## Openers #3

Name: Key

*Each day when you come into class, there will be a problem projected for you to complete. Find the appropriate box to complete the problem in and work on it when you arrive.*

| Date: | 3-1 |
|---|---|
| ___/___/___ | **Given P(-5,9) & Q(-8,-7),**<br><br>Find the distance d(P,Q).<br>$\sqrt{(-8-(-5))^2+(-7-9)^2}$<br>$\sqrt{9+256} = \sqrt{265} \approx 16.3$<br><br>Find the midpoint of the segment PQ.<br>$\left(\frac{-5+-8}{2}, \frac{9+-7}{2}\right) = \left(\frac{-13}{2}, 1\right)$ or $(-6.5, 1)$<br><br>Find the slope of segment PQ.<br>$\frac{-7-9}{-8-(-5)} = \frac{-16}{-3} = \frac{16}{3} \approx 5.3\overline{}$ |
| **Date:** | 3-2 |
| ___/___/___ | Find the center & radius of the circle $(x-7)^2 + (y+4)^2 = 81$.<br>$C(7,-4)$; $r=9$<br><br>Find the center & radius of the circle $x^2 + y^2 - 12y + 31 = 0$<br>$x^2+y^2-12y+\underline{36} = -31+\underline{36}$<br>$x^2+(y-6)^2 = 5$<br>$C(0,6)$; $r=\sqrt{5}$<br><br>Write an equation of a circle with center at (-5,2) and a radius of 7.<br>$(x+5)^2+(y-2)^2=49$ |

Date: ___/___/___

3-3

**Find an equation of the line through A($\frac{1}{2}, -\frac{1}{3}$) that is**

Parallel to the line 6x + 2y + 5 = 0.

$m = \frac{-6}{2} = -3$

$y = -3x + b$

$-\frac{1}{3} = -3(\frac{1}{2}) + b$

$-\frac{1}{3} = -\frac{3}{2} + b$

$\frac{7}{6} = b$

slope-intercept: $y = -3x + \frac{7}{6}$

or

general form: $18x + 6y = 7$

Perpendicular to the line 6x + 2y + 5 = 0.

$m = \frac{-6}{2} = -3$;

$\perp$ so $m = \frac{1}{3}$

$y = \frac{1}{3}x + b$

$-\frac{1}{3} = \frac{1}{3}(\frac{1}{2}) + b$

$-\frac{1}{3} - \frac{1}{6} = b$

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

slope-intercept: $y = \frac{1}{3}x + -\frac{1}{2}$

or

general form: $2x - 6y = 3$

Find a general from of an equation of the line through P(4,-3) with slope 5.

$y = 5x + b$

$-3 = 5(4) + b$

$-23 = b$

$y = 5x - 23$

$-5x + y = -23$

$5x - y = 23$

Express 8x + 3y – 24 = 0 in slope-intercept form.

$8x + 3y = 24$

$\frac{3y}{3} = \frac{-8x + 24}{3}$

$y = -\frac{8}{3}x + 8$

Date: ___/___/___

3-4

If $f(x) = -x^3 - x^2 + 3$, find f(2).

$-(2)^3 - (2)^2 + 3$

$-8 - 4 + 3$

$-12 + 3 = -9$

Find f(a+h) if f(3 – 4x)

$3 - 4(a+h)$

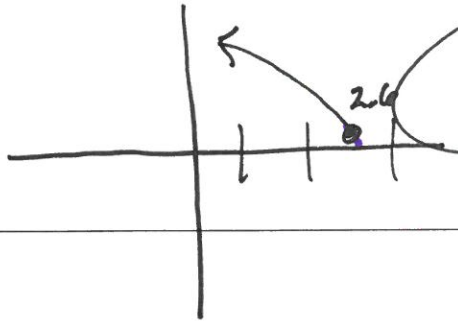
$3 - 4a - 4h$

Find the domain. $f(x) = \sqrt{8 - 3x}$

$8 - 3x \geq 0$

$\frac{-3x}{-3} \geq \frac{-8}{-3}$

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




$x \leq 2.6$

$(-\infty, 2.6]$

$3x-4 \geq 0$ ; $3x \geq 4$ ; $x \geq \frac{4}{3}$

**Date:**

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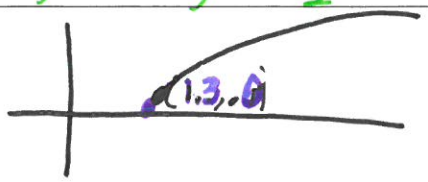
3-5

Find the ~~domain and~~ range of f if $f(x) = \sqrt{3x-4}$.



