

Key

1. Find the equation of a line in slope intercept form that passes through (6, -5) and is parallel to the line $-3x + 9y = 18$.

$9y = 3x + 18$ $|| \div 9$ $m = \frac{1}{3}$ $y = mx + b$
 $y = \frac{1}{3}x + 2$ $-5 = \frac{1}{3}(6) + b$ $-5 = 2 + b$ $-7 = b$
 $y = \frac{1}{3}x - 7$

2. Let $h(x) = x^2 - 4x + 3$. Find the following.

a) $h(2)$

$(2)^2 - 4(2) + 3$
 $4 - 8 + 3 = -1$

b) $h(-3) + 5$

$(-3)^2 - 4(-3) + 3 + 5$
 $9 + 12 + 3 + 5$
 29

3. Find the domain of the following functions.

a) $f(x) = -3x^2 + 5x - 2$

All real numbers
 \mathbb{R}

b) $f(x) = \frac{2x-5}{x+4}$

$x \neq -4$
 $\mathbb{R} \ x \neq -4$

4. Find any local maximum and or minimum values of the function $f(x) = x^3 - 7x$. Round to the nearest hundredths place.

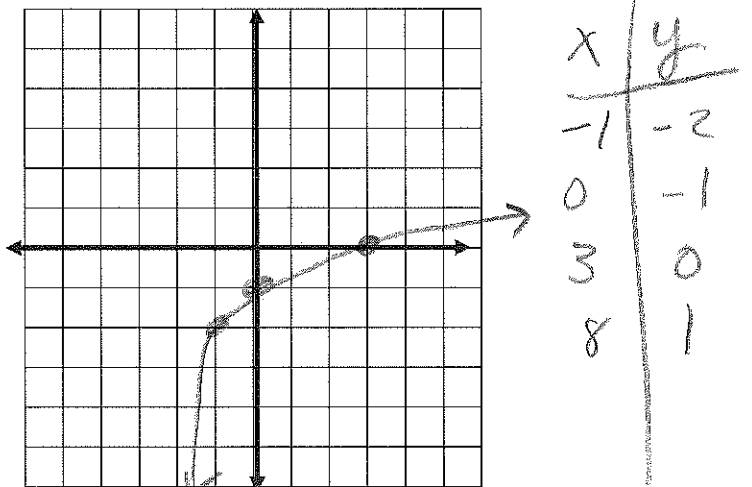
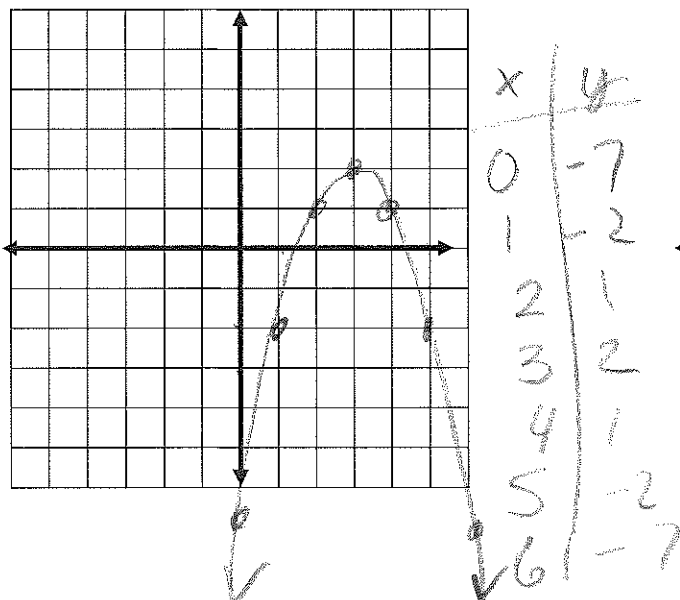
Use Calculator - 2nd Trace Min/Max



5. Graph the following functions. Specific points must be plotted. NO sketches!!

a) $f(x) = -(x - 3)^2 + 2$

b) $f(x) = \sqrt{x + 1} - 2$



6. Let $f(x) = x + 3$ and $g(x) = x^2 + 6x - 3$. Find the following.

a) $(g - f)(x)$

$$\begin{aligned} &x^2 + 6x - 3 - (x + 3) \\ &x^2 + 6x - 3 - x - 3 \\ &x^2 + 5x - 6 \end{aligned}$$

b) $g(f(x))$

$$\begin{aligned} &x^2 + 6x - 3 \\ &(x+3)^2 + 6(x+3) - 3 \\ &x^2 + 6x + 9 + 6x + 18 - 3 \\ &x^2 + 12x + 24 \end{aligned}$$

7. Find the inverse of the function $f(x) = x^3 + 7$.

$$\begin{aligned} &y = x^3 + 7 \\ &x = y^3 + 7 \\ &\sqrt[3]{x-7} = \sqrt[3]{y^3} \\ &y = \sqrt[3]{x-7} \end{aligned}$$

