San José State University
Fall 2015
Math-8: College Algebra
Section 03: MW noon–1:15pm
Section 05: MW 4:30pm-5:45pm

Homework Week 4 Solutions

Section 0.5

7. $-3x^3 + 2x + 8$, degree=3

8. Not a polynomial because of the $-3x^{-1}$ term.

9. Not a polynomial, because if we divide by x we get $3 + 4x^{-1}$, which is not a polynomial because of the $4x^{-1}$ term.

10. $\frac{2}{3}x^2 + \frac{5}{3}x - 1$, degree=2

11. $-w^4 + 2w^3 + w^2$, degree=4

12. Not a polynomial because of the square root.

16. $x^3 - 4x^2 + x$

a. $x = -1$

$$(-1)^3 - 4(-1)^2 + (-1) = -1 - 4(1) - 1 = -1 - 4 - 1 = -6$$

b. $x = 0$

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

c. $x = 1$

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

d. $x = 2$

$$(2)^3 - 4(2)^2 + (2) = 8 - 4(4) + 2 = 8 - 16 + 2 = -6$$

18.

$$\begin{aligned}(3x^2 + 1) - (2x^2 - 2x + 3) &= 3x^2 + 1 - 2x^2 + 2x - 3 \\ &= (3x^2 - 2x^2) + 2x + (1 - 3) \\ &= x^2 + 2x - 2\end{aligned}$$

20.

$$\begin{aligned}-(5x^2 - 1) + (-3x^2 + 5) &= -5x^2 + 1 - 3x^2 + 5 \\ &= (-5x^2 - 3x^2) + (1 + 5) \\ &= -8x^2 + 6\end{aligned}$$

22.

$$\begin{aligned}(15x^4 - 18x - 19) - (13x^4 - 5x + 15) &= 15x^4 - 18x - 19 - 13x^4 + 5x - 15 \\ &= (15x^4 - 13x^4) + (-18x + 5x) + (-19 - 15) \\ &= 2x^4 - 13x - 34\end{aligned}$$

24. $z^2(2z^2 + 3z + 1) = 2z^4 + 6z^3 + z^2$

26. $(2 - x^2)(-2x)(4x) = -8x^2(2 - x^2) = -16x^2 + 8x^4 = 8x^4 - 16^2$

28. $(x - 5)(x + 10) = x^2 + 10x - 5x - 50 = x^2 + 5x - 50$

30. $(7x - 2)(4x - 3) = 28x^2 - 21x - 8x + 6 = 28x^2 - 29x + 6$

32. $(3x - 4)(x^2 - 2x + 1) =$

$3x^3$	$-6x^2$	$+3x$	
	$-4x^2$	$+8x$	-4
$3x^3$	$-10x^2$	$+11x$	-4

34. $(x^2 + 3x + 2)(2x^2 - x + 4) =$

$2x^4$	$-x^3$	$+4x^2$		
	$+6x^3$	$-3x^2$	$+12x$	
		$+4x^2$	$-2x$	$+8$
$2x^4$	$+5x^3$	$+5x^2$	$+10x$	$+8$

36. $(3x + 2)(3x - 2) = 9x^2 - 4$

38. $(3x - 2)^2 = 9x^2 - 12x + 4$

40. $(5 - 8x)^2 = 25 - 80x + 64x^2 = 64x^2 - 80x + 25$

42. $[(x + 1) - y]^2 = (x + 1)^2 - 2(x + 1)y + y^2$

44. $(x - 2)^3 = x^3 - 3x^2(2) + 3x(2^2) - x^3 = x^3 - 6x^2 + 12x - 8$

46.

$$\begin{aligned}(3x + 2y)^3 &= (3x)^3 + 3(3x)^2(2y) + 3(3x)(2y)^2 + (2y)^3 \\ &= 27x^3 + (3 \cdot 9 \cdot 2)x^2y + (3 \cdot 3 \cdot 4)xy^2 + 8y^3 \\ &= 27x^3 + 54x^2y + 36xy^2 + 3y^3\end{aligned}$$

48. $(3x^2 - 4y^2)(3x^2 + 4y^2) = 9x^4 - 16y^2$

62. $920(1.04)^5 + 1000(1.04)^4 + 780(1.04)^3 + 1310(1.04)^2 + 1020(1.04) + 1200 = 6844.27$
Not quite \$7000, so you would be a little short on the deposit.

