Panel 1 (Aug 27-1:27 PM)

1-8 HW Answer Key

1. Either $x=0$ or $y=0$.
2. $\{3\}$
3. $\{2\}$
4. $\{0, 9\}$
5. $\left\{\pm\frac{7}{3}\right\}$
6. $\{0, \pm5\}$
7. $\{6, 1\}$
8. $\{2, 1/2\}$
9. $\{\pm2, \pm4\}$
10. $\{\pm2, -3\}$
11. $f(x)=x^2-x-6$
12. $\{7\}$
13. $(3x+4)(9x^2-12x+16)$
14. $21x^2+2xy-8y^2$

Aug 27-1:27 PM

Panel 2 (Sep 1-4:27 PM)

1. If $xy=0$, what can you say about x and/or y.
   Either $x=0, y=0$ or both are zero.

Find the roots of each equation by factoring.

2. $x^2 - 6x = -9$
$x^2 - 6x + 9 = 0$ $P = 9$
$(x-3)(x-3) = 0$ $S = -6$ $-3, -3$
$x - 3 = 0 \mid x = 3$
$\{3\}$

3. $5x^2 + 20 = 20x$
$\frac{5x^2 - 20x + 20}{5} = \frac{0}{5}$
$x^2 - 4x + 4 = 0$ $P = 4$ $-2, -2$
$(x-2)(x-2) = 0$ $S = -4$
$x - 2 = 0 \mid x = 2$
$\{2\}$

4. $m^3 - 9m^2 = 0$ (GCF)
$m^2(m - 9) = 0$
$m^2 = 0 \mid m - 9 = 0$
$m = 0 \mid m = 9$
$\{0, 9\}$

5. $9x^2 = 49$ (DOTS)
$9x^2 - 49 = 0$
$(3x - 7)(3x + 7) = 0$
$3x - 7 = 0 \mid 3x + 7 = 0$
$3x = 7 \mid 3x = -7$
$x = 7/3 \mid x = -7/3$
$\{\pm 7/3\}$

6. $4x^3 - 100x = 0$ (GCF/DOTS)
$4x(x^2 - 25) = 0$
$4x(x+5)(x-5) = 0$
$4x = 0 \mid x + 5 = 0 \mid x - 5 = 0$
$x = 0 \mid x = -5 \mid x = 5$
$\{0, \pm 5\}$

Find the zeros of each function by factoring.

7. $f(x) = x^2 - 7x + 6$
$x^2 - 7x + 6 = 0$ $P = 6$
$(x-6)(x-1) = 0$ $S = -7$ $-1, -6$
$x - 6 = 0 \mid x - 1 = 0$
$x = 6 \mid x = 1$
$\{1, 6\}$

8. $g(x) = 2x^2 - 5x + 2$
$2x^2 - 5x + 2 = 0$ $P = 4$ $-4, -1$
$2x^2 - 4x - 1x + 2 = 0$ $S = -5$
$2x(x-2) - 1(x-2) = 0$
$(x-2)(2x-1) = 0$
$x - 2 = 0 \mid 2x - 1 = 0$
$x = 2 \mid 2x = 1$
$2x = 1/2$
$\{2, 1/2\}$

Sep 1-4:27 PM

Panel 3 (Sep 1-4:28 PM)

Short PLS/DOTS

9. $f(t) = t^4 - 20t^2 + 64$ $P = 64$ -20
$t^4 - 20t^2 + 64 = 0$ $S = -20$ $-4, -16$
$(t^2 - 4)(t^2 - 16) = 0$
$(t+2)(t-2)(t+4)(t-4) = 0$
$t + 2 = 0 \mid t - 2 = 0 \mid t + 4 = 0 \mid t - 4 = 0$
$t = -2 \mid t = 2 \mid t = -4 \mid t = 4$
$\{\pm 2, \pm 4\}$

Grouping DOTS

10. $g(x) = x^3 + 3x^2 - 4x - 12$
$x^3 + 3x^2 - 4x - 12 = 0$
$x^2(x+3) - 4(x+3) = 0$
$(x+3)(x^2 - 4) = 0$
$(x+3)(x+2)(x-2) = 0$
$x + 3 = 0 \mid x + 2 = 0 \mid x - 2 = 0$
$x = -3 \mid x = -2 \mid x = 2$
$\{-2, 2, 3\}$

11. Write a quadratic function in standard form with zeros 3 and -2.
$f(x) = (x - 3)(x - 2)$
$f(x) = (x - 3)(x + 2)$
$f(x) = x^2 - 3x + 2x - 6$
$f(x) = x^2 - x - 6$

12. What is the solution of $(y - 7)^{28} = 0$?
$(y - 7)(y - 7) \cdots = 0$
$y = 7 \mid y = 7$
$\{7\}$

13. Factor $27x^3 + 64$. $= (3x + 4)(9x^2 - 12x + 16)$
$a = 3x$
$b = 4$

14. Simplify $(7x - 4y)(3x + 2y)$.
$= 21x^2 + 14xy - 12xy - 8y^2$
$= 21x^2 + 2xy - 8y^2$

Sep 1-4:28 PM

Panel 4 (Aug 27-1:35 PM)

1-9: More Finding Roots And Zeros

Warm-up: Can you correctly complete the following statement without looking at yesterday's notes? Check with a neighbor before checking yesterday's notes.
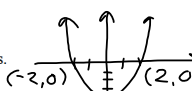
Functions have ___zeros___ or ___x-intercepts___, while equations have ___roots___ or ___solutions___.

