UNIT 3 DAY 2 MORE SOLVING.

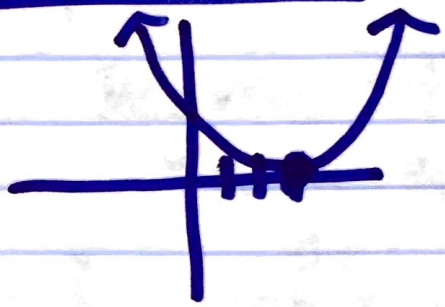
Solve. Identify any double roots.

① $(x-3)^2=0$

$(x-3)(x-3)=0$ → $x=3$ double root

$x-3=0$ $\quad$ $x-3=0$

$x=3$ $\quad$ $x=3$



② $y^1(y-1)^2(y+2)^1=0$ ✓ $=0$ ✓ factored

$y=0$ | $y-1=0$ → $y=1$ double root | $y+2=0$ → $y=-2$

degree $=4=$ number of solutions

③ $(x+2)(x^2-4)=0$

$(x+2)(x+2)(x-2)=0$ * factor completely!

$x=2,-2$ double root

UNIT 3 DAY 2

MORE SOLVING. IDENTIFY ANY DOUBLE ROOTS.

① $(x-3)^2 = 0$

$x = 3$ double root

② $y(y+1)^2(y-2) = 0$ [$= 0$? factored?

$y = 0$ | $(y+1)^2 = 0$ | $y - 2 = 0$

$(y+1)(y+1) = 0$

$y = -1$ double root | $y = 2$

Degree = 4 = number of solutions!

$\{0, -1 \text{ dr.}, 2\}$

③ $(u+3)(u-3) = 8u$ [set $= 0$

$-8u \quad -8u$

$(u+3)(u-3) - 8u = 0$ [multiply out

$\rightarrow u^2 - 9 - 8u = 0$

$u^2 - 8u - 9 = 0$

$\rightarrow (u+1)(u-9) = 0$

$u+1 = 0 \qquad u-9 = 0$

$u = -1 \qquad u = 9$

④ $x = (x-6)^2$

$x = (x-6)(x-6)$ [set = 0

$x = x^2 - 12x + 36$

$-x \qquad -x$

$0 = x^2 - 13x + 36$

$0 = (x-4)(x-9)$

$\boxed{x=4,\ x=9}$

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⑤ $(x+2)(x^2-4) = 0$ [✓ = 0

$(x+2)(x+2)(x-2) = 0$ [factored?

$x+2=0$

$x=-2$

double root

$x-2=0$

$x=2$

degree = 3

Honors Math III
7.7 Discovery Activity

Name: McG Key

1. **Write a quadratic equation that has roots 2 and -3.**

$(x-2)(x+3)$ ← factors

Equation $0 = x^2 + x - 6$

What is the sum of the roots? -1 What is the product of the roots? -6

2. **Write a quadratic equation that has roots 5 and -1.**

$(x-5)(x+1)$

Equation $0 = x^2 - 4x - 5$

What is the sum of the roots? 4 What is the product of the roots? -5

3. **Write a quadratic equation that has roots 4 and 6.**

Equation $0 = x^2 - 10x + 24$

What is the sum of the roots? 10 What is the product of the roots? 24

4. **Write a quadratic equation that has roots -8 and -3.**

Equation $0 = x^2 + 11x + 24$

What is the sum of the roots? -11 What is the product of the roots? 24

5. **Compare your equations to the sum and product of the roots. What do you notice?**

$0 = x^2 - (\text{sum})x + \text{product}$

p.342

Ex.: (10) $\frac{3}{2}, -\frac{1}{2}$ s: 1 p: $-\frac{3}{4}$ $4\left(x^2 - x - \frac{3}{4}\right)$ $4x^2 - 4x - 3 = y$

(14) $2+\sqrt{7}, 2-\sqrt{7}$ s: 4 p: $4-7=-3$ $y = x^2 - 4x - 3$

$$0 = x^2 - (\text{sum})x + \text{product}$$

Roots: $2+\sqrt{7}, 2-\sqrt{7}$ (conjugate pairs)

sum: $2+\sqrt{7}+2-\sqrt{7} = 4$

product: $(2+\sqrt{7})(2-\sqrt{7}) = 4-7 = -3$

$$\boxed{0 = x^2 - 4x - 3}$$

Roots: $\frac{2+i\sqrt{3}}{2}, \frac{2-i\sqrt{3}}{2}$

sum: $\frac{2+i\sqrt{3}}{2} + \frac{2-i\sqrt{3}}{2} = \frac{4}{2} = 2$ $\boxed{i^2 = -1}$

product: $\left(\frac{2+i\sqrt{3}}{2}\right)\left(\frac{2-i\sqrt{3}}{2}\right) = \frac{4-i^2\cdot 3}{4}$

$= \frac{4-(-1)3}{4} = \frac{7}{4}$

$$4\left(0 = x^2 - 2x + \frac{7}{4}\right)$$

$$\boxed{0 = 4x^2 - 8x + 7}$$