Bellwork Alg 2 Friday, December 6, 2019

Find all EXACT complex zeros, real and non-real, by factoring.

1. $y = 12x^5 + 51x^3 - 126x$

2. $f(x) = 36x^5 - 8x^4 + 180x^3 - 40x^2$

3. Find all EXACT complex zeros, real and non-real. $y = 16x^4 + 56x^3 - 194x^2 + 243x - 198$

4. Simplify. $(5 - \sqrt{-36}) - (2 + 7i)(4 - 3i)$

5. Is $x + 3$ a factor of $x^3 + 4x^2 - 27x - 93$

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ANSWERS

Find all EXACT complex zeros, real and non-real, by factoring.

1. $y = 12x^5 + 51x^3 - 126x$

GCF = $3x$

$3x(4x^4 + 17x^2 - 42)$

-168, $+24$, -7, $+17$

	x^2	$+6$
$4x^2$	$4x^4$	$+24x^2$
-7	$-7x^2$	-42

$3x(x^2+6)(4x^2-7)$

$x = 0, \pm i\sqrt{6}, \pm \frac{\sqrt{7}}{2}$

$x = 0$

$x^2+6=0$, $\sqrt{x^2} = \sqrt{-6}$, $x = \pm i\sqrt{6}$

$4x^2-7=0$, $4x^2 = 7$, $\sqrt{x^2} = \sqrt{7/4}$, $x = \pm \frac{\sqrt{7}}{2}$

2. $f(x) = 36x^5 - 8x^4 + 180x^3 - 40x^2$

GCF = $4x^2$

$4x^2(9x^3 - 2x^2 + 45x - 10)$

	$9x$	-2
x^2	$9x^3$	$-2x^2$
$+5$	$+45x$	-10

$4x^2(9x-2)(x^2+5)$

$x = 0, \frac{2}{9}, \pm i\sqrt{5}$

$x = 0$

$9x-2=0$, $9x=2$, $x = 2/9$

$x^2+5=0$, $\sqrt{x^2} = \sqrt{-5}$, $x = \pm i\sqrt{5}$

3. Find all EXACT complex zeros, real and non-real. $y = 16x^4 + 56x^3 - 194x^2 + 243x - 198$

-6 | 16 56 −194 243 −198

	−96	240	−276	198
16	−40	46	−33	0

$8x^2 - 8x + 11$

$2x-3$ | $16x^3 - 40x^2 + 46x - 33$

$-(16x^3 - 24x^2)$

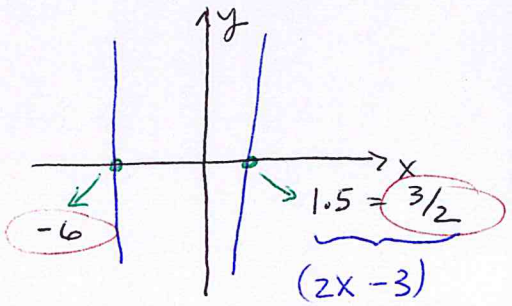
$-16x^2 + 46x$

$-(-16x^2 + 24x)$

$22x - 33$

$-(22x - 33)$

0



$8x^2 - 8x + 11 = 0$

$b^2 - 4ac = -288$

$\frac{8 \pm \sqrt{-288}}{16} \rightarrow 144 \cdot 2 = \frac{8 \pm 12i\sqrt{2}}{16}$

$= \frac{2 \pm 3i\sqrt{2}}{4}$

$x = -6, 3/2, \frac{2 \pm 3i\sqrt{2}}{4}$

4. Simplify. $(5 - \sqrt{-36}) - (2 + 7i)(4 - 3i)$

$(5 - 6i)$

	2	$+7i$
4	8	$+28i$
$-3i$	$-6i$	$-21i^2 = +21$

$(29 + 22i)$

$(5 - 6i) - (29 + 22i)$

$= -24 - 28i$

5. Is $x+3$ a factor of $x^3 + 4x^2 - 27x - 93$

-3 | 1 4 −27 −93

	−3	−3	90
1	1	−30	−3

OR

$f(-3) = (-3)^3 + 4(-3)^2 - 27(-3) - 93$

$f(-3) = -3$

Remainder = −3

NO, $x+3$ is not a factor because the remainder is NOT zero