Algebra 2 Name_____ ID: 1

Assignment Date_____ Period____

Find all roots.

1) $(3x^2-5)(x+3)(x-3)=0$

2) $(3x-2)(3x^2+2)(x^2-6)=0$

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

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

$3x^2=4$ $-3\ -3$ $x=3$

$x^2=\frac{4}{3}$ $x=-3$

$x=\pm\sqrt{4/3}$

4) $(x+3)(x^2+7)(3x^2+4)=0$

Divide.

5) $(x^3-x^2-20x-60)\div(x-6)$

6) $(n^3+3n^2-45n-49)\div(n-6)$

7) $(3x^4-30x^3+52x^2-42x+80)\div(x-8)$

8) $(v^4-9v^3+11v^2+50v-38)\div(v-6)$

Find all roots.

9) $x^4-16x^2+63=0$

10) $x^4-x^2-42=0$

7) $(3x^4-30x^3+52x^2-42x+80)\div(x-8)$

8) $(v^4-9v^3+11v^2+50v-38)\div(v-6)$

Find all roots.

9) $x^4-16x^2+63=0$

10) $x^4-x^2-42=0$

Hint: $x^4+0x^3-16x^2+0x+63=0$

$\downarrow$ 1 0 -16 0 63

p/q ☺

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6) $(n^3+3n^2-45n-49)\div(n-6)$

$n-6$

$6\,\rfloor$ 1 3 -45 -49

$\downarrow$ 6 54 54

$1x^2$ $9x$ 9 $\boxed{5}$ constant remainder

$(n-6)\left(n^2+9n+9+\frac{5}{n-6}\right)$

$6\overline{)41}$ 6 $\frac{5}{6}$

-36

5 $6\frac{5}{6}$

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Divide.

5) $(x^3-x^2-20x-60)\div(x-6)$

6) $(n^3+3n^2-45n-49)\div(n-6)$

$(x-6)\overline{)x^3-x^2-20x-60}$

$x-6=0$

$6\,\rfloor$ 1 -1 -20 -60

$\downarrow$ 6 30 60

$1x^2$ $5x$ 10 $\boxed{0}$ constant

$(x-6)(x^2+5x+10)$

- FACTOR
- $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$(x-6)(x-\frac{-5+i\sqrt{15}}{2})(x+\quad)$

$\left(x-\frac{-5+i\sqrt{15}}{2}\right)$

$\left(x+\frac{-5-i\sqrt{15}}{2}\right)$

$\frac{-5\pm\sqrt{25-4(1)(10)}}{2(1)}$

$\frac{-5\pm\sqrt{25-40}}{2}$

$\frac{-5\pm\sqrt{-15}}{2}$

$\frac{-5\pm i\sqrt{15}}{2}$

Break apart.

$x=\frac{-5+i\sqrt{5}}{2}$ $x=\frac{-5-i\sqrt{5}}{2}$

$a=1$
$b=5$
$c=10$
ax^2+bx+c

- Find all factors.

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4) $(x+3)(x^2+7)(3x^2+4)=0$

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

$x^2+7=0$ $\quad \sqrt{x^2}=\sqrt{-7}$ $\quad x=\pm i\sqrt{7}$

$3x^2+4=0$ $\quad 3x^2=-4$ $\quad \sqrt{x^2}=\sqrt{\frac{-4}{3}}$ $\quad x=\pm i\sqrt{4/3}$

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

$3x^2-4=0$ $\quad 3x^2=4$ $\quad x^2=\frac{4}{3}$ $\quad x=\pm\sqrt{4/3}$

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

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

simplify

$x=\pm\frac{\sqrt{4}}{\sqrt{3}}=\pm\frac{2}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\pm\frac{2\sqrt{3}}{3}$

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1) $(3x^2-5)(x+3)(x-3)=0$

FACTORS

$3x^2-5=0$ $\quad 3x^2=5$ $\quad x^2=5/3$ $\quad x=\pm\sqrt{5/3}$

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

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

roots $\{\pm\sqrt{5/3}, -3, 3\}$

$x=\pm\sqrt{5/3}$

$x=3$

$x=-3$

2) $(3x-2)(3x^2+2)(x^2-6)=0$

$3x-2=0$ $\quad x=\frac{2}{3}$

$3x^2+2=0$ $\quad 3x^2=-2$ $\quad \sqrt{x^2}=\sqrt{\frac{-2}{3}}$ $\quad x=\pm\sqrt{\frac{-2}{3}}$

know $\sqrt{-1}=i$

question: $x=\pm i\sqrt{2/3}$ $\quad x=\pm\sqrt{2/3}\,i$ $\quad x=\pm\sqrt{2/3}\,i$

$x^2-6=0$ $\quad \sqrt{x^2}=\sqrt{6}$ $\quad x=\pm\sqrt{6}$

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Find all roots.

