

Complex Fractions

When simplifying complex fractions, multiply by a fraction equal to 1 which has a numerator and denominator composed of the common denominator of all the denominators in the complex fraction.

Simplify each of the following.

$$1) \frac{\frac{25}{a} - a}{5+a} \quad 2) \frac{2 - \frac{4}{x+2}}{5 + \frac{10}{x+2}} \quad 3) \frac{4 - \frac{12}{2x-3}}{5 + \frac{15}{2x-3}} \quad 4) \frac{\frac{x}{x+1} - \frac{1}{x}}{\frac{x}{x+1} + \frac{1}{x}} \quad 5) \frac{1 - \frac{2x}{3x-4}}{x + \frac{32}{3x-4}}$$

Functions

To evaluate a function for a given value, simply plug the value into the function for x .

Recall: $(f \circ g)(x) = f[g(x)]$ read "f of g of x" Means to plug the inside function (in this case $g(x)$) in for x in the outside function (in this case, $f(x)$).

Let $f(x) = 2x + 1$ and $g(x) = 2x^2 - 1$. Find each.

$$6) f(2) = \quad 7) g(-3) = \quad 8) f(a+1) =$$

$$9) f[g(-2)] = \quad 10) g[f(m+2)] = \quad 11) \frac{f(x+h) - f(x)}{h} =$$

Let $f(x) = x^2$, $g(x) = 2x + 5$, and $h(x) = x^2 - 1$. Find each.

$$12) h[f(-2)] = \quad 13) f[g(x-1)] = \quad 14) g[h(x^3)] =$$

Find $\frac{f(x+h) - f(x)}{h}$ for the given function f .

$$15) f(x) = 9x + 3 \quad 16) f(x) = 5 - 2x \quad 17) f(x) = x^2 - 5x$$

Equation of a line**Slope intercept form:** $y = mx + b$ **Vertical line:** $x = c$ (slope is undefined)**Point-slope form:** $y - y_1 = m(x - x_1)$ **Horizontal line:** $y = b$ (slope is 0)

- 18) Use slope-intercept form to find the equation of the line having a slope of 3 and a y -intercept of 5.
- 19) Determine the equation of a line passing through the point $(5, -3)$ with an undefined slope.
- 20) Determine the equation of a line passing through the point $(-4, 2)$ with a slope of 0.
- 21) Use point-slope form to find the equation of the line passing through the points $(0, 5)$ with a slope of $2/3$.
- 22) Find the equation of a line passing through the point $(2, 8)$ and parallel to the line $y = \frac{5}{6}x - 1$.
- 23) Find the equation of line perpendicular to the y -axis passing through the point $(4, 7)$.
- 24) Find the equation of a line passing through the points $(-3, 6)$ and $(1, 2)$.
- 25) Find the equation of a line with an x -intercept $(2, 0)$ and a y -intercept $(0, 3)$.

Exponentials and Logarithms:26) Solve for x (do NOT use a calculator):

a) $5^{(x+1)} = 25$ b) $\frac{1}{3} = 3^{(2x+2)}$ c) $\log_2 x = 3$ d) $\log_3 x^2 = 2\log_3 4 - 4\log_3 5$

27) Simplify:

a) $\log_2 5 + \log_2(x^2 - 1) - \log_2(x - 1)$ b) $2\log_4 9 - \log_4 3$ c) $3^{(2\log_3 5)}$

d) $\log_{10}(10^{1/2})$ e) $\log_{10}\left(\frac{1}{10^x}\right)$ f) $2\log_{10}\sqrt{x} + 3\log_{10}x^{1/3}$

28) Find the exact value without using the calculator.

a) $\sin\left(\frac{3\pi}{4}\right)$ b) $\cos\left(\frac{5\pi}{6}\right)$ c) $\tan\left(\frac{7\pi}{4}\right)$ d) $\csc\left(\frac{2\pi}{3}\right)$

e) $\sec\left(\frac{\pi}{2}\right)$ f) $\cot\left(\frac{4\pi}{3}\right)$ g) $\sin\left(\frac{5\pi}{3}\right)$ h) $\cos\left(\frac{11\pi}{6}\right)$

2016 Summer Calculus (all levels)

<p>1) $\frac{5-a}{a}$</p> <p>2) $\frac{2x}{5x+20}$</p> <p>3) $\frac{4x-12}{5x}$</p> <p>4) $\frac{x^2-x-1}{x^2+x+1}$</p> <p>5) $\frac{x-4}{3x^2-4x+32}$</p> <p>6) 5</p> <p>7) 17</p> <p>8) $2a+3$</p> <p>9) 15</p> <p>10) $8m^2+40m+49$</p> <p>11) 2</p> <p>12) 15</p> <p>13) $4x^2+12x+9$</p> <p>14) $2x^6+3$</p> <p>15) 9</p> <p>16) -2</p> <p>17) $2x+h-5$</p>	<p>18) $y=3x+5$</p> <p>19) $x=5$</p> <p>20) $y=2$</p> <p>21) $y=\frac{2}{3}x+5$</p> <p>22) $y-8=\frac{5}{6}(x-2)$</p> <p>23) $y=7$</p> <p>24) $m=\frac{6-2}{-3-1}=-1$ $y=-x+3$</p> <p>25) $m=\frac{0-3}{2-0}=-\frac{3}{2}$ $y=-\frac{3}{2}x+3$</p> <p>26a) 1</p> <p>b) $-\frac{3}{2}$</p> <p>c) 8</p> <p>d) $\frac{4}{25}$</p>	<p>27a) $\log_2 5(x+1)$</p> <p>b) $\log_4 27$</p> <p>c) 25</p> <p>d) $\frac{1}{2}$</p> <p>e) $-x$</p> <p>f) $\log x^2$</p> <p>28a) $\frac{1}{\sqrt{2}}$</p> <p>b) $-\frac{\sqrt{3}}{2}$</p> <p>c) -1</p> <p>d) $\frac{2}{\sqrt{3}}$</p> <p>e) undefined</p> <p>f) $\frac{1}{\sqrt{3}}$</p> <p>g) $-\frac{\sqrt{3}}{2}$</p> <p>h) $\frac{\sqrt{3}}{2}$</p>
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