8. Write the quadratic function $f(x) = x^2 - 8x + 13$ in vertex form by completing the square.

$$\begin{aligned} &\left(\frac{-b}{2}\right)^2 \quad x^2 - 8x + 13 = 0 \\ &x^2 - 8x + 16 = -13 + 16 \quad \rightarrow c = \left(\frac{b}{2}\right)^2 \\ &(x-4)^2 = 3 \\ &y = (x-4)^2 - 3 \end{aligned}$$

9. Given one zero of the polynomial function, find the other zeros using synthetic division.

zero: $x = 3$, function: $f(x) = x^3 - 6x^2 - x + 30$

$$\begin{array}{r|rrrr} 3 & 1 & -6 & -1 & 30 \\ & & 3 & -17 & -30 \\ \hline & 1 & -3 & -10 & 0 \end{array}$$

$$x^2 - 3x - 10 = 0$$

Factor: $(x-5)(x+2) = 0$

$x = 5, -2$

10. Write the polynomial function of least degree with integer coefficients that have the given zeros $x = \pm 3i, -2$.

$$\begin{aligned} &(x + 3i)(x - 3i)(x + 2) \\ &x^2 - 3i + 3i - 9i^2 \\ &(x^2 + 9)(x + 2) = x^3 + 2x^2 + 9x + 18 \end{aligned}$$

11. Divide using long division $(6x^2 + 11x - 1) \div (3x - 2)$.

$$\begin{array}{r} 2x + 5 \\ 3x - 2 \overline{) 6x^2 + 11x - 1} \\ \underline{6x^2 - 4x} \\ 15x - 1 \\ \underline{- 15x + 10} \\ 9 \end{array}$$

$$2x + 5 + \frac{9}{3x - 2}$$

AC Method

12. Factor the following expressions.

a) $x^2 - 2x - 35$

$(x-7)(x+5)$

b) $2x^2 + 5x - 12$

M-24 / AS
 $(2x^2 + 8x - 3x - 12)$
 $2x(x+4) - 3(x+4)$
 $(2x-3)(x+4)$

c) $2x^3 - 8x^2 + 5x - 20$

$2x^2(x-4) + 5(x-4)$
 $(2x^2+5)(x-4)$

13. Simplify the following expressions.

a) $\frac{x+3}{x-5} \cdot \frac{x^2-4x-5}{x^2-9}$

Factor $(2x-3)(x+4)$
 $\frac{x+3}{x-5} \cdot \frac{(x-5)(x+1)}{(x-3)(x+3)} = \frac{x+1}{x-3}$

b) $\frac{4}{x^2-9} + \frac{3}{x+3}$ need LCD
 $(x-3)(x+3)$

$\frac{4 + 3(x-3)}{(x-3)(x+3)} = \frac{4+3x-9}{(x-3)(x+3)}$

14. Solve the following equations.

a) $x^2 = -48$

$\pm i\sqrt{48}$
 $\pm 4i\sqrt{3}$

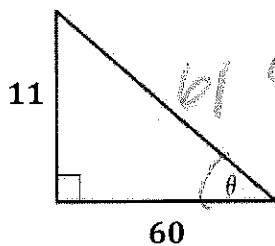
b) $\log_3 81 = x$

$\frac{\log 3^4}{\log 3} = x$
 $4 = x$

c) $2^{x-1} = 64$

$\log_2 \log_2$
 $x-1 = \log_2 64$
 $x-1 = 6$
 $x = 7$

15. Evaluate the six trigonometric ratios of the angle θ .



$a^2 + b^2 = c^2$
 $60^2 + 11^2 = c^2$
 $61 = c$

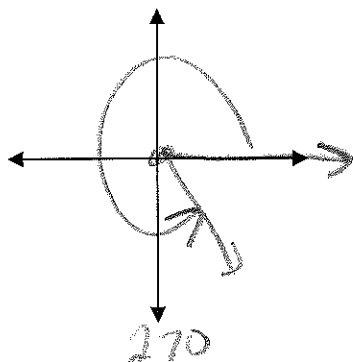
$\sin \theta = \frac{11}{61}$ $\csc \theta = \frac{61}{11}$

$\cos \theta = \frac{60}{61}$ $\sec \theta = \frac{61}{60}$

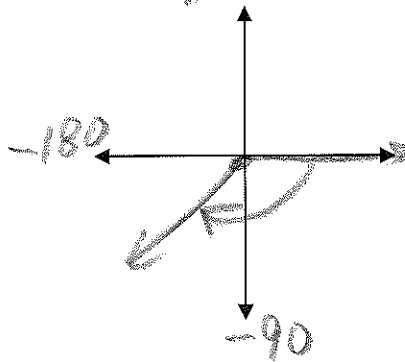
$\tan \theta = \frac{11}{60}$ $\cot \theta = \frac{60}{11}$

16. Draw the angle with the given measure in standard position.

a) 300°



b) $-\frac{5\pi}{6} = \frac{180}{\pi} = -150^\circ$



17. Find one positive angle and one negative angle that are co-terminal with the given angle 110° .

$110 + 360 = 470^\circ$

$110 - 360 = -250^\circ$

