HW – 2/19/14
p.109, #17-22, 27-30, 32-38

17. $(x-3)$; $P(x) = 4x^6 - 12x^5 + 2x^3 - 6x^2 - 5x + 10$

$$3 \,|\; \begin{array}{ccccccc} 4 & -12 & 0 & 2 & -6 & -5 & 10 \\ & 12 & 0 & 0 & 6 & 0 & -15 \\ \hline 4 & 0 & 0 & 2 & 0 & -5 & \underline{-5} \end{array}$$

no, not a factor

18. $(x-8)$; $P(x) = x^5 - 8x^4 + 8x - 64$

$$8 \,|\; \begin{array}{cccccc} 1 & -8 & 0 & 0 & 8 & -64 \\ & 8 & 0 & 0 & 0 & 64 \\ \hline 1 & 0 & 0 & 0 & 8 & \boxed{0} \end{array}$$

yes, a factor

19. $(3x+12)$; $P(x) = 3x^4 + 12x^3 + 6x + 24$

$$-4 \,|\; \begin{array}{cccc} 3 & 12 & 6 & 24 \\ & -12 & 0 & -24 \\ \hline 3 & 0 & 6 & \underline{0} \end{array}$$

yes, a factor

20. $(8y^3 - 4y^2 - 50y + 25)$
$4y^2(2y-1) - 25(2y-1)$
$(2y-1)(4y^2-25)$
$\boxed{(2y-1)(2y-5)(2y+5)}$

21. $(4b^3 + 3b^2 - 16b - 12)$
$b^2(4b+3) - 4(4b+3)$
$(4b+3)(b^2-4)$
$\boxed{(4b+3)(b+2)(b-2)}$

22. $(3p^3 - 21p^2)(-p+7)$
$3p^2(p-7) - 1(p-7)$
$\boxed{(3p^2-1)(p-7)}$

27. $s^6 - 1$
$(s^3-1)(s^3+1)$
$\boxed{(s-1)(s^2+s+1)(s+1)(s^2-s+1)}$

28. $24n^2 + 3n^5$
$3n^5 + 24n^2$
$3n^2(n^3+8)$
$\boxed{3n^2(n+2)(n^2-2n+4)}$

29. $6x^4 - 162x$

$6x(x^3 - 27)$

$\boxed{6x(x-3)(x^2+3x+9)}$

30. $40 - 5t^3$

$-5t^3 + 40$

$-5(t^3 - 8)$

$\boxed{-5(t-2)(t^2+2t+4)}$

32. $V(x) = 168 - 28x - 28x^2$

$= -28(x^2 + x - 6)$

$= -28(x+3)(x-2)$

$x + 3 = 0 \qquad x - 2 = 0$

$\boxed{x = -3 \qquad x = 2}$

33. $x^6 - 14x^4 + 49x^2$

$x^2(x^4 - 14x^2 + 49)$

$\boxed{x^2(x^2 - 7)(x^2 - 7)}$

• 34. $(2x^3 + x^2 - 72x - 36)$

$x^2(2x+1) - 36(2x+1)$

$(2x+1)(x^2 - 36)$

$\boxed{(2x+1)(x-6)(x+6)}$

• 35. $(4x^3 + x^2 - 16x - 4)$

$x^2(4x+1) - 4(4x+1)$

$(4x+1)(x^2 - 4)$

$\boxed{(4x+1)(x+2)(x-2)}$

36. $9x^9 - 16x^7 + 9x^6 - 16x^4$

$x^4(9x^5 - 16x^3 + (9x^2 - 16))$

$x^4(x^3(9x^2 - 16) + 1(9x^2 - 16))$

$x^4(x^3 + 1)(9x^2 - 16)$

$\boxed{x^4(x+1)(x^2 - x + 1)(3x+4)(3x-4)}$

• 37. $8x^7 - 4x^5 - 18x^3 + 9x$

$x((8x^6 - 4x^4) - 18x^2 + 9))$

$x(4x^4(2x^2 - 1) - 9(2x^2 - 1))$

$x(4x^4 - 9)(2x^2 - 1)$

$\boxed{x(2x^2 + 3)(2x^2 - 3)(2x^2 - 1)}$

• 38. $x^{13} - 15x^9 - 16x^5$

$x^5(x^8 - 15x^4 - 16)$

$x^5(x^4 - 16)(x^4 + 1)$

$x^5(x^4 + 1)(x^2 + 4)(x^2 - 4)$

$\boxed{x^5(x^4 + 1)(x^2 + 4)(x+2)(x-2)}$