Practice and Review for Calculus

ALGEBRA

Laws of Exponents

For each question below, simplify as much as possible. Write your answers without negative exponents. *Note*: A calculator is not necessary and should not be used.

1 $(3a^3b^3)(4ab^2)^2 =$

2 $(\frac{2}{3})^{-2} =$

3 $16^{-\frac{3}{4}} =$

4 $(27a^{-3}b^6c^3)^{\frac{1}{3}} =$

5 $\left(\frac{3x^{3/2}y^3}{x^2y^{-1/2}}\right)^{-2} =$

6 $\frac{x^{4b+1}}{x^{2-b}} =$

7 $\sqrt[4]{3}\sqrt[5]{3} =$

8 $\frac{(25-9)^{3/2}}{8^{2/3}} =$

9 $\frac{\left((2b)^3(b+2)\right)^3}{(2b^2)^4} =$

10 $\frac{\left(\sqrt[4]{a}\sqrt[4]{b}\right)^2}{(ab)^2} =$

Expanding, Factoring, Simplifying

Simplify the given expressions.

11 $\dfrac{x^2-5x+6}{2(x-3)}$

12 $\dfrac{x^2+4x}{x^2-2x-24}$

13 $\dfrac{9-6x}{2x^2+5x-12}$

14 $\dfrac{2(1+h)^2+4(1+h)-6}{h}$

15 $\dfrac{(x+h)^2+3(x+h)-(x^2+3x)}{h}$

16 $\frac{f(x+h)-f(x)}{h}$, where $f(x) = 5 - 3x^2$.

17 $\frac{g(x+h)-g(x)}{h}$, where $g(x) = \frac{x^2}{2} - 4x + 9$.

18 $\frac{\frac{1}{3x^2}-\frac{1}{12}}{x-2}$

19 $\left(\frac{(a+b)^2}{a^2-b^2}\right)\left(\frac{a-b}{a+b}\right)$

20 $\frac{\frac{21-7x}{x+3}}{\frac{x^2-3x}{2x+3}}$

Solving Equations

In each equation, find all solutions for the given unknown variable. (Find only the real solutions.)

21 $x^2 - x - 12 = 0$

22 $u^3 - 2u^2 - 15u = 0$

23 $t^4 + t^2 = 12$

24 $9(y-1)^2(y+2)^5 - 6(y-1)^3(y+2)^4 = 0$

25 $2x(4-x)^{-1/2} - 3(4-x)^{1/2} = 0$

26 $t^4 = 4t^3 - 2t^2$

27 $\frac{1}{x} = \frac{1}{x+1} + \frac{1}{x+4}$

28 $(u-3)^2 + u(u+15) = 0$

29 $\frac{(x+2)^2(6x) - 2(3x^2+1)(x+2)}{(x+2)^4} = 0$

30 $\frac{3(t^2+1)(t-2)^2 - 2t(t-2)^3}{t^2+1} = 0$