*AAT

Chapter 3: Test Review Packet (IC/HW)

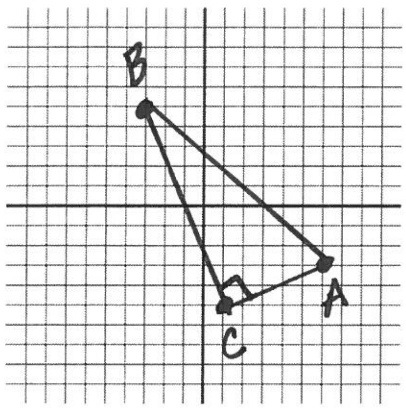
Name: Key

Date: ____________ Period: ____________

1. Find the midpoint of the segment AB between the points A(-1,-3) and B(15,11).

$$\left(\frac{-1+15}{2}, \frac{-3+11}{2}\right) = \left(\frac{14}{2}, \frac{8}{2}\right) = (7,4)$$

2. Find the area of the right triangle with vertices A(6,-3), B(-3,5), and C(1,-5).

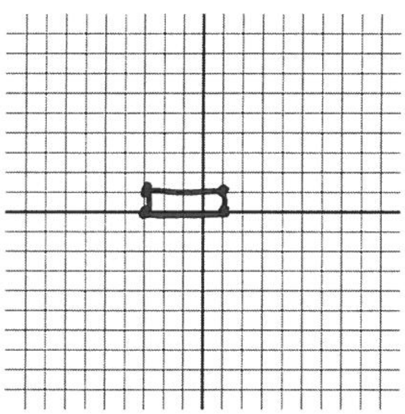


$$A = \frac{1}{2}bh$$
$$= \frac{1}{2}(5.4)(10.8) \approx 29$$

$$\sqrt{(6-1)^2+(-3-(-5))^2}$$
$$= \sqrt{5^2+2^2} = \sqrt{29} \approx 5.4$$

$$\sqrt{(1-(-3))^2+(-5-5)^2}$$
$$\sqrt{4^2+(-10)^2}$$
$$= \sqrt{116} \approx 10.8$$

3. Find the type of quadrilateral with the vertices A(1,1), B(1,0), C(-3,0), and D(-3,1).



rectangle

4. Find the equation of the upper half of the circle $(x-4)^2 + (y+7)^2 = 39$.

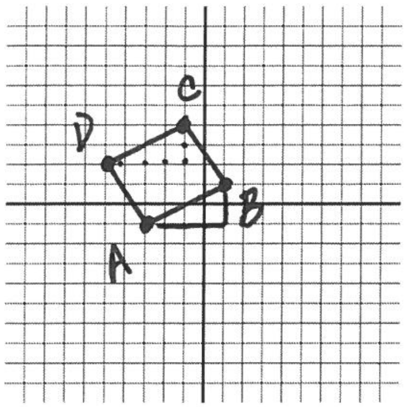
$$\sqrt{(y+7)^2} = \sqrt{39-(x-4)^2}$$
$$y+7 = \pm\sqrt{39-(x-4)^2}$$
$$y = -7+\sqrt{39-(x-4)^2}$$

5. For the given circle, $x^2 + y^2 - 4x - 6y + 4 = 0$, find the x- and y- intercepts.

$$0+y^2-0-6y+4=0$$
$$y^2-6y+4=0$$
$$y^2-6y+9 = -4+9$$
$$\sqrt{(y-3)^2} = \sqrt{5}$$
$$y-3 = \pm\sqrt{5} \; ; \; y = 3\pm\sqrt{5}$$
$$(0, 3\pm\sqrt{5}) \text{ or } (0, 5.24) \; (0, .76)$$

$$x^2+0-4x-0+4=0$$
$$x^2-4x+4=0$$
$$(x-2)^2=0$$
$$x=2 \rightarrow (2,0)$$

6. If three consecutive vertices of a parallelogram are A(-3,-1), B(1,1), and C(-1,4), find the fourth vertex.



down 2, left 4

(-5,2)

7. Find a general form of an equation of the line through the point A(-2,5) with the x-intercept 0. (0,0)

$Ax + By = C$

$y = mx + b$

$5 = m(-2) + 0$

$\frac{5}{-2} = \frac{m(-2)}{-2}$

$-\frac{5}{2} = m$

$y = -\frac{5}{2}x$

$\frac{5}{2}x + y = 0$

$5x + 2y = 0$

8. If a and h are real numbers, find $\frac{f(a+h)-f(a)}{h}$, $h \neq 0$ if f(x) = 6x – 9.

$$\frac{6(a+h)-9-(6a-9)}{h} = \frac{\cancel{6a}+6h-\cancel{9}-\cancel{6a}+\cancel{9}}{h} = \frac{6\cancel{h}}{\cancel{h}} = 6$$

