

Assignment

1. Factor completely.

a) $x^4 + 9x^2 + 20$ $\begin{array}{r} + \\ - \\ \hline 9 \end{array} \begin{array}{r} + \\ - \\ \hline 20 \end{array}$
 $(x^2 + 4)(x^2 + 5)$

b) $x^4 - 9x^2 + 20$ $\begin{array}{r} + \\ - \\ \hline 9 \end{array} \begin{array}{r} + \\ - \\ \hline 20 \end{array}$
 $(x^2 - 4)(x^2 - 5)$
 $(x-2)(x+2)(x^2 - 5)$

c) $a^4 - 17a^2 + 16$ $\begin{array}{r} + \\ - \\ \hline 17 \end{array} \begin{array}{r} + \\ - \\ \hline 16 \end{array}$
 $(a^2 - 16)(a^2 - 1)$
 $(a-4)(a+4)(a-1)(a+1)$

d) $t^6 - 4t^3 - 21$ $\begin{array}{r} + \\ - \\ \hline 4 \end{array} \begin{array}{r} + \\ - \\ \hline 21 \end{array}$
 $(t^3 - 7)(t^3 + 3)$

e) $3x^4 + 9x^2 - 30$ $\begin{array}{r} + \\ - \\ \hline 9 \end{array} \begin{array}{r} + \\ - \\ \hline 30 \end{array}$
 $3(x^4 + 3x^2 - 10)$
 $3(x^2 + 5)(x^2 - 2)$

f) $2x^5 - 16x^3 + 32x$ $\begin{array}{r} + \\ - \\ \hline 16 \end{array} \begin{array}{r} + \\ - \\ \hline 32 \end{array}$
 $2x(x^4 - 8x^2 + 16)$
 $2x(x^2 - 4)(x^2 - 4)$
 $2x(x-2)(x+2)(x-2)(x+2)$
 $2x(x-2)^2(x+2)^2$

2. Factor completely.

a) $6x^4 + 11x^2 + 5$ $\begin{array}{r} + \\ - \\ \hline 11 \end{array} \begin{array}{r} + \\ - \\ \hline 30 \end{array}$
 $6x^4 + 6x^2 + 5x^2 + 5$
 $6x^2(x^2 + 1) + 5(x^2 + 1)$
 $(6x^2 + 5)(x^2 + 1)$

b) $2a^4 - 5a^2 + 2$ $\begin{array}{r} + \\ - \\ \hline 5 \end{array} \begin{array}{r} + \\ - \\ \hline 2 \end{array}$
 $2a^4 - 4a^2 - 1a^2 + 2$
 $2a^2(a^2 - 2) - 1(a^2 - 2)$
 $(2a^2 - 1)(a^2 - 2)$

c) $5p^6 - 8p^3 - 4$ $\begin{array}{r} + \\ - \\ \hline 8 \end{array} \begin{array}{r} + \\ - \\ \hline 20 \end{array}$
 $5p^6 - 10p^3 + 2p^3 - 4$
 $5p^3(p^3 - 2) + 2(p^3 - 2)$
 $(5p^3 + 2)(p^3 - 2)$

d) $16x^4 + 8x^2 - 3$ $\begin{array}{r} + \\ - \\ \hline 8 \end{array} \begin{array}{r} + \\ - \\ \hline 48 \end{array}$
 $16x^4 - 4x^2 + 12x^2 - 3$
 $4x^2(4x^2 - 1) + 3(4x^2 - 1)$
 $(4x^2 + 3)(4x^2 - 1)$
 $(4x^2 + 3)(2x - 1)(2x + 1)$

e) $4 - 9r^2 - 9r^4$
 $-9r^4 - 12r^2 + 3r^2 + 4$
 $-3r^2(3r^2 + 4) + 1(3r^2 + 4)$
 $(-3r^2 + 1)(3r^2 + 4)$
 $-1(3r^2 - 1)(3r^2 + 4)$

f) $4x^5 - 50x^3 + 126x$
 $2x(2x^4 - 25x^2 + 63)$
 $2x(2x^4 - 18x^2 - 7x^2 + 63)$
 $2x^2(x^2 - 9) - 7(x^2 - 9)$
 $2x(2x^2 - 7)(x^2 - 9)$
 $2x(2x^2 - 7)(x - 3)(x + 3)$

g) $4x^2y^2 - xy - 14$
 $4x^2y^2 - 8xy + 7xy + 14$
 $4xy(xy - 2) + 7(xy - 2)$
 $(4xy + 7)(xy - 2)$

h) $4\pi^2r^2 - 9\pi r - 9$
 $4\pi^2r^2 - 12\pi r + 3\pi r - 9$
 $4\pi r(\pi r - 3) + 3(\pi r - 3)$
 $(4\pi r + 3)(\pi r - 3)$

π is the same as any variable like x + y

3. Given that $(\sin x)^2$ is written as $\sin^2 x$ and $(\cos x)^2$ is written as $\cos^2 x$, factor \rightarrow factor without + replace

a) $6 \sin^2 x + \sin x - 2 \rightarrow 6x^2 + x - 2$
 $6x^2 - 3x + 4x - 2$
 $3x(2x - 1) + 2(2x - 1)$
 $(3x + 2)(2x - 1)$
 $(3 \sin x + 2)(2 \sin x - 1)$

b) $4 \cos^2 x - 7 \cos x + 3$
 $4x^2 - 7x + 3$
 $4x^2 - 4x - 3x + 3$
 $4x(x - 1) - 3(x - 1)$
 $(4x - 3)(x - 1)$
 $(4 \sin x - 3)(\sin x - 1)$