64. $20(x + x + 12) = 20(2x + 12) = 40x + 240$

Section 0.6

34. $x^2 + 6x + 8 = (x + 4)(x + 2)$

36. $z^2 - z - 6 = (z-3)(z+2)$

38. $z^2 - 4z - 21 = (z-7)(z+3)$

40. $x^2 - 5x - 150 = (x-15)(x+10)$

42. $2x^2 - x - 1 = (2x+1)(x-1)$

44. $12y^2 + 7y + 1 = (4y+1)(3y+1)$

46. $5u^2 + 13u - 6 = (5u-2)(u+3)$

52. $z^5 + 2z^3 + z^2 + 2 = z^3(z^2+2) + (z^2+2) = (z^3+1)(z^2+2)$

54. $3x^2 + 5x - 2 = 3x^2 + 6x - x - 2 = 3x(x+2) - (x+2) = (3x-1)(x+2)$

58. $12x^3 - 48x = 12x(x^2-4) = 12x(x+2)(x-2)$

60. $x^3 - \frac{1}{4}x = \frac{1}{4}x(4x^2-1) = \frac{1}{4}x(2x+1)(2x-1)$

62. $7y^2 - 63 = 7(y^2-9) = 7(y+3)(y-3)$

64. $9x^2 - 6x + 1 = (3x-1)^2$

66. $16 + 6x - x^2 = -(x^2 - 6x - 16) = -(x-8)(x+2)$

68. $3x^4 + x^3 - 10x^2 = x^2(3x^2 + x - 10) = x^2(3x-5)(x+2)$

70. Irreducible

72. $5 - x + 5x^2 - x^3 = (5-x) + x^2(5-x) = (1+x^2)(5-x)$

74. $3u - 2u^2 + 6 - u^3 = (3u+6) - (2u^2+u^3) = 3(u+2) - u^2(u+2) = (3-u^2)(u+2)$

76. $(t-1)^2 - 49 = [(t-1)+7][(t-1)-7] = (t+6)(t-8)$

78. $(x^2+8)^2 - 36x^2 = [(x^2+8)+6x][(x^2+8)-6x] = (x^2+6x+8)(x^2-6x+8)$

80. $3x^3 + 81 = 3(x^3+27) = 3(x+3)(x^2-3x+9)$

86. $3x^2 + 8x + 4 = (3x+2)(x+2)$, so if the width is $x+2$ then the length must be $3x+2$.

Section 1.3

12.

$$\begin{aligned} x^2 - 10x + 9 &= 0 \\ (x-1)(x-9) &= 0 \\ x &= 1, 9 \end{aligned}$$

14.

$$\begin{aligned} 9x^2 - 1 &= 0 \\ (3x-1)(3x+1) &= 0 \\ x &= \pm\frac{1}{3} \end{aligned}$$

16.

$$\begin{aligned} 16x^2 + 56x + 49 &= 0 \\ (4x+7)^2 &= 0 \\ x &= -\frac{7}{4} \end{aligned}$$

18.

$$\begin{aligned} 2x^2 &= 19x + 33 \\ 2x^2 - 19x - 33 &= 0 \\ (2x+3)(x-11) &= 0 \\ x &= -\frac{3}{2}, 11 \end{aligned}$$

20.

$$\begin{aligned} x^2 + 4x &= 21 \\ x^2 + 4x - 21 &= 0 \\ (x+7)(x-3) &= 0 \\ x &= -7, 3 \end{aligned}$$

66.

$$\begin{aligned} w(w+10) &= 336 \\ w^2 + 10w - 336 = 0 & \\ (w+28)(w-14) &= 0 \\ w &= 14 \\ l &= 14 + 10 = 24 \end{aligned}$$

70.

$$\begin{aligned} (2x+40)(2x+30) &= 3000 \\ 2(x+20)\cdot 2(x+15) &= 3000 \\ 4(x+20)(x+15) &= 3000 \\ (x+20)(x+15) &= 750 \\ x^2 + 35x + 300 &= 750 \end{aligned}$$

$$\begin{aligned} x^2 + 35x - 450 &= 0 \\ (x+45)(x-10) &= 0 \\ x &= 10 \\ w &= 2(10) + 30 = 50\text{ft} \end{aligned}$$

72.

$$\begin{aligned} -16t^2 + 1053 &= 0 \\ -16t^2 &= -1053 \\ t^2 &= \frac{1053}{16} \\ t &= \sqrt{\frac{1053}{16}} \\ t &\approx 8 \text{ seconds} \end{aligned}$$

74.

$$\begin{aligned} -16t^2 + 100 &= 0 \\ 16t^2 - 100 &= 0 \\ 4t^2 - 25 &= 0 \\ (2t+5)(2t-5) &= 0 \\ t &= 2.5 \text{ seconds} \end{aligned}$$