

Expression or Equation: How is the process different?



I can add or subtract a rational expression.

I can solve a rational equation.



Simplify.

LCD: $(v-1)(v-2)$

$$\frac{2v^{\downarrow(v-2)}}{(v-1)} - \frac{v \cdot (v-1)}{(v-2)}$$

$$\frac{2v\sqrt{(v-2)}}{(v-1)(v-2)} + \frac{-v\sqrt{(v-1)}}{(v-1)(v-2)} =$$

$$\frac{2v^2 - 4v - v^2 + v}{LCD}$$

$$\frac{v^2 - 3v}{(v-1)(v-2)} \rightarrow \frac{v(v-3)}{(v-1)(v-2)}$$

Solve.

LCD: $(v-2)(v-1)$ $v \neq 1, 2$

$$\left[\frac{2v^{\sqrt{(v-2)}}}{(v-1)} - \frac{v^{\sqrt{(v-1)}}}{(v-2)} = \frac{4}{v^2 - 3v + 2} \right]$$

$$2\sqrt{(v-2)} - \sqrt{(v-1)} = 4$$

$$2v^2 - 4v - v^2 + v = 4$$

$$v^2 - 3v = 4$$

$$v^2 - 3v - 4 = 0$$

$$(v-4)(v+1) = 0$$

$$v-4=0 \quad v+1=0$$

$$v=4 \quad v=-1 \quad \{4, -1\}$$



Variation Functions



Obj: Solve a problem involving direct, inverse, or joint variation.

Obj: Compare direct, inverse, and joint variation & identify the type of variation present in a problem.

$$y = kxz$$

3. Suppose y varies jointly as x and z. Find y when $x = 9$ and $z = -3$, if $y = -50$ when z is 5 and x is -10.

$$-50 = k(-10)(5)$$

$$\frac{-50}{-50} = \frac{-50k}{-50}$$

$$1 = k$$

$$y = 1xz$$

$$y = 1(9)(-3)$$

$$y = -27$$

4. An appliance store manager noted that weekly sales varied directly with the amount of money spent on advertising. If last week's sales were \$10,000 and \$2000 was spent on advertising, what should sales be during a week that \$1200 was spent on advertising?

$$S = ka$$

$$10,000 = k(2000)$$

$$5 = k$$

$$S = 5a$$

$$S = 5(1200)$$

$$S = 6,000$$

Sales should be \$6,000.

Solving Rational Equations



Learning Targets: I can solve rational equations in one variable.



I can solve a word problem involving fractional equations (i.e., resistance in physics, work problems, etc.).

WORK

5. Kris and Robin wax cars. Kris can wax a particular car in 60 minutes and Robin can wax the same car in 80 minutes. They plan on waxing the same car together and want to know how long it will take. $X = \#$ minute to wax car together.

$\frac{1}{60} + \frac{1}{80} = \frac{1}{X}$ LCD: $2^4 \cdot 3 \cdot 5 \cdot X = 240X$

$4x + 3x = 240$
 $7x = 240$
 $x = 34 \frac{2}{7}$

a little over 34 minutes

6. Nine pounds of Great Value mixed nuts containing 55% peanuts were mixed Planter's mixed nuts that contain 35% peanuts. How many pounds of the Planter's mixed nuts should be used to have the perfect mix with 40% peanuts?

	Great Val	Planter's	
Amt of Peanuts	55(9)	35(x)	40
total weight	9	x	100

$\frac{4.95 + .35x}{9+x} = \frac{40}{100}$

27 pounds

$40(9+x) = 100(4.95 + .35x)$

7. The speed of the wind is 8 miles per hour. If it takes Olivia 2 hours to ride her bike 24 miles round trip, determine her rate of speed in still air.

$r \cdot t = d$

	r	D	t
with wind	$r+8$	12	$\frac{12}{r+8}$
against wind	$r-8$	12	$\frac{12}{r-8}$

$\frac{12}{r+8} + \frac{12}{r-8} = 2$ LCD: $(r+8)(r-8)$ in still.

