

Precalculus. Fall 2007

Factorization and Powers. Monday, September 17th, 2007

1. Simplify:

$$\left(\frac{2a^2b}{3}\right)^3 : \frac{b^2}{a^{-3}}$$

2. True or False, and why:

(a) The cube of $2x$ is $2x^3$

(b) $2^3 \cdot 7^3 = 14^6$

(c) The half of 2^{2002} is 2^{1001}

(d) $4 \cdot 10^5 + 7 \cdot 10^3 = 11 \cdot 10^8$

(e) The half of $\sqrt{50}$ is $\sqrt{25}$

(f) $4 - x^2 = (x + 2)(x - 2)$

(g) $10\sqrt{2} = \sqrt{200}$

(h) $(\sqrt{2} + \sqrt{3})^2 = 5$

(i) $\sqrt{43 + \sqrt{31 + \sqrt{21 + \sqrt{13 + \sqrt{7 + \sqrt{3 + \sqrt{1}}}}}}}} = 7$

3. Simplify:

$$\frac{3^3 \cdot (-2)^2 \cdot 3^2}{9^3 \cdot 6^2} \quad \left(4^{\frac{3}{5}}\right) : \sqrt{8}$$

4. Solve:

$$(2a + b)^2 \cdot (3a) \qquad \frac{(a^2 \cdot b)^2 (ca^2)}{(a \cdot b^2)^3} \qquad \frac{(a^2b)^{-3} \cdot c^5 \cdot a^4}{a \cdot (b \cdot c^2)^2 \cdot b^{-1}}$$

5. Factorize: $(x^2 - 4) + (x + 2)^2$

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

6. Knowing that $3689^2 = 13608721$, find, without a calculator, the product 3688×3690

7. True or false, and why:

$$\begin{array}{llll} (3x)^2 & = & 9x^2 & 4^8 & = & 2^{16} & 10^{10} & = & 1^{100} \\ -(-4)^2 & = & 16 & 100^{100} & = & 10^{200} & 100^{100} & = & (10^{100})^2 \end{array}$$

8. Let $a = \sqrt{17 + \sqrt{12}}$ and $b = \sqrt{17 - \sqrt{12}}$. Find ab and $(a + b)^2$

9. Solve and simplify:

$$\frac{9b^2(a^3)^2}{3a^4} + (2b)^5 \frac{(-a)^3}{ab^3}$$

10. Factorize:

$$P(x) = 4x^2 - 81 + (x - 3)(2x + 9) \quad ; \quad Q(x) = (5 - x^2) - (2 - x)(5 + x) \quad ; \quad R(x) = x^2 - \frac{2}{3}x + \frac{1}{9}$$

11. Develop, reduce and factorize:

$$(7x + 6)^2 - 24x(x + 1) =$$