

Advanced Precalculus
Unit 1 Review

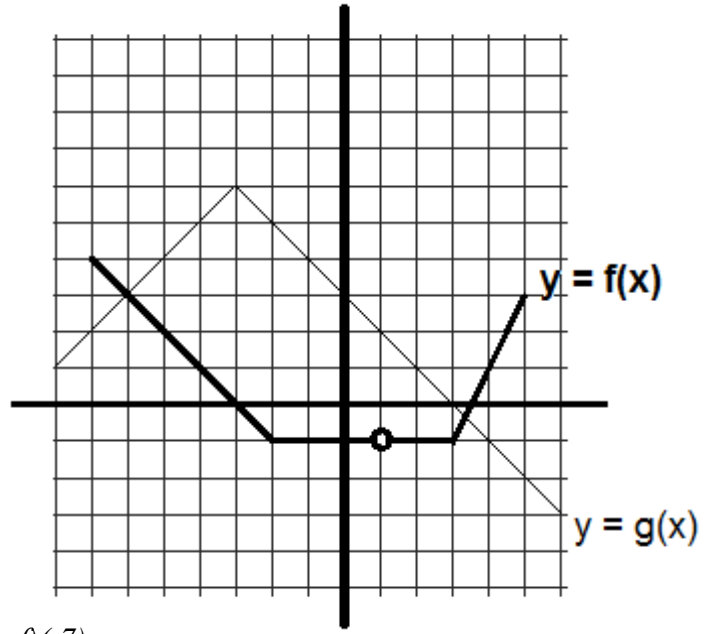
Name: _____

Absolute Value Equations

- 4.) $|2x+1|+|3x+1|=|6x-15|$
- 5.) $\|5x-1|+|x+3|+2x|+|x-1|=2x+13$
- 6.) $|x^2-2x-3|-|3x-1|=|x+2|$

Function Basics

- 4.) Find the following in the graph:
 Domain of f :
 Range of f :
 $(f \circ g)(3) =$
 $(g \circ f)(-7) =$



- 5.) Draw any function with the following Domain and Range:
 D: $\{-4\} \cup (2, 7]$
 R: $\{-2, 3, 4\} \cup (-1, 2)$
- 6.) Draw any function with the following Domain and Range:
 D: $\{-5, -2, -1\} \cup (1, 3) \cup [4, 5)$
 R: $(-1, 0) \cup (0, 1) \cup (1, 2) \cup (2, 3) \cup (3, 4) \cup (4, 5)$

Functions

- 4.) Given $f(x) = -3x^2 - 30x + 2011$, state the transformations that must be performed to the graph of $y = x^2$ to obtain $y = f(x)$.
- 5.) What transformations must be performed on $y = f(x)$ to graph $y = -\frac{2}{5}f\left[\frac{1}{2} - \frac{3}{4}x\right] - \frac{3}{5}$
- 5.) What point(s) must be on the graph of $y = -\frac{1}{4}f\left[-\frac{3(x+2)}{5x+6}\right] + \frac{12}{5}$ if $(2, -8)$ is on the graph of $y = f(x)$?
- 6.) What point(s) must be on the graph of $y = -3(h \circ g \circ f)\left[\frac{2x-7}{15x+4}\right] + 12$ if $(2, 3)$ is on the graph of $y = f(x)$, $(3, 4)$ is on the graph of $y = g(x)$, and $(4, 5)$ is on the graph of $y = h(x)$?

Lines

- Consider $\triangle ABC$ where $A(3,1)$, $B(6, 5)$, and $C(9, 3)$ are the points.
- 4.) Find the circumcenter of $\triangle ABC$.
 - 5.) Find the orthocenter of $\triangle ABC$.
 - 6.) Find the centroid of $\triangle ABC$.

Parabolas

- 4.) Find the equation of the parabola with directrix $y=2$ and vertex $(5,5)$.
- 5.) Find the equation of the parabola with directrix $y=-4$ and focal point $(-6,-10)$.
- 6.) Find the equation of the parabola with focal point $(-2,3)$ and vertex $(-7,3)$.

Circles

- 5.) Find the center point and radius of the circle $(x+1)^2+(y-8)^2=50$
- 6.) Find the center point and radius of the circle $64x^2+64y^2+512y=256x-1084$

Ellipses

- 3.) Find the equation of the ellipse with the following:
Focal Points: $(-2, 3)$ and $(-2, 7)$ Endpoint: $(-2, 9)$
- 4.) Find the equation of the ellipse with the following:
Endpoints: $(1, 4), (5, 7), (9, 4), (5, 1)$
- 5.) Find the key features of the ellipse with equation:
 $64x^2+9y^2+90y=128x+287$
- 6.) Find the key features of the ellipse with equation:
 $6x^2+36x+8y^2-16y+14=0$

Hyperbolas

- 3.) Find the equation of the hyperbola with the following:
Focal Points: $(-2, 3)$ and $(-2, 7)$ Endpoint: $(-2, 6)$
- 4.) Find the equation of the hyperbola with the following:
Vertex Points: $(1, -5)$ and $(-3, -5)$ Focal Point: $(-4, -5)$
- 5.) Find the key features of the hyperbola with equation:
 $x^2+2x=9y^2+36y+44$
- 6.) Find the key features of the hyperbola with equation:
 $49y^2+72x=196y+36x^2+1604$

Miscellaneous

- 6.) Consider the equation $Ax^2+By^2+Cx+Dy+E=0$.
Determine constraints on the constants so that this equation describes:
 - A.) a Parabola
 - B.) a Circle
 - C.) an Ellipse
 - D.) a Hyperbola