1) $(3x^2-5)(x+3)(x-3)=0$

2) $(3x-2)(3x^2+2)(x^2-6)=0$

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

4) $(x+3)(x^2+7)(3x^2+4)=0$

Divide.

5) $(x^3-x^2-20x-60)\div(x-6)$

6) $(n^3+3n^2-45n-49)\div(n-6)$

7) $(3x^4-30x^3+52x^2-42x+80)\div(x-8)$

8) $(v^4-9v^3+11v^2+50v-38)\div(v-6)$

Find all roots.

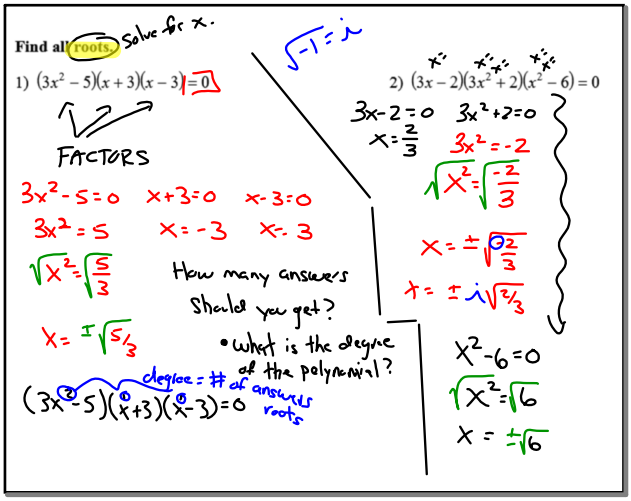
9) $x^4-16x^2+63=0$

10) $x^4-x^2-42=0$

$x^4+0x^3-16x^2+0x+63=0$

1 0 -16 0 63

p/q:



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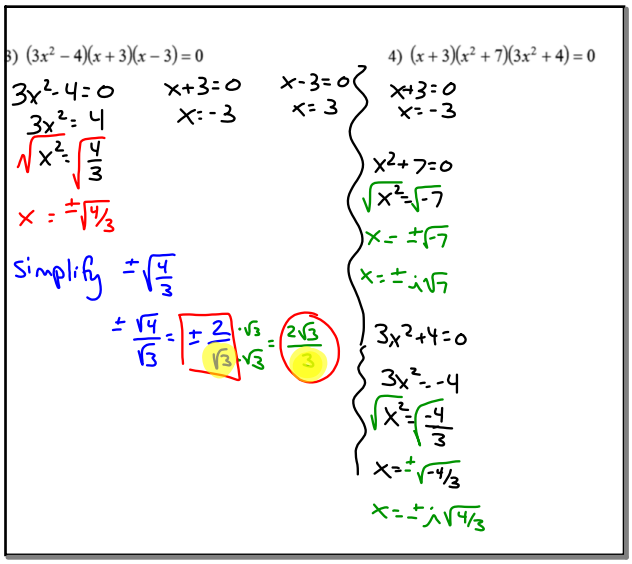

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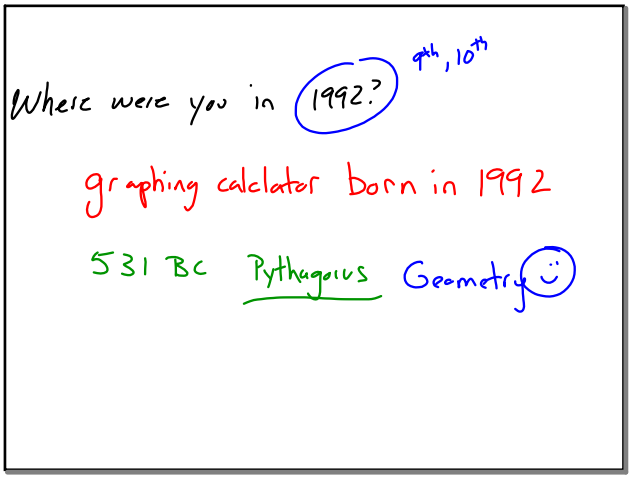