Explain the special role of the number zero in factoring and solving an equation.

Aug 27-1:35 PM

Panel 5 (Aug 27-1:36 PM)

Zeros, Roots and X-Intercepts

1a. Graph $f(x) = x^2 - 4$ on your calculator.

The ___x-intercepts___ are where the function crosses the x-axis.
How many of them are there? __2__
State them as full points. $(-2, 0), (2, 0)$
Sketch the function to the side and label the x-intercepts.
$(-2, 0)$ $(2, 0)$

b. These are also the ___zeros___ of the function.
Find the zeros graphically on your calculator by using 2nd-Trace-Zero(2).
The zeros are __±2__ and are at the same point as the ___x-intercepts___
The zeros or x-intercepts always have the same y-coordinate of __0__.
Integer value zeros can be seen in your calculator table by looking for y = __0__.

c. Algebraically find the zeros of this same function by factoring means:
We set $f(x)$ or y equal to __0__. $f(x) = x^2 - 4$
Then we find the zeros by factoring and solving the equation to find the roots.
$x^2 - 4 = 0$
$(x - 2)(x + 2) = 0$
$x - 2 = 0 \mid x + 2 = 0$
$x = 2 \mid x = -2$

d. We've already checked our zeros graphically by sketching and labeling above.
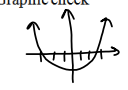Check your zeros algebraically by substituting them into the equation in part c.

Aug 27-1:36 PM

Panel 6 (Aug 27-1:36 PM)

For the following:
a) Algebraically find the zeros of the function.
b) Check graphically on your calculator by sketching the function and labeling the x-intercepts/zeros.
c) Check algebraically by substituting your solutions into the equation.
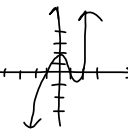
2a. $f(x) = 2x^2 + x - 15$ b. Graphic check   c. Algebraic check
$2x^2 + x - 15 = 0$ $P: -30$ $2(-3)^2 + (-3) - 15 = 0$
$\frac{2x^2 + 6x - 5x - 15 = 0}{2x \quad -5}$ $S: 1$ $6, -5$ $2\left(\frac{5}{2}\right)^2 + \left(\frac{5}{2}\right) - 15 = 0$
$2x(x+3) - 5(x+3) = 0$
$(x+3)(2x-5) = 0$
$x + 3 = 0 \mid 2x - 5 = 0$
$x = -3 \mid x = 5/2$

3a. $f(x) = x^3 - 2x^2 - x + 2$ b. Graphic check   c. Algebraic check
$x^3 - 2x^2 - x + 2 = 0$ $(2)^3 - 2(2)^2 - (2) + 2$
$x^2(x-2) - 1(x-2) = 0$ $= 0$
$(x-2)(x^2 - 1) = 0$ $(1)^3 - 2(1)^2 - (1) + 2$
$(x-2)(x+1)(x-1) = 0$ $= 0$
$x - 2 = 0 \mid x + 1 = 0 \mid x - 1 = 0$ $(-1)^3 - 2(-1)^2 - (-1) + 2$
$x = 2 \mid x = -1 \mid x = 1$ $= 0$
$\{2, \pm 1\}$

Aug 27-1:36 PM

Find the roots of the following equations by factoring. No checks.

4. $4x^2 = 36$ 5. $4x^2 = 7$

$$\frac{4x^2-36}{4} = \frac{0}{4}$$

$$x^2 - 9 = 0$$

$$(x-3)(x+3) = 0 \qquad \{\pm 3\}$$

$$x-3=0 \mid x+3=0$$

$$x=3 \mid x=-3$$

Find the zeros of the following functions by factoring. No checks.

6. $f(x) = 4x^7 - 28x^6 + 48x^5$ 7. $f(t) = t^5 - 10t^3 + 21t$

$$\frac{4x^7 - 28x^6 + 48x^5}{4x^5} = 0$$ $$\frac{t^5 - 10t^3 + 21t}{t} = 0$$

$$4x^5(x^2 - 7x + 12) = 0 \quad \begin{matrix} P \ 12 \\ S \ -7 \end{matrix}$$

$$t(t^4 - 10t^2 + 21) = 0$$

$$4x^5(x-4)(x-3) = 0$$ $$t(t^2-7)(t^2-3) = 0 \quad \begin{matrix} P: 21 \\ S: -10 \end{matrix}$$

$$4x^5 = 0 \mid x-4=0 \mid x-3=0 \quad -4, -3$$

$$t = 0 \mid t^2-7=0 \mid t^2-3=0$$

$$x=0 \mid x=4 \mid x=3$$ $$t^2 = 7 \mid t^2 = 3 \quad -7, -3$$

$$t = \pm\sqrt{7} \mid t = \pm\sqrt{3}$$

$$\{0, 4, 3\}$$ $$\{0, \pm\sqrt{7}, \pm\sqrt{3}\}$$

Sep 14-9:31 PM

Aug 27-1:41 PM