4. Factor the polynomial expression $16a^8 - 65a^4 + 4$.

$16a^8 - 65a^4 + 4$
 $16a^4(a^4 - 4) - 1(a^4 - 4)$
 $(16a^4 - 1)(a^4 - 4)$
 $(4a^2 - 1)(4a^2 + 1)(a^2 - 2)(a^2 + 2)$
 $(2a - 1)(2a + 1)(4a^2 + 1)(a^2 - 2)(a^2 + 2)$

5. Factor.

a) $4(3x+1)^2 - 5(3x+1) + 1$

$4x^2 - 5x + 1$ $\begin{array}{r|l} 4 & x+1 \\ & -1 \\ \hline & -5 \end{array}$

$4x^2 - 4x - x + 1$ $-4, -1$

$4x(x-1) - 1(x-1)$

$(4x-1)(x-1)$

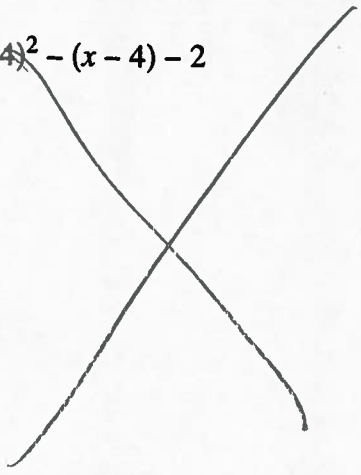
$(4(3x+1)-1)((3x+1)-1)$

$(12x+4-1)(3x)$

$(12x+3)(3x) \rightarrow$

$3(4x+1)(3x)$
 $9x(4x+1)$

b) $6(x-4)^2 - (x-4) - 2$



c) $4(a-b)^2 - 40(a-b) + 100$

$4A^2 - 40A + 100$

$4(A^2 - 10A + 25)$

$4(A-5)(A-5)$

$4(a-b-5)(a-b-5)$

or

$4(a-b-5)^2$

d) $5(2-3x)^2 - 28(2-3x) + 15$

$5A^2 - 28A + 15$ $\begin{array}{r|l} 5 & A \\ & -5 \\ \hline & -25 \end{array}$

$5A^2 - 25A - 3A + 15$ $-25, -3$

$5A(A-5) - 3(A-5)$

$(5A-3)(A-5)$

$[5(2-3x)-3][(2-3x)-5]$

$(10-15x-3)(2-3x-5)$

$(7-15x)(-3-3x)$

\leftarrow GCF?

$(7-15x) - 3(1+x)$

$-3(7-15x)(1+x)$

6. Factor $2(3a-4)^2 - (3a-4)(a+2) - 6(a+2)^2$

$2A^2 - AB - 6B^2$ $\begin{array}{r|l} 2 & A \\ & -3B \\ \hline & -12B \end{array}$

$2A^2 - 4AB + 3AB - 6B^2$ $-4, 3$

$2A(A-2B) + 3B(A-2B)$

$(2A+3B)(A-2B)$

$[2(3a-4) + 3(a+2)][(3a-4) - 2(a+2)]$

$(6a-8+3a+6)(3a-4-2a-4)$

$(9a-2)(a-8)$

Multiple choice

7. From the expressions below, the one which does not represent a perfect square trinomial is

- A. $x^2 - 14x + 49$
- B. $144 + 24x + x^2$
- C. $4x^2 - 12x + 36$
- D. $9x^4 + 30x^2 + 25$

8. When factored completely, the polynomial $k^4 + 16 - 17k^2$ is equal to

- A. $(k^2 - 1)(k^2 - 16)$
 - B. $(k^2 + 1)(k^2 + 16)$
 - C. $k^2(k + 1)(k + 16)$
 - D. $(k + 1)(k - 1)(k + 4)(k - 4)$
- Handwritten notes for Q8:*
 $k^4 - 17k^2 + 16$
 $\begin{array}{r} +1x \\ -17 \overline{)16} \\ -16 \overline{)16} \\ \hline 0 \end{array}$
 $(k^2 - 16)(k^2 - 1)$
 $(k - 4)(k + 4)(k - 1)(k + 1)$
yes but not all the way

9. One factor of $x^4 - 16x^2 + 15$ is

- A. $x + 1$
- B. $x^2 + 15$
- C. $x + 15$
- D. $x - 15$

Handwritten work for Q9:
 $\begin{array}{r} +1x \\ -16 \overline{)15} \\ -15 \overline{)15} \\ \hline 0 \end{array}$
 $(x^2 - 15)(x^2 - 1)$
 $(x^2 - 15)(x - 1)(x + 1)$

Numerical Response

10. The polynomial expression $\frac{1}{4}(x - 2)^2 + 3(x - 2) + 9$ can be written in the form $(Ax + B)^2$. The value of $A + B$, to the nearest tenth, is _____.
 (Record your answer in the numerical response box from left to right.)

2.5

Handwritten work for Q10:
 $\sqrt{\frac{1}{4}} = \frac{1}{2}$
 $\sqrt{9} = 3$
 $\frac{1}{2} \cdot 3 = 1.5$
 $1.5 \times 2 = 3$
 so perfect square

Handwritten work for Q10:
 $\sqrt{\left(\frac{1}{4}A^2 + 3A + 9\right)}$
 $\left(\frac{1}{2}A + 3\right)\left(\frac{1}{2}A + 3\right)$
 $\left(\frac{1}{2}(x-2) + 3\right)\left(\frac{1}{2}(x-2) + 3\right)$
 $\left(\frac{1}{2}x - 1 + 3\right)\left(\frac{1}{2}x - 1 + 3\right)$

Handwritten work for Q10:
 $\left(\frac{1}{2}x + 2\right)^2$
 $\frac{1}{2} + 2 = 2\frac{1}{2}$
 2.5