$\frac{12(r-8)}{r+8} + \frac{12(r+8)}{r-8} = 2(r^2-64)$

$12r - 96 + 12r + 96 = 2r^2 - 128$
 $24r = 2r^2 - 128$
 $-24r \quad -24r$

$0 = 2r^2 - 24r - 128$
 $0 = 2(r^2 - 12r - 64)$
 $0 = 2(r+4)(r-16)$

$r+4=0 \quad r-16=0$
 $r=-4 \quad r=16$

Olivia's rate is 16mph

1,64
2,32
4,16



Next Test: Cumulative Review

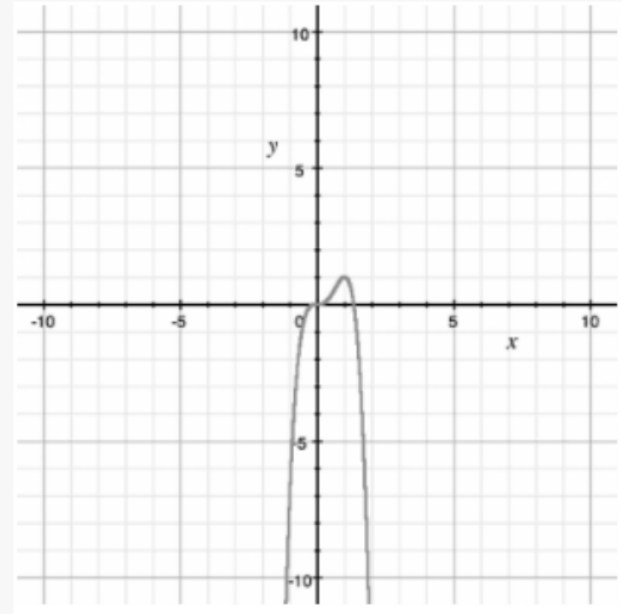


1. ✓ Factor the polynomial completely.

$$x^2 - 18$$

- A) $(x + 2)(x + 9)$
- B) $(x - 9)(x - 2)$
- C) $(x + 6)(x - 3)$
- D) cannot be factored

3.



Which function COULD be the one shown in the graph?

- A) ~~$f(x) = -2x^2 - x$~~
- B) ~~$f(x) = 2x^2 - 4x$~~
- C) $f(x) = -3x^3 - x^2$
- D) $f(x) = -3x^4 + 4x^3$

2. ✓ Let $f(x) = 6x^2 + 5$ and $g(x) = 3x - 5$. Find $g(f(0))$.

$$f(0) = 6(0)^2 + 5$$

$$6 \cdot 0 + 5 = 5$$

$$g(5) = 3(5) - 5$$

$$15 - 5 = 10$$

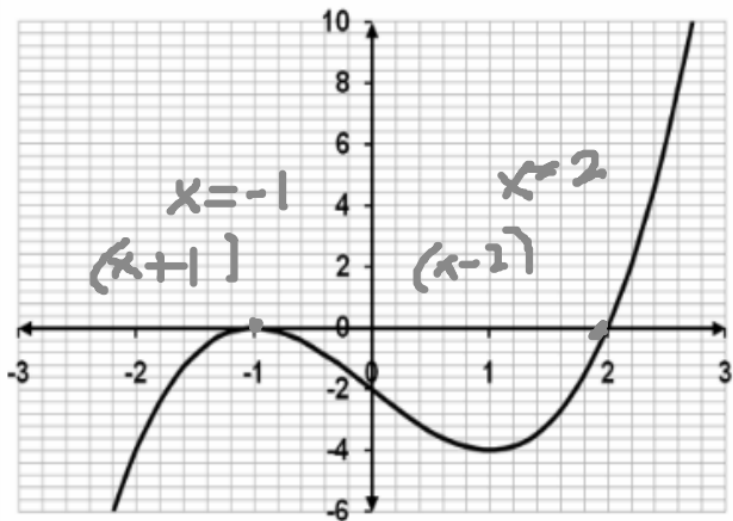
- A) 10
- B) 75
- C) 90
- D) 155



Next Test: Cumulative Review



4.



The graph shows a polynomial function $f(x)$ of degree 3.

Which statement about $f(x)$ is true?

- A) ~~$f(x) = (x-1)^2(x+2)$~~
- B) $f(x) = (x+1)^2(x-2)$
- C) ~~$f(x) = (x+2)^2(x-1)$~~
- D) ~~$f(x) = (x-2)^2(x+1)$~~

5. Find $f \circ g$.

$$f(x) = x^2 - 5x + 6 \quad g(x) = x + 3$$

Handwritten work shows the composition:

$$(x+3)^2 - 5(x+3) + 6$$

$$= x^2 + 3x + 3x + 9 - 5x - 15 + 6$$

$$= x^2 + x$$

- A) $x^2 + x$
- B) ~~$x^2 - 4x + 9$~~
- C) ~~$x^2 - 5x + 9$~~
- D) ~~$x^3 - 5x^2 - 9x + 18$~~

$$x^2 + x$$

6. The expression $x^3 + 6x^2 + 36x + 216$ is equivalent to $(x + 6)(x^2 + 36)$. At what point(s) does the graph of the function $f(x) = x^3 + 6x^2 + 36x + 216$ intersect the x-axis?

- A) (6, 0)
- B) (-6, 0)
- C) (-36, 0)
- D) (-6, 0) and (6, 0)

Handwritten work for question 6:

$$(x+6)(x^2+36) = 0$$

$$x+6=0 \quad x^2+36=0$$

$$x=-6 \quad x^2=-36$$

$$x = \pm \sqrt{-36}$$

$$x = \pm 6i$$