

1. Find the values of x that satisfy each inequality. Use interval notation.

a. $x^3 - 5x^2 - 9x + 45 > 0$

b. $\frac{2x}{x-6} \leq 5$

2. Given: $f(x) = \frac{2x^2-1}{25-x^2}$ $g(x) = \sqrt{3x+7}$

Find, or state a reason why the quantity can't be found:

a. the domain of f .

b. the domain of g .

c. $g \circ f(-2)$

d. $f \circ g(5)$

e. $f \circ g(x)$

f. the domain of $f \circ g$.

3. In the following, find a 'simple' expression for $\frac{f(a+h)-f(a)}{h}$ for the given function and the given value of a by simplifying the expression so that the ' h ' is eliminated from the denominator: then evaluate this expression if $h = 0$.

[while you can't have $h = 0$ in the original expression, you can have $h = 0$ in the 'simple' expression]

a. $f(x) = x^2 - 5x, a = 4$

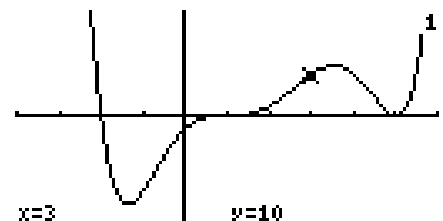
b. $f(x) = \sqrt{x+2}, a = 7$

4. Given the function $f(x) = x^3 - 16x^2 + 51x + 54$

a. List the *possible* rational zeroes of f .

b. Find the exact values of all the zeroes of f ; your answers could include both real and complex values.

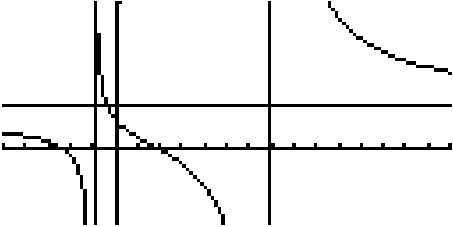
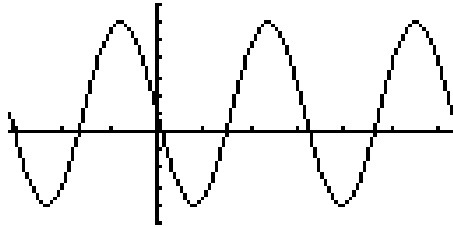
5. Determine the polynomial of degree 6 whose graph is shown at the right; each mark on the x -axis represents one unit. All of the zeroes of the polynomial are integer values. Note the point on the graph listed with the 'TRACE' feature (The polynomial can be left in factored form).



6. Sketch the graph of the following functions. For any periodic function show at least two periods. Label the scales on the axes. Find the key points (intercepts, any maximum and minimum points, points where the graph crosses an asymptote), and draw and label any asymptotes of the function (horizontal, vertical and/or 'slant').

a. $f(x) = \frac{3x^2+x-14}{x^2-6x-7}$

b. $g(x) = 5 \cos\left(2x + \frac{\pi}{2}\right) + 1$

1. a. $(-3, 3) \cup (5, \infty)$ b. $(-\infty, 6) \cup [10, \infty)$
2. a. $\{x | x \neq \pm 5\}$ b. $[-\frac{7}{3}, \infty)$ c. $\sqrt{8}$ d. $\frac{43}{3}$ e. $\frac{6x+13}{18-3x}$ f. $[-\frac{7}{3}, 6) \cup (6, \infty)$
3. a. $3+h$ (@ $h=0 : 3$) b. $\frac{1}{\sqrt{9+h+3}}$ (@ $h=0 : \frac{1}{6}$)
4. a. $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18, \pm 27, \pm 54$ b. $6, 5 \pm \sqrt{34}$
5. $f(x) = \frac{1}{16}(x+2)(x-1)^3(x-5)^2$
6. a. Vertical asymptotes: $x = -1, x = 7$
 Horizontal asymptote: $y = 3$
 Intercepts: $(0, 2); (2, 0); (-\frac{7}{3}, 0)$
- b. Amplitude: 5 Period: π
 High: $y = 6$ Low: $y = -4$
 'Midline': $y = -1$
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7. a. $\{\ln 3, \ln 6\}$ b. $\{6\}$ c. $\{\frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}\}$
8. a. $-\frac{\sqrt{3}}{2}$ b. $\frac{1+\sqrt{3}}{1-\sqrt{3}} = -2 - \sqrt{3}$ c. $\frac{\sqrt{2-\sqrt{2}}}{2}$
- d. $-\frac{\pi}{3}$ e. $-\frac{\pi}{6}$ f. $\frac{\sqrt{13}}{7}$
9. a. $-\frac{\sqrt{11}}{6}$ b. $-\frac{7}{18}$ c. $\sqrt{\frac{6+\sqrt{11}}{12}}$
10. $a \approx 8.4$ $\beta \approx 125^\circ$ $\gamma \approx 20^\circ$
11. a. 47° b. about 12 hours