Sols

MATH 122

The following sets of three statements contain two truths and a lie. Your task is to determine which are truthful statements and which is the lie. Provide justification for your conjectures.

Radicals

A) $\sqrt{x^2 + y^2} = \sqrt{x^2} + \sqrt{y^2} = x + y$ *(circled)*

B) $\sqrt{\dfrac{36}{x^2}} = \dfrac{\sqrt{36}}{\sqrt{x^2}} = \dfrac{6}{x}$

C) $\sqrt{a^2 b^2 c^4 d^8} = abc^2 d^4$

Simplification

A) $\dfrac{x}{x(x-4)} = \dfrac{1}{x-4}$

B) $\dfrac{y}{a+b} = \dfrac{y}{a} + \dfrac{y}{b}$ *(circled)*

C) $\dfrac{x+y}{b} = \dfrac{x}{b} + \dfrac{y}{b}$

Exponents

A) $x^5 x^2 = x^7$

B) $(a^2)^3 = a^6$

C) $\dfrac{x^6 y^4}{x^3 y} = x^2 y^4$ *(circled)*

Expanding Binomials

A) $(x+2y)^2 = x^2 + 4y^2$ *(circled)*

B) $(2a+3b)^2 = 4a^2 + 12ab + 9b^2$

C) $(-4x+1)^2 = 16x^2 - 8x + 1$

Sidework

$\sqrt{1^2 + 2^2} = \sqrt{1+4} = \sqrt{5}$

$\sqrt{1^2} + \sqrt{2^2} = 1 + 2 = 3$ ✗

$\dfrac{y}{a} + \dfrac{y}{b} = \dfrac{y}{a}\cdot\dfrac{b}{b} + \dfrac{y}{b}\cdot\dfrac{a}{a} = \dfrac{yb}{ab} + \dfrac{ya}{ab}$

$= \dfrac{yb + ya}{ab} \neq \dfrac{y}{a+b}$

$\dfrac{x^n}{x^m} = x^{n-m}$ So, $\dfrac{x^6 y^4}{x^3 y} = x^{6-3} y^{4-1}$

$= x^3 y^3$

$\neq x^2 y^4$

$(x+2y)^2 = (x+2y)(x+2y)$ FOIL

$= x^2 + 2xy + 2xy + 4y^2$

$= x^2 + 4xy + 4y^2$

$\neq x^2 + 4y^2$

In order to be successful in throughout this course, your factoring skills need to be sharp. Factor the following expressions completely; simplify if possible.

1. $4x + 8y + 16z$

$4(x + 2y + 4z)$

2. $3xy^2 + 6x^3y - 15x^2$

$3x(y^2 + 2x^2y - 5x)$

3. $\dfrac{x^2 + x}{x}$

$\dfrac{\cancel{x}(x+1)}{\cancel{x}}$

$x + 1$

4. $x^2 - 4$

$(x+2)(x-2)$

5. $x^2 + 5x + 6$

$(x+3)(x+2)$

6. $x^2 - 2x - 8$

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

7. $2x^2 - 5x - 3$

$(2x+1)(x-3)$

8. $\dfrac{x^2 - 16}{2x^2 + 7x - 4}$

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

$\dfrac{x-4}{2x-1}$