9. If a is a positive real number, find $g(\frac{1}{a})$ if $g(x) = 6x^2$.

$$6\left(\frac{1}{a}\right)^2 = \frac{6}{a^2}$$

10. Determine whether f is even, odd, or neither.

$f(x) = 5x^5 - 3x^4$

11. Let $f(x) = -x^2$, $g(x) = 4x - 8$. Find$(\frac{f}{g})(5)$.

$$\frac{f(5)}{g(5)} = \frac{-25}{12}$$

12. Let f(x) = |x|, g(x) = -5. Find (g∘f)(x).

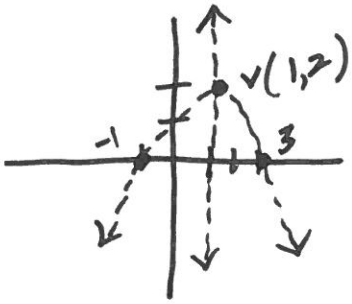
$g(f(x)) = -5$

$$g(f(x))$$

13. Let $f(x) = x^3 + 7$, $g(x) = \sqrt[3]{x-7}$. Find $(g \circ f)(x)$.

$$\sqrt[3]{(x^3+7)-7} = \sqrt[3]{x^3} = x$$

14. Find the standard equation of a parabola that has vertical axis and satisfies the conditions: x-intercepts -1 and 3, highest point has y-coordinate 2.



$y = a(x-h)^2 + k$

$0 = a(3-1)^2 + 2$

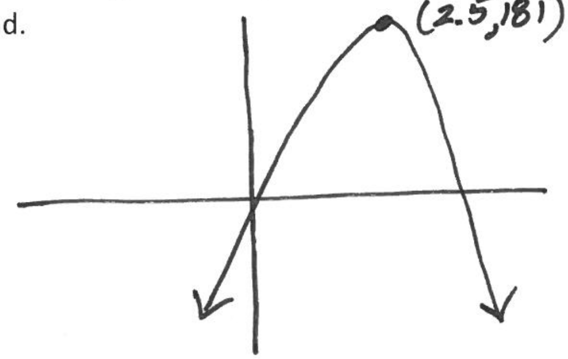
$0 = 4a + 2$

$-2 = 4a$

$a = -\frac{1}{2}$

$$y = -\frac{1}{2}(x-1)^2 + 2$$

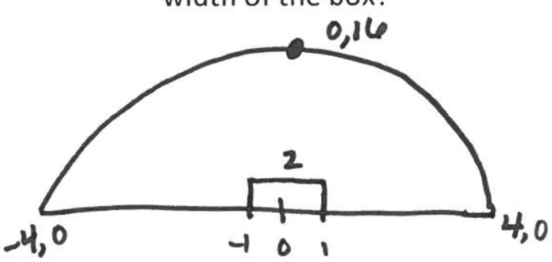
15. An object is projected vertically upward from the top of a building 81 feet high with an initial velocity of 80 ft/sec. Find its maximum distance above the ground.



$y = -16t^2 + 80t + 81$

181 ft.

16. A doorway has the shape of a parabolic arch and is 16 feet high at the center and 8 feet wide at the base. If a rectangular box 15 feet high must fit through the doorway, what must be the maximum width of the box?



$y = a(x-h)^2 + k$

$y = a(x-0)^2 + 16$

$y = ax^2 + 16$

$0 = a(4)^2 + 16$

$\frac{-16}{16} = \frac{16a}{16}$ $\quad a = -1$

$y = -x^2 + 16$

$15 = -x^2 + 16$

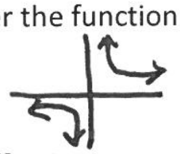
$-1 = -x^2$

$1 = x^2$

$x = \pm 1$

2 ft.

17. Determine whether the function $f(x) = \frac{1}{x}$ is one-to-one.



Yes - one-to-one

18. Ventilation is an effective way to improve indoor air quality. In nonsmoking restaurants, air circulation requirements are given by the function $V(x) = 35x$, where x is the number of people in the dining area. Find V^{-1}. Use V^{-1} to determine the maximum number of people that should be in a restaurant having a ventilation capability of 2,700 ft^3/min.

$y = 35x$ → # of people

$\frac{x}{35} = \frac{35y}{35}$

$y^{-1} = \frac{x}{35}$

max # of people

$y = \frac{2700}{35} \approx 77.1$

19. y is directly proportional to x and inversely proportional to the sum of r and s, if x=5, r=3, and s=2, then y = 20. Find k.

$$y = \frac{kx}{r+s}$$

$$K = 20$$

$$\frac{20}{5} = \frac{K(5)}{5}$$

20. Find the point with coordinates of the form (2a, a) that is in the third quadrant and is a distance 9 from P(2,5).

$$(9)^2 = \left(\sqrt{(2a-2)^2+(a-5)^2}\right)^2$$

$$81 = 4a^2 - 8a + 4 + a^2 - 10a + 25$$

$$0 = 5a^2 - 18a + 29 - 81$$

$$0 = 5a^2 - 18a - 52$$

$a = \cancel{5.49}$ $a = -1.89$

$2a = -3.79$

21. Find the inverse function of f(x) = $\sqrt[3]{x}$ +2.

$$y = \sqrt[3]{x} + 2$$

$$x = \sqrt[3]{y} + 2$$

$$(x-2)^3 = (\sqrt[3]{y})^3$$

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