→ Also know how to divide polynomials ←

MAC 1105 PRACTICE EXAM I (70 pts.)

① Add
$(-3x^3 - 5x^4 - 7) + (9x^4 + 3 - 9x^3)$

② Multiply: $(7x-2)(2x^2+5x+3)$

③ Multiply: $(x+2)^3$

④ Factor: $q^4 + 64q$

⑤ Factor: $64x^3 - 48x^2 - 4x + 3$
Hint: Use grouping on ⑤

⑥ Factor: $12x^2 + x - 6$

⑦ Factor: $81x^4 - 16$

⑧ Reduce: $\dfrac{x^2+2x-8}{2-x}$

⑨ Multiply and simplify:
$\dfrac{10m^2-3m-4}{5m^2-m-4} \cdot \dfrac{15m^2+12m}{4m^2-1}$

⑩ Add:
$\dfrac{8}{x+5} + \dfrac{3}{x-5}$

⑪ Simplify:
$$\frac{1}{\frac{1}{x} - \frac{1}{y}}$$

⑫ Rationalize denominator and reduce:
$\dfrac{4}{3-\sqrt{7}}$

⑬ Combine like terms: $x, y \geq 0$
$4\sqrt{8x} - \sqrt{12y^2} + 4\sqrt{2x} + 2\sqrt{75y^2}$

⑭ Simplify:
$\sqrt{\dfrac{9x^5}{8y^2z}}$ $x, y, z \geq 0$

Note: Simplify and reduce answers completely on this exam.
Factor means to factor completely.
Show all work on the stapled pages.

# MAC 1105 PRACTICE EXAM I KEY

① $4x^4 - 12x^3 - 4$

② $14x^3 + 35x^2 + 21x$
$\quad - 4x^2 - 10x - 6$
$14x^3 + 31x^2 + 11x - 6$

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

④ $q(q^3 + 64) =$
$q(q+4)(q^2 - 4q + 16)$

⑤ $16x^2(4x-3) - 1(4x-3)$
$(16x^2 - 1)(4x-3)$
$(4x+1)(4x-1)(4x-3)$

⑥ $12(-6) = -72$
$(-8)(9) = -72$
$12x^2 - 8x + 9x - 6$
$4x(3x-2) + 3(3x-2)$
$(4x+3)(3x-2)$

⑦ $(9x^2 + 4)(9x^2 - 4) =$
$(9x^2+4)(3x+2)(3x-2)$

⑧ $\dfrac{(x+4)(x-2)(-1)}{(2-x)}$
$= -x - 4$

⑨ $\dfrac{(2m+1)(5m-4)}{(5m+4)(m-1)} \cdot \dfrac{3m(5m+4)}{(2m+1)(2m-1)}$
$= \dfrac{3m(5m-4)}{(m-1)(2m-1)}$

⑩ $\dfrac{8(x-5) + 3(x+5)}{(x+5)(x-5)}$
$= \dfrac{8x - 40 + 3x + 15}{(x+5)(x-5)} = \dfrac{11x - 25}{(x+5)(x-5)}$

⑪ $\dfrac{1}{\left(\frac{1}{x} - \frac{1}{y}\right)} \cdot \dfrac{xy}{xy} = \dfrac{xy}{y - x}$

⑫ $\dfrac{4}{3-\sqrt{7}} \cdot \dfrac{3+\sqrt{7}}{3+\sqrt{7}} = \dfrac{12 + 4\sqrt{7}}{9-7}$
$= \dfrac{12 + 4\sqrt{7}}{2} = 6 + 2\sqrt{7}$

⑬ $8\sqrt{2x} - 2y\sqrt{3} + 4\sqrt{2x} + 10y\sqrt{3}$
$= 12\sqrt{2x} + 8y\sqrt{3}$

⑭ $\dfrac{3x^2}{2y}\sqrt{\dfrac{x}{2z}}$