PRECALCULUS REVIEW

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Problem 1. (Arithmetic) Evaluate the following expressions

a) $64 + 138 + 36 =$

b) $5.991 + 1.79 + 0.21 + 0.009 =$

c) $1/8 + 13/16 + 3/16 + 3/8 =$

d) $-5 - 3^2 =$

e) $3 - 4[5 - 6(2 - 8)] =$

f) $[3 - 8 \cdot 5 - (-1 - 2 \cdot 3)] \cdot (3^2 - 4^2)^2 =$

g) $2 \cdot 3 - 4 \cdot 5^2 =$

h) $7 + 4[2(5 - 8) - 4] =$

i) $1/2 + 1/3 + 1/6 =$

j) $\{4 \cdot 8 - 6[7 - (5 - 6)^2]\}^2 =$

Problem 2. (Polynomials) Simplify

a) $(x^3 - 3x^2 + 8x + 7) + (-5x^3 - 12x + 3) =$

b) $(y^2 - 5y + 7) - (3y^2 - 5y + 12) =$

c) $(x + 5)(x^2 + 5x - 1) =$

d) $(2x + 3)(4x + 5) =$

e) $(x + 2y)(x^3 - 3x^2y + xy^2) =$

f) $3x^2 - 5x - (5x + 8 - (7 - 5x^2 + (3x^2 - x + 1))) =$

Problem 3. (Factoring Polynomials) Factor completely:

a) $x^2 + 2x + 1 =$

b) $x^2 - 4$

c) $x^2 + 8x + 4 =$

d) $4x^2 - 9y^2 =$

e) $3x^5 - 24x^4 + 12x^3 =$

f) $x^2 + 7x + 10 =$

g) $x^2 - 7x + 10 =$

h) $x^2 - 15x + 50 =$

i) $3x^2 + 4xy - 3xt - 4ty =$

j) $4x^2 + 11xy + 6y^2 =$

k) $x^2 + 12x + 20 =$

l) $9x^2 - 25y^4 =$

Problem 4. (Exponents) Simplify

a) $2(3x^2y)^3(4x^4y^3)^2 =$

b) $\dfrac{4x^5y^3)^2}{2(xy^4)^3} =$

c) $\dfrac{x^2y^{-3}}{x^3y^3} =$

d) $\dfrac{(x^2y^{-3})^{-2}}{(x^3y^4)^{-4}} =$

e) $(x^2 + y^2)^{-2} =$

f) $(3x^{-5})^{-2}(5y^{-4})^3 =$

g) $(x^{-2} + y^{-2})^2 =$

h) $\left(\dfrac{t^3u^4}{4t^5u^3}\right)^{-3} =$

i) $x^{1/2}x^{1/3} =$

j) $x^{2/3}/x^{5/6} =$

k) $(x^4y^4)^{-1/2} =$

Problem 5. (Rational Expressions) Simplify:

a) $\dfrac{(x+h)^2 - x^2}{h} =$

b) $\dfrac{5x^2 - 8x + 3}{25x^2 - 9} =$

c) $\dfrac{x^2 - 7x + 12}{x^2 - 9} \cdot \dfrac{x^3 - 6x^2 + 9x}{x^3 - 4x^2}$

d) $\dfrac{x^2 - 4y^2}{xy + 2y^2} \div (x^2 - 3xy + 2y^2) =$

Problem 6. (More Rational Expressions) Simplify:

a) $\dfrac{y - \dfrac{x^2}{y}}{x + y} =$

b) $\dfrac{\dfrac{x}{x-1} - \dfrac{x}{x+1}}{\dfrac{x}{x-1} + \dfrac{x}{x+1}} =$

c) $\dfrac{\dfrac{1}{x} - \dfrac{1}{a}}{x - a} =$

Problem 7. (Radicals) Rationalize the denominator:

a) $\dfrac{x^3y^2}{\sqrt{2xy^2}} =$

b) $\dfrac{\sqrt{x}}{\sqrt{x}+1} =$

c) $\dfrac{\sqrt{x}+\sqrt{h}}{\sqrt{x}-\sqrt{h}} =$

d) $\dfrac{x^2 - 16y^2}{\sqrt{x} - 2\sqrt{y}} =$

Problem 8. (Equations) Solve for x (for the first three use the indicated method):

a) $3x^2 + 5x + 2 = 0$ by factoring

b) $x^2 + 5x + 2 = 0$ by factoring

c) $x^2 - 8x + 25 = 0$ using the quadratic formula

d) $\sqrt{x+2} = x - 4$

e) $\dfrac{x}{5} - \dfrac{3x}{4} = 2 - \dfrac{x}{8}$

f) $2(3x + 4) + 5(6x - 7) = 7(5x - 4) + 1 + x$

g) $\dfrac{y+5}{y-3} = 7$

h) $\dfrac{6}{x+1} = 5 - \dfrac{6x}{x+1}$

i) $(x + 5)^2 + (2x - 7)^2 = 82$

j) $x^4 - 5x^2 - 36 = 0$

k) $e^{2x} - 9 = 0$

l) $e^{2x} - 6e^x + 8 = 0$

m) $\sqrt{2x} = \sqrt{x+1} + 1$