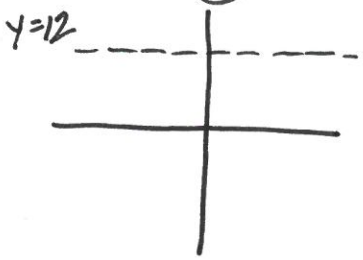

D: $[1.3, \infty)$ R: $[0, \infty)$

~~Explain~~ how the graph of ~~the function~~ $y=f(x-2)+3$ compares to the graph $y=f(x)$.

shift 2 right & 3 up

Determine whether $f(x) = 3x^2 - 5x + 1$ is even, odd, or neither.

Determine whether $f(x) = 12$ is even, odd, or neither.




Symmetric w/ respect to y-axis.

**Date:**

___/___/___

3-6

Find the standard equation of any parabola that has V(4, -2). $y = a(x-4)^2 - 2$

Express $f(x) = x^2 - 6x + 11$ in the form $a(x-h)^2 + k$.

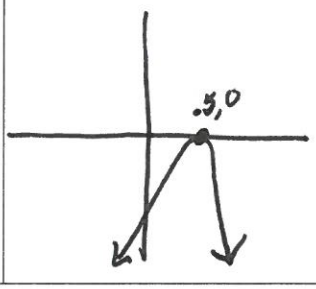
$y - 11 = x^2 - 6x + 9$

$+9$

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

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

Find the ~~zeros & maximum~~ or minimum of $f(x) = -4x^2 + 4x - 1$.




Zero's: D.R. $x = .5$

Maximum: $f(\frac{1}{2}) = 0$

**Date:** ___/___/___

3-7

Find the standard equation of a parabola that has a vertical axis, V(0,5), & passing through (2,-3).

$y = ax^2 + 5$

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

$-3 = 4a + 5$

$-8 = 4a$

$a = -2$

$y = -2x^2 + 5$

Find (f ∘ g)(2) if **f(x) = 8x - 1** & **g(x) = $\sqrt{x-2}$.**

$f(g(2)) = \sqrt{2-2}$

$= 0$

$f(0) = 8(0) - 1 = -1$

Find $g(f(3))$ if $f(x) = 5x+2$ & $g(x) = 6x-1$

$f(3) = 5(3) + 2$

$= 17$

$g(17) = 6(17) - 1$

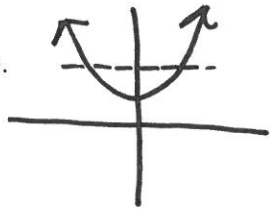
$= 101$

**Date:** ___/___/___

3-8

Determine whether $f(x) = x^2 + 4$ is one-to-one.

NO



Prove that $f(x) = x^3 - 4$ and $g(x) = \sqrt[3]{x+4}$ are inverse functions of each other.

$y = x^3 - 4$

$x = y^3 - 4$

$x + 4 = y^3$

$\sqrt[3]{x+4} = y$

Find $f^{-1}(x)$ if $f(x) = 10 - 15x$.

$y = 10 - 15x$

$x = 10 - 15y$

$\frac{x-10}{-15} = \frac{-15y}{-15}$

$\frac{x-10}{-15} = y$ -or- $\frac{10-x}{15} = y$

-or-

$-\frac{1}{15}x + \frac{2}{3} = y$

Find $f^{-1}(x)$ if $f(x) = \frac{1}{x+3}$.

$y = \frac{1}{x+3}$

$x = \frac{1}{y+3}$

$y + 3 = \frac{1}{x}$ → $y = \frac{1}{x} - 3$ or $\frac{1-3x}{x} = y$

| Date: | 3-9 |
| --- | --- |
| ____ / ____ / ____ | Express the statement *y is directly proportional to x and inversely proportional to the sum of r and s. If x = 3, r = 5, and s = 7, then y = 2* as a formula and then determine the value of *k*. |

$$y = k\frac{x}{r+s}$$

$$2 = k\frac{3}{5+7}$$

$$2 = k\left(\frac{1}{4}\right);$$

$k = 8$

Express the statement *r is directly proportional to the product of s and v and inversely proportional to the cube of p. If s = 2, v = 3, and p = 5, then r = 40* as a formula and then determine the value of *k*.

$$r = k\frac{sv}{p^3}$$

$$40 = k\frac{2\cdot 3}{5^3}$$

$$40 = \frac{6k}{125}$$

$$\frac{5000}{6} = \frac{6k}{6}$$

$$833\tfrac{1}{3} = k$$