Algebra 2 Worksheet Name: Key
Section 6.5 - Finding Real Roots DAY ONE Period: ___

I. Solve each polynomial equation by factoring.

1. $2x^4 + 16x^3 + 32x^2 = 0$

$2x^2(x^2 + 8x + 16) = 0$

$2x^2(x+4)(x+4) = 0$

$2x^2(x+4)^2 = 0$

$2x^2 = 0$ $\quad$ $(x+4)^2 = 0$

$x^2 = 0$ $\quad$ $x + 4 = 0$

$x = 0$ $\quad$ $x = -4$

$\boxed{x = -4 \text{ OR } 0}$

2. $x^4 - 37x^2 + 36 = 0$

$(x^2 - 36)(x^2 - 1) = 0$

$(x+6)(x-6)(x+1)(x-1) = 0$

$x + 6 = 0$ $\quad$ $x - 6 = 0$ $\quad$ $x + 1 = 0$ $\quad$ $x - 1 = 0$

$x = -6$ $\quad$ $x = 6$ $\quad$ $x = -1$ $\quad$ $x = 1$

$\boxed{x = \pm 1, \pm 6}$

3. $4x^7 - 28x^6 = -48x^5$

$4x^7 - 28x^6 + 48x^5 = 0$

$4x^5(x^2 - 7x + 12) = 0$

$4x^5(x-3)(x-4) = 0$

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

$x^5 = 0$ $\quad$ $x = 3$ $\quad$ $x = 4$

$x = 0$

$\boxed{x = 0, 3, 4}$

4. $3x^4 + 11x^3 = 4x^2$

$3x^4 + 11x^3 - 4x^2 = 0$

$x^2(3x^2 + x - 4) = 0$

$x^2(3x + 4)(x - 1) = 0$

$x^2 = 0$ $\quad$ $3x + 4 = 0$ $\quad$ $x - 1 = 0$

$x = 0$ $\quad$ $3x = -4$ $\quad$ $x = 1$

$x = -\frac{4}{3}$

$\boxed{x = -\frac{4}{3}, 0, 1}$

5. $2x^3 - 12x^2 = 32x - 192$

$(2x^3 - 12x^2) + (-32x + 192) = 0$

$2x^2(x-6) - 32(x-6) = 0$

$(x-6)(2x^2 - 32) = 0$

$(x-6)[2(x^2 - 16)] = 0$

$2(x-6)(x+4)(x-4) = 0$

$2 \neq 0$ $\quad$ $x - 6 = 0$ $\quad$ $x + 4 = 0$ $\quad$ $x - 4 = 0$

$x = 6$ $\quad$ $x = -4$ $\quad$ $x = 4$

$\boxed{x = \pm 4, 6}$

6. $x^4 + 100 = 29x^2$

$x^4 - 29x^2 + 100 = 0$

$(x^2 - 4)(x^2 - 25) = 0$

$(x-2)(x+2)(x-5)(x+5) = 0$

$x - 2 = 0$ $\quad$ $x + 2 = 0$ $\quad$ $x - 5 = 0$ $\quad$ $x + 5 = 0$

$x = 2$ $\quad$ $x = -2$ $\quad$ $x = 5$ $\quad$ $x = -5$

$\boxed{x = \pm 2, \pm 5}$

II. Identify the roots of each function. State the multiplicity of each root.

5. $f(x)=(x+2)^3(x-2)^3$

$x+2=0$

$x=-2$

-2 mult. of 3 (triple root)

$x-2=0$

$x=2$

2 mult of 3 (triple root)

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

$x=0$

0 mult. of 1 (single root)

$x+3=0$

$x=-3$

-3 mult of 2 (double root)

$x-1=0$

$x=1$

1 mult. of 1

$x+1=0$

$x=-1$ mult of 1

7. $f(x)=-x^3(2x-5)(2x+1)$

$-x^3=0$

$x^3=0$

$x=0$

0 mult. of 3

$2x-5=0$

$2x=5$

$x=\frac{5}{2}$ mult. of 1

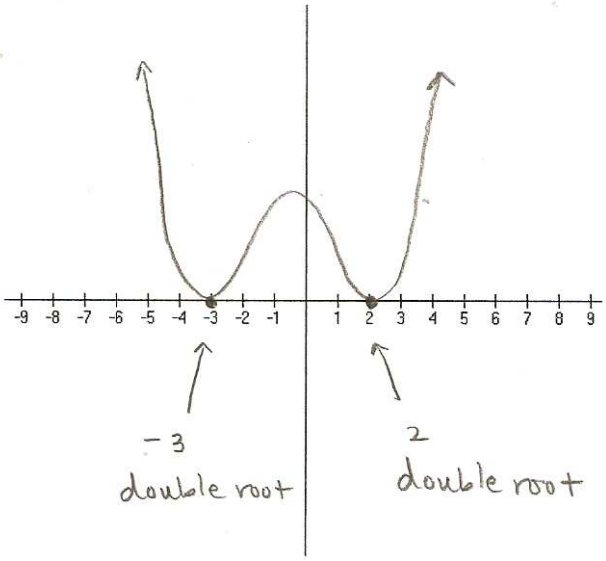
$2x+1=0$

$2x=-1$

$x=-\frac{1}{2}$ mult. of 1

III. Use your graphing calculator to make a sketch of the function and to find its roots. Then rewrite the function in factored form.

8. $f(x)=x^4+2x^3-11x^2-12x+36$

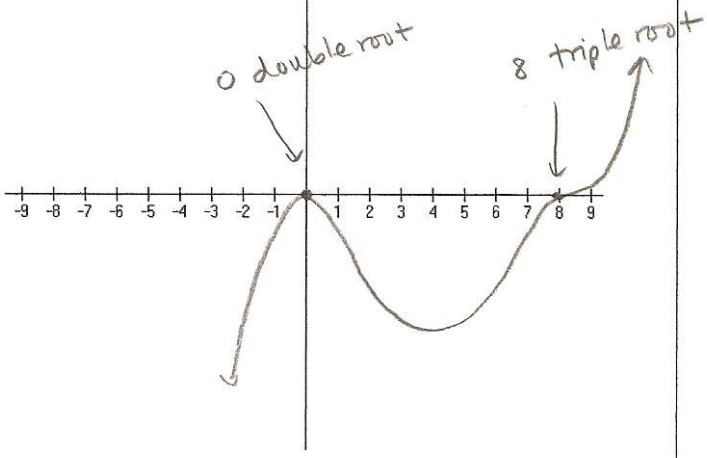


$\boxed{f(x)=(x+3)^2(x-2)^2}$

9. $f(x)=x^5-24x^4+192x^3-512x^2$

~~$f(x)=8x^5-192x^4+1536x^3-4096x^2$~~

you need to look @ your table and then play w/ window.



$\boxed{f(x)=x^2(x-8)^3}$