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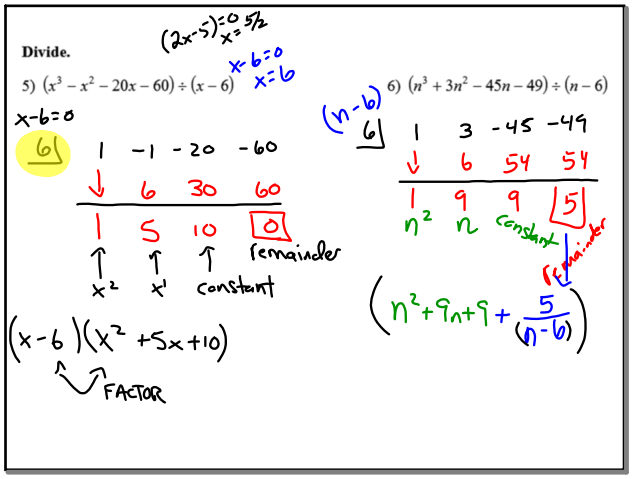

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5) $(x^3 - x^2 - 20x - 60) \div (x - 6)$

$$\begin{array}{r} x^2 + 5x + 10 \\ x-6 \overline{)\, x^3 - x^2 - 20x - 60} \\ -(-x^3 \pm 6x^2) \\ \hline 5x^2 - 20x \\ -(-5x^2 \pm 30x) \\ \hline 10x - 60 \\ -(-10x \pm 60) \\ \hline 0 \end{array}$$

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$$\begin{array}{r} 8 \\ 5\overline{)43} \\ -40 \\ \hline 3 \end{array} \quad \frac{3}{5}$$

$(5)(8\frac{3}{5}) = 43$

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Algebra 2 Name_____ ID: 1

Assignment Date_____ Period____

Find all roots.

1) $(3x^2 - 5)(x + 3)(x - 3) = 0$

2) $(3x - 2)(3x^2 + 2)(x^2 - 6) = 0$

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

4) $(x + 3)(x^2 + 7)(3x^2 + 4) = 0$

Divide.

5) $(x^3 - x^2 - 20x - 60) \div (x - 6)$ FACTOR

6) $(n^3 + 3n^2 - 45n - 49) \div (n - 6)$

7) $(3x^4 - 30x^3 + 52x^2 - 42x + 80) \div (x - 8)$

8) $(v^4 - 9v^3 + 11v^2 + 50v - 38) \div (v - 6)$

Find all roots.

9) $x^4 - 16x^2 + 63 = 0$

10) $x^4 - x^2 - 42 = 0$

Find all roots.

$\frac{P}{Q}$ (63) (1) $= \pm \frac{\pm 1, \pm 7, \pm 9, \pm 63}{\pm 1}$ $\pm 3, \pm 21$

9) $x^4 - 16x^2 + 63 = 0$

$x^4 + 0x^3 - 16x^2 + 0x + 63 = 0$

$$\begin{array}{r|rrrrr} 3 & 1 & 0 & -16 & 0 & 63 \\ (x-3) & \downarrow & 3 & 9 & -21 & -63 \\ \hline & 1x^3 & 3x^2 & -7x & -21 & \boxed{0} \end{array}$$

$x^3 + 3x^2 - 7x - 21$

$\frac{P}{Q} = \frac{\pm 1, 3, 7, 21}{1}$

$$\begin{array}{r|rrrr} -3 & 1 & 3 & -7 & -21 \\ (x+3) & \downarrow & -3 & 0 & 21 \\ \hline & 1x^2 & 0x & -7 & \boxed{0} \end{array}$$

$(x^2 - 7)$

$(x-3)(x+3)(x^2-7) = 0$

$x = 3 \quad x = -3 \quad x^2 - 7 = 0$

$x^2 = 7$

$x = \pm\sqrt{7}$

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6) $(n^3 + 3n^2 - 45n - 49) \div (n - 6)$

$(n-6)$

6 | 1 3 -45 -49

↓ 6 54 54

1 9 9 | 5

n^2 n constant remainder

$(n-6)\left(n^2+9n+9+\frac{5}{(n-6)}\right)$

$\left(n^2+9n+9+\frac{5}{(n-6)}\right)(n-6)$

$(n-6)n^2+(n-6)9n+9(n-6)+(n-6)\left(\frac{5}{n-6}\right)$

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$8\ \frac{3}{5}$

5 | 43

−40

3

$5\left(8\frac{3}{5}\right)=43$

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Divide.

