

1. Given the function

$$f(x) = \frac{4}{2x+5}, \text{ find } x \text{ when}$$

$$f(x) = 2$$

$$2 = \frac{4}{2x+5}$$

$$4x+10 = 4$$

$$4x = -6$$

$$x = \frac{-6}{4} \text{ or } \boxed{\frac{-3}{2}}$$

2. What is the domain

$$\text{of } f(x) = \sqrt{x+5} - 6?$$

$$x \geq -5$$

$$\boxed{[-5, \infty)}$$

3. Solve the equation $\frac{x}{6} - \frac{3}{4} = 2$

$$12 \left[\frac{x}{6} - \frac{3}{4} = 2 \right]$$

$$2x - 9 = 24$$

$$2x = 33$$

$$x = \frac{33}{2}$$

$$\boxed{x = 16.5}$$

4. Solve the equation $3x^2 - 6x = 1$

$$3x^2 - 6x - 1 = 0$$

$$x = \frac{6 \pm \sqrt{36+12}}{6}$$

$$x = \frac{6 \pm \sqrt{48}}{6}$$

$$= \frac{6 \pm 4\sqrt{3}}{6}$$

$$= \boxed{1 \pm \frac{2\sqrt{3}}{3}}$$

5. Shift the graph

$y = -4(x+3)^2 + 21$ down 7 and left 5. What is the equation of the new function?

$$V (-3, 21)$$

-5 -7
left down

New Vertex

$$(-8, 14)$$

$$\boxed{y = -4(x+8)^2 + 14}$$

6. What is the vertex of the

function $f(x) = (x+3)(x-11)$.

$$x\text{-int: } x = -3, x = 11$$

$$\frac{-3+11}{2} \rightarrow \frac{8}{2} \rightarrow 4$$

$$\boxed{\text{vertex } (4, -49)}$$

$$\begin{aligned} y &= (4+3)(4-11) \\ &= 7(-7) \\ &= -49 \end{aligned}$$

7. Write the equation of an absolute value graph with vertex (2, 9) and passing through (-3, 5).

$$y = a|x-2| + 9$$

$$5 = a|-3-2| + 9$$

$$-4 = 5a \rightarrow a = -\frac{4}{5}$$

$$y = -\frac{4}{5}|x-2| + 9$$

8. Solve the equation

$$3(x-2)^2 + 5 = 86$$

$$3(x-2)^2 = 81$$

$$(x-2)^2 = 27$$

$$x-2 = \pm\sqrt{27}$$

$$x = 2 \pm 3\sqrt{3}$$

9. A gallon of gas is \$2.45. Prices have increased by 2% each year. Write an equation to model this situation.

$$y = 2.45(1.02^x)$$

10. Solve the equation

$$2\sqrt{x+3} + 7 = 29$$

$$2\sqrt{x+3} = 22$$

$$\sqrt{x+3} = 11$$

$$x+3 = 121$$

$$x = 118$$

11. Solve the equation

$$10|2x+5| - 3 = 87$$

$$|2x+5| = \frac{90}{10}$$

$$|2x+5| = 9$$

$$2x+5 = 9 \text{ or } -(2x+5) = 9$$

$$2x = 4$$

$$x = 2$$

$$-2x-5 = 9$$

$$-2x = 14$$

$$x = -7$$

12. Complete the square to put in graphing form.

$$x^2 + 2x + y^2 + 14y + 30 = 6$$

$$x^2 + 2x + \underline{1} + y^2 + 14y + \underline{49} = \overset{-30}{-30} + \overset{+50}{+50}$$

$$(x+1)^2 + (y+7)^2 = 20$$

1. Solve $27^{x-2} = 9$

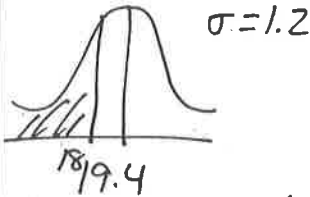
$$(3^3)^{x-2} = 3^2$$

$$3x - 6 = 2$$

$$3x = 8$$

$$x = \frac{8}{3}$$

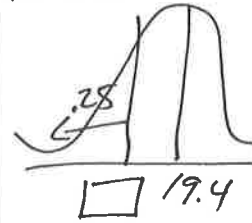
2. 5k times of high school boys is normally distributed with a mean of 19.4 minutes and a standard deviation of 1.2 minutes. Find the probability that a high school boy is randomly chosen and has a time below 18 minutes.



$$\text{normalcdf}(-10, 18, 19.4, 1.2)$$

$$\approx \boxed{0.1217}$$

3. Using the information in the previous problem, what would the time be of a boy in the 25th percentile?



$$\text{invNorm}(0.25, 19.4, 1.2)$$

$$\approx \boxed{18.59}$$

4. Find the inverse function of

$$y = 4^{x+5} - 8$$

$$x = 4^{y+5} - 8$$

$$x + 8 = 4^{y+5}$$

$$y + 5 = \log_4(x + 8)$$

$$y = \log_4(x + 8) - 5$$

5. If $f(x)$ has a domain of $[-6, 11)$ and a range of $[0, 10]$. What is the domain of $f^{-1}(x)$?

$$\boxed{[0, 10]}$$

6. Solve $7^x = 14$

$$x \cdot \log 7 = \log 14$$

$$x = \frac{\log 14}{\log 7}$$

$$x \approx \boxed{1.356}$$

7. What is the domain of

$$y = \log_2(x+9) - 12$$

$$x > -9$$

$$\boxed{(-9, \infty)}$$

8. What is the equation of the circle that has center (1, 4) and passes through (-5, 12)

$$(x-1)^2 + (y-4)^2 = r^2$$

$$(-5-1)^2 + (12-4)^2 = r^2$$

$$36 + 64 = r^2$$

$$r^2 = 100$$

$$\boxed{(x-1)^2 + (y-4)^2 = 100}$$

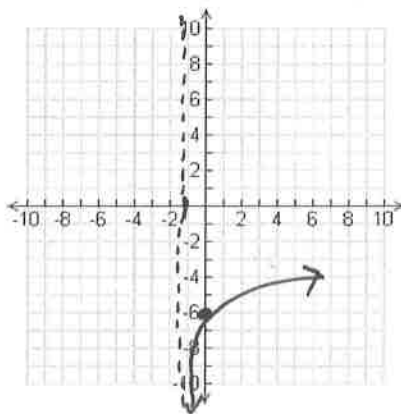
9. Write as a single logarithm.

$$3\log x + 2\log z - \log y$$

$$\log x^3 + \log z^2 + \log y^{-1}$$

$$\boxed{\log \left(\frac{x^3 z^2}{y} \right)}$$

10. Graph. $f(x) = \log_2(x+1) - 6$



11. Find the inverse of

$$f(x) = \frac{3}{4}\sqrt{6x-7} + 9$$

$$x = \frac{3}{4}\sqrt{6y-7} + 9$$

$$\frac{4}{3}(x-9) = \sqrt{6y-7}$$

$$\frac{16}{9}(x-9)^2 = 6y-7$$

$$\frac{16}{9}(x-9)^2 + 7 = 6y$$

$$y = \frac{1}{6} \cdot \frac{16}{9} (x-9)^2 + \frac{7}{6}$$

$$\boxed{y = \frac{8}{27}(x-9)^2 + \frac{7}{6}}$$

12. Write in log form.

$$5^{x+6} = 10$$

$$(x+6) \log 5 = \log 10$$

$$x+6 = \frac{\log 10}{\log 5}$$

$$x+6 \approx 1.431$$

$$\boxed{x \approx -4.569}$$