Warm up

Name:

StudentID:

Major:

Justify your solutions and show all your steps. Write down formulae used.

1. Write the following with positive exponents:

   (a) x^{-3}

   (b) $\frac{1}{x^{-2}}$

   (c) $\sqrt{x}$

   (d) $\frac{1}{3}(x^2-1)^{-\frac{2}{3}}(2x)$

   (e) $\sqrt{x^2-1}$

2. Simplify:

   (a) 2^0

   (b) x^0

   (c) $49^{\frac{1}{2}}$

   (d) 10^{-2}

   (e) $\frac{4(x+h)^2-4x^2}{h}$ if $h \neq 0$

   (f) $(2x^3+3x+1)2x+(x^2+4)(6x^2+3)$

   (g) $\frac{x(3x^2)-x^3(1)}{x^2}$ if $x \neq 0$

   (h) $\frac{x^2-x-6}{x+2}$ if $x \neq -2$

   (i) $\frac{x^2-4}{x-2}$ if $x \neq 2$

   (j) $\frac{1}{(3x)^{\frac{1}{2}}} \cdot \frac{1}{2}(3x)^{-\frac{1}{2}} \cdot 3$

   (k) $\frac{1}{n^3}\left(\frac{n(n+1)(2n+1)}{6} - \frac{2n(n+1)}{2} + n\right)$

3. Answer true or false:

   (a) $(\frac{1}{2})^x = 2^{-x}$

   (b) $\sqrt{50} = 50^{\frac{1}{2}}$

   (c) If $8 = 2^y$ then $y = 4$.

   (d) If $x^3 = 8$ then $x = 2$

4. Find the value:

   (a) $f(x) = 2^{-2x}$ for $x = -2$ and 1

   (b) $f(t) = (1+0,02)^t$ for $t = 0$

   (c) $f(t) = 100(0,03)^{0,02^t}$ for $t = 0$

   (d) $f(x) = \frac{x^2-x-6}{x+2}$ for $-3, -2, 5, -2, 1, -2$

    (e) $f(x) = \frac{1}{3}x^3 - x^2 - 3x + 2$ for -1

    (f) $f'(x) = x^2 - 2x - 3$ for -2

5. Factor:

    (a) $x^2 - x - 6$

    (b) $x^2 - 4$

    (c) $x^2 + 3x + 2$

    (d) $x^3 - x^2 - 6x$

    (e) $8000 - 80x - 3x^2$

6. Expand:

    (a) $(x^2 + 4)^2$

7. Write as a power:

    (a) $\sqrt{t}$

    (b) $\frac{1}{x}$

    (c) $\frac{1}{\sqrt[3]{x^2+1}}$

    (d) $\sqrt{x}$

    (e) $\sqrt{x^2 - 9}$

8. Find $\frac{f(x+h)-f(x)}{h}$ for $f(x) = 3x^2 + 2x$.

9. Find the slope of the passing line through $(1,2)$ and $(2,4)$.

10. What slopes have vertical and horizontal lines?

11. Write the equation of the line passing

    (a) through $(1,5)$ with slope 8.

    (b) through $(-2,-2)$ with slope 5.

12. For what values of x are the following functions undefined?

    (a) $\frac{2}{3\sqrt[3]{x+2}}$

    (b) $\frac{1}{3}(x^2 - 1)^{-\frac{2}{3}}(2x)$

13. Solve:

    (a) $0 = x^2 - 2x - 3$

    (b) If $f'(x) = 3x^2 - 3$, what values of x make $f'(x) = 0$?

    (c) $x^2 + y^2 - 9 = 0$ for y

    (d) $\ln y = kt + C$ for y

    (e) $\begin{cases} 0 = 50 - 2x - 2y \\ 0 = 60 - 2x - 4y \end{cases}$ for x and y

    (f) $\begin{cases} x = 2y \\ x + y - 9 = 0 \end{cases}$

14. Divide $x^4 - 2x^3 + 4x^2 - 7x - 1$ by $x^2 - 2x$

15. If $F(x) = \frac{x^4}{4} + 4x + C$, what is $F(4) - F(2)$?

16. If $F(x) = -\frac{1}{9} \ln \left(\frac{0 + \sqrt{81 - 9x^2}}{3x} \right)$, what is $F(3) - F(2)$?

17. What is the dependent and independent variable of a function?

18. What is the domain of $f(x) = \frac{3x}{x-1}$?