5) $(x^3 - x^2 - 20x - 60) \div (x - 6)$

$x=6$ FACTOR $x-6=0$

$(2x-5)$ $x=5/2$

$x-6\overline{)x^3-x^2-20x-60}$

6 | 1 -1 -20 -60

↓ 6 30 60

1 5 10 | 0

x^2 x^1 constant remainder

$(x-6)(x^2+5x+10)$

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d all roots. Solve for x.

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

FACTORS

$3x-2=0$ $3x^2+2=0$ $x^2-6=0$

$x=\frac{2}{3}$ $3x^2=-2$ $\sqrt{x^2}=\sqrt{6}$

$\sqrt{x^2}=\sqrt{-\frac{2}{3}}$ $x=\pm\sqrt{6}$

$x=\frac{\pm\sqrt{0-\frac{2}{3}}}{}$ $i=\sqrt{-1}$

$x=\pm i\sqrt{\frac{2}{3}}$

FACTORS

$3x^2-5=0$ $x+3=0$ $x-3=0$

$+5\ +5$ $-3\ -3$ $+3\ +3$

$x=-3$ $x=3$

$\frac{3x^2}{3}=\frac{5}{3}$

$\sqrt{x^2}=\sqrt{\frac{5}{3}}$

$x=\pm\sqrt{5/3}$

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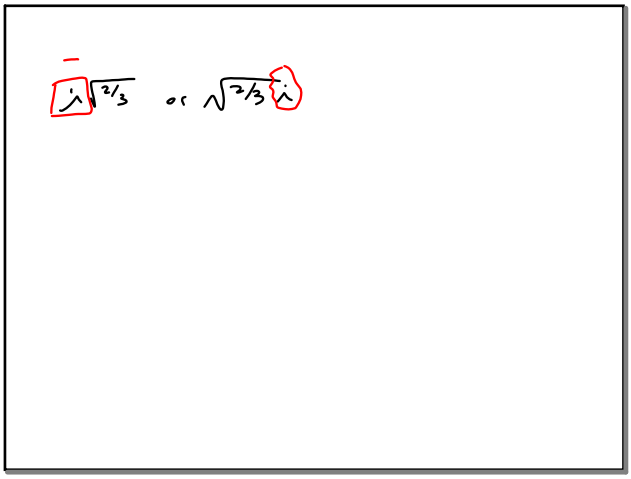

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Find all roots.

1) $(3x^2 - 5)(x + 3)(x - 3) = 0$

$\left\{\frac{\sqrt{15}}{3}, -\frac{\sqrt{15}}{3}, -3, 3\right\}$

2) $(3x - 2)(3x^2 + 2)(x^2 - 6) = 0$

$\left\{\frac{2}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}, \sqrt{6}, -\sqrt{6}\right\}$

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

$\left\{\frac{2\sqrt{3}}{3}, -\frac{2\sqrt{3}}{3}, -3, 3\right\}$

4) $(x + 3)(x^2 + 7)(3x^2 + 4) = 0$

$\left\{-3, i\sqrt{7}, -i\sqrt{7}, \frac{2i\sqrt{3}}{3}, -\frac{2i\sqrt{3}}{3}\right\}$

Divide.

5) $(x^3 - x^2 - 20x - 60) \div (x - 6)$

$x^2 + 5x + 10$

6) $(n^3 + 3n^2 - 45n - 49) \div (n - 6)$

$n^2 + 9n + 9 + \frac{5}{n - 6}$

7) $(3x^4 - 30x^3 + 52x^2 - 42x + 80) \div (x - 8)$

$3x^3 - 6x^2 + 4x - 10$

8) $(v^4 - 9v^3 + 11v^2 + 50v - 38) \div (v - 6)$

$v^3 - 3v^2 - 7v + 8 + \frac{10}{v - 6}$

Find all roots.

9) $x^4 - 16x^2 + 63 = 0$

$\{\sqrt{7}, -\sqrt{7}, -3, 3\}$

10) $x^4 - x^2 - 42 = 0$

$\{i\sqrt{6}, -i\sqrt{6}, \sqrt{7}, -\sqrt{7}\}$

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