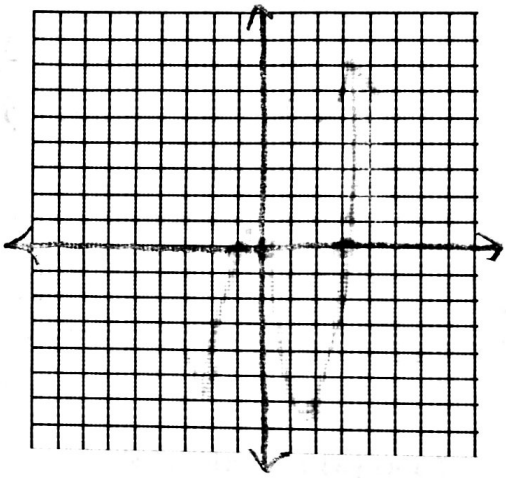
End behavior:

As $x \to -\infty, h(x) \to$ $-\infty$ As $x \to \infty, h(x) \to$ ∞

Roots (with multiplicity): $x = 0, 3, -1$

Degree: 3

Value of $h(2)$: $2^3 - 2(2^2) - 3(2) = 8 - 8 - 6 = -6$



13.

Function in standard form: $f(x) = x^4 - x^3 - 4x^2 + 4x$ **Graph:**

Function in factored form: $f(x) = x(x+2)(x-1)(x-2)$

End behavior:

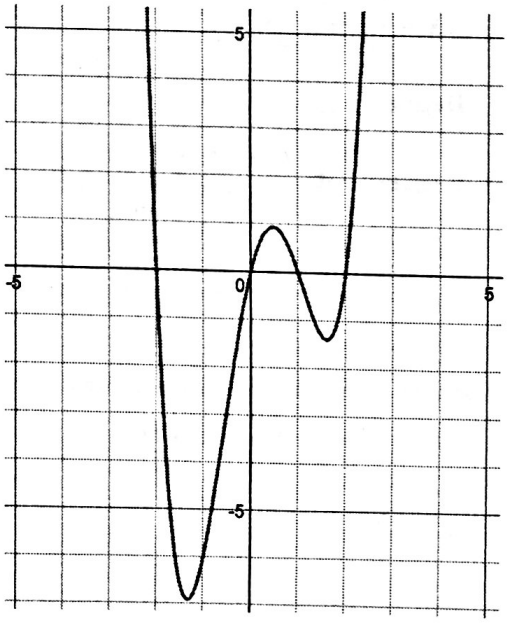
As $x \to -\infty, f(x) \to$ ∞ As $x \to \infty, f(x) \to$ ∞

Roots (with multiplicity): $x = -2, 0, 1, 2$

Degree: 4

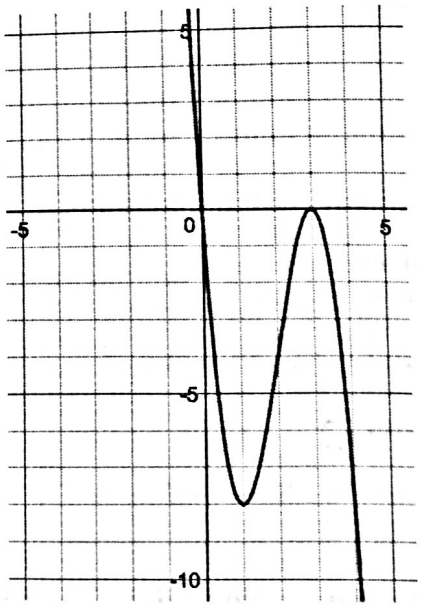
y-intercept: $(0, 0)$

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



14.

Graph:



Function in standard form: $f(x) = -2x^3 + 12x^2 - 18x$

Function in factored form: $f(x) = -2x(x-3)^2$

End behavior:

As $x \to -\infty, p(x) \to \infty$ As $x \to \infty, p(x) \to -\infty$

Roots (with multiplicity): 0, 3 (mult. 2)

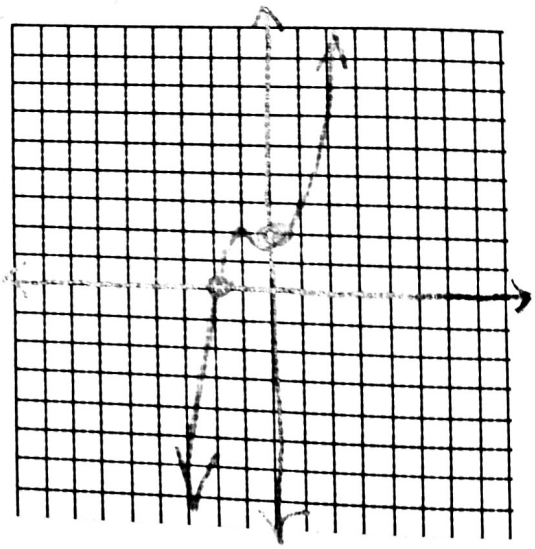
Degree: 3

Value of leading coefficient: -2

$(-8 = -(1)(-3)^3)$

15.

Graph:



Function in standard form: $q(x) = x^3 + 2x^2 + x + 2$

Function in factored form: $q(x) = (x+2)(x^2+1)$ or $q(x) = (x+2)(x-i)(x+i)$

End behavior:

As $x \to -\infty, q(x) \to -\infty$ As $x \to \infty, q(x) \to \infty$

Roots (with multiplicity):

$x = i, -i, -2$

Degree: 3

y-intercept: (0, 2)

GO
Topic: Working with factors of polynomials

Write the polynomial function in standard form given the leading coefficient and the zeros of the function.

18. Leading coefficient: 2; *roots*: $2, \sqrt{2}, -\sqrt{2}$

$f(x) = 2(x-2)(x-\sqrt{2})(x+\sqrt{2})$
$= (2x-4)(x^2-2)$
$= 2x^3 - 4x^2 - 4x + 8$

19. Leading coefficient: -1; *roots*: $1, 1+\sqrt{3}, 1-\sqrt{3}$

$f(x) = -1(x-1)(x-1-\sqrt{3})(x-1+\sqrt{3})$
$= (-x+1)(x^2 - x + \sqrt{3}x - x + 1 - \sqrt{3} - \sqrt{3}x + \sqrt{3} - 3)$
$= (-x+1)(x^2 - 2x - 2) = -x^3 + 3x^2 - 2$

20. Leading coefficient: 2; *roots*: $4i, -4i$

$f(x) = 2(x-4i)(x+4i)$
$= 2(x^2 - 16i^2) = 2x^2 + 32$

Fill in the blanks to make a true statement.

21. If $f(b) = 0$, then a factor of $f(b)$ must be $x - b$.

22. The rate of change in a linear function is always a constant.

23. The rate of change of a quadratic function is linear.

24. The rate of change of a cubic function is quadratic.

25. The rate of change of a polynomial function of degree n can be described by a function of degree $n-1$.