

Advanced Algebra

Polynomials and the Intro to the Derivative Assignment #8

Either factor the given polynomial or multiply it out to general form.

1) $y = x^3 + 12x^2 + 20x - 96$ has a given root at -6

$$\begin{array}{r}
 x^2 + 6x - 16 \\
 \hline
 x+6 \overline{) x^3 + 12x^2 + 20x - 96} \\
 \underline{-x^3 + 6x^2} \\
 6x^2 + 20x \\
 \underline{-6x^2 + 36x} \\
 -16x - 96 \\
 \underline{+16x + 96} \\
 0
 \end{array}$$

Final factored form answer

$$y = (x+6)(x+8)(x-2)$$

2) $y = (x-5)(x-3)(x+4)$

	x^2	$-8x$	$+15$
x	x^3	$-8x^2$	$15x$
4	$4x^2$	$-32x$	60

Final general form answer

$$y = x^3 - 4x^2 - 17x + 60$$

3) $y = 2x^3 - 9x^2 - 50x - 48$ has a given root at -2

$$(2x+3)(x-8)$$

$$\begin{array}{r}
 2x^2 - 13x - 24 \\
 \hline
 x+2 \overline{) 2x^3 - 9x^2 - 50x - 48} \\
 \underline{-2x^3 + 4x^2} \\
 -13x^2 - 50x - 48 \\
 \underline{+13x^2 + 26x} \\
 -24x - 48 \\
 \underline{+24x + 48} \\
 0
 \end{array}$$

Final factored form answer

$$y = (x+2)(x-8)(2x+3)$$

4) $y = x^3 + 0x^2 - 28x + 48$ has a given root at -6

$$\begin{array}{r}
 x^2 - 6x + 8 \\
 x+6 \overline{) x^3 + 0x^2 - 28x + 48} \\
 \underline{-x^3 + 6x^2} \\
 6x^2 - 28x \\
 \underline{+6x^2 + 36x} \\
 8x + 48 \\
 \underline{-8x - 48} \\
 0
 \end{array}$$

Final factored form answer

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

5) $y = (x-2)(x+4)(x-6)$

	x^2	$2x$	-8
x	x^3	$2x^2$	$-8x$
-6	$-6x^2$	$-12x$	48

Final general form answer

$$y = x^3 - 4x^2 - 20x + 48$$

6) $y = 3x^3 + 16x^2 - 60x + 32$ has a given root at 2

$$\begin{array}{r}
 3x^2 + 22x - 16 \\
 x-2 \overline{) 3x^3 + 16x^2 - 60x + 32} \\
 \underline{-3x^3 + 6x^2} \\
 22x^2 - 60x \\
 \underline{-22x^2 + 44x} \\
 -16x + 32 \\
 \underline{-16x + 32} \\
 0
 \end{array}$$

Final factored form answer

$$y = (x-2)(x+8)(3x-2)$$

$$(3x-2)(x+8)$$

7) $y = (x-5)(x+8)(x-2)(x-4)$ hint: product of 2 binomials twice then 3 by 3 box

	x^2	$3x$	-40
x^2	x^4	$3x^3$	$-40x^2$
$-6x$	$-6x^3$	$-18x^2$	$240x$
8	$8x^2$	$24x$	-320

Final general form answer

$$y = x^4 - 3x^3 - 50x^2 + 264x - 320$$