Honors Algebra 2
Semester 2 Exam Review

Name KEY
Date 2014-15 Ch 4-8 Per

Chapter 4

Solve the following equations and inequalities and graph their solutions.

$4x - 3 \geq -9$

$+3 \quad +3$

$\frac{4x}{4} \geq \frac{-6}{4}$

$\boxed{x \geq -\frac{3}{2}}$

$15 - 3x < -21 - 7x$

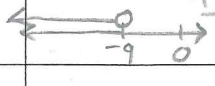
$+7x \quad +7x$

$15 + 4x < -21$

$-15 \quad -15$

$\frac{4x}{4} < \frac{-36}{4}$

$\boxed{x < -9}$



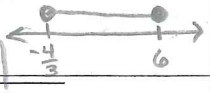
$12 + |3x - 7| \leq 23$

$|3x - 7| \leq 11$

$3x - 7 \leq 11$ AND $3x - 7 \geq -11$

$3x \leq 18 \qquad 3x \geq -4$

$\boxed{x \leq 6 \text{ AND } x \geq -\frac{4}{3}}$

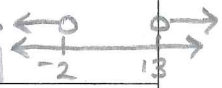


$|11 - 2x| > 15$

$11 - 2x > 15$ OR $11 - 2x < -15$

$-2x > 4 \qquad -2x < -26$

$\boxed{x < -2 \text{ OR } x > 13}$



$\sqrt{2x - 1} = 3$

$(\sqrt{2x-1})^2 = (3)^2$

$2x - 1 = 9$

$2x = 10$

$\boxed{x = 5}$

$\sqrt{x^2 + 6} = x + 2$

$(\sqrt{x^2+6})^2 = (x+2)^2$

$x^2 + 6 = x^2 + 4x + 4$

$2 = 4x$

$\boxed{\frac{1}{2} = x}$

$x = \sqrt{20 - x}$

$(x)^2 = (\sqrt{20-x})^2$

$x^2 = 20 - x$

$x^2 + x - 20 = 0$

$(x+5)(x-4) = 0$

$\cancel{x = -5} \quad \boxed{x = 4}$

$\sqrt{x + 15} = 5 + \sqrt{x}$

$(\sqrt{x+15})^2 = (5 + \sqrt{x})^2$

$x + 15 = 25 + 10\sqrt{x} + x$

$\frac{-10}{10} = \frac{10\sqrt{x}}{10}$

$-1 = \sqrt{x}$

$\boxed{\cancel{1 = x}}$ EXTRANEOUS

NO SOLUTIONS

Solve the equations for x.

$3x^2 + 5x + 2 = 0$

$(3x + 2)(x + 1) = 0$

$3x + 2 = 0 \qquad x + 1 = 0$

$\boxed{x = -\frac{2}{3} \qquad x = -1}$

$2x^2 + 4x = -1$

$2x^2 + 4x + 1 = 0$

$x = \frac{-4 \pm \sqrt{(4)^2 - 4(2)(1)}}{2(2)}$

$= \frac{-4 \pm \sqrt{8}}{4} = \frac{-4 \pm 2\sqrt{2}}{4} =$

$= \boxed{-1 \pm \frac{\sqrt{2}}{2}}$ OR $\frac{-2 \pm \sqrt{2}}{2}$

Gloria is weighing combinations of geometric solids. She found that 4 cylinders and 5 prisms weigh 32 ounces and that 1 cylinder and 8 prisms weigh 35 ounces. Write and solve a system of equations to determine the weight of each cylinder and prism.

Let c = # of cylinders
p = # of prisms

$4c + 5p = 32$

$c + 8p = 35 \longrightarrow c = 35 - 8p$

$4(35 - 8p) + 5p = 32$

$140 - 32p + 5p = 32$

$140 - 27p = 32$

$108 = 27p$

$p = 4$, so $c = 35 - 8(4)$

$c = 35 - 32 = 3$

$c = 3$

Check:

$4(3) + 5(4) = 32$ ✓

$12 + 20 = 32$

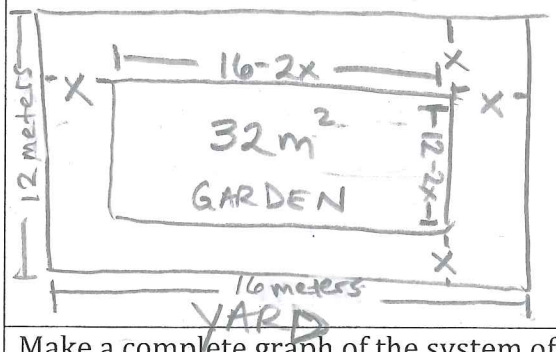
$3 + 8(4) = 35$ ✓

$3 + 32 = 35$

$\boxed{\text{Cylinders weigh 3 ounces and prisms weigh 4 ounces.}}$

A rectangular flower garden is planted in a rectangular yard that is 16 meters by 12 meters. The garden occupies $\frac{1}{6}$ of the yard and leaves a uniform strip of grass around the edges. Find the dimensions of the garden.

THE GARDEN IS 8 M X 4 M.



AREA OF GARDEN IS $\frac{1}{6}$ OF YARD AREA

AREA OF GARDEN $= \frac{1}{6}(16 \times 12) = 32\ m^2$

AREA OF GARDEN:

$(16-2x)(12-2x) = 32$

$192 - 56x + 4x^2 = 32$

$160 - 56x + 4x^2 = 0$

$4(x^2 - 14x + 40) = 0$

$x^2 - 14x + 40 = 0$

$(x-10)(x-4) = 0$

$\cancel{x = 10}$ $\boxed{x = 4}$

EXTRANEOUS

Make a complete graph of the system of inequalities:

$y < x^2 - 2x - 3$ V: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

$y \le \frac{3}{4}x + 2$ $(1, -4)$

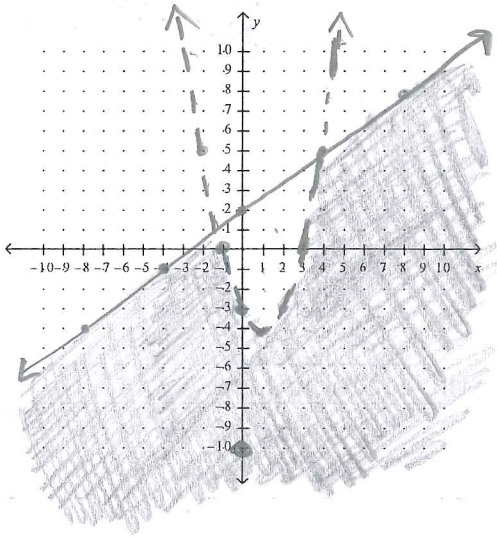
Check: $(0, -10)$

$-10 < (0)^2 - 2(0) - 3$

$-10 < -3$ ✓

$-10 \le \frac{3}{4}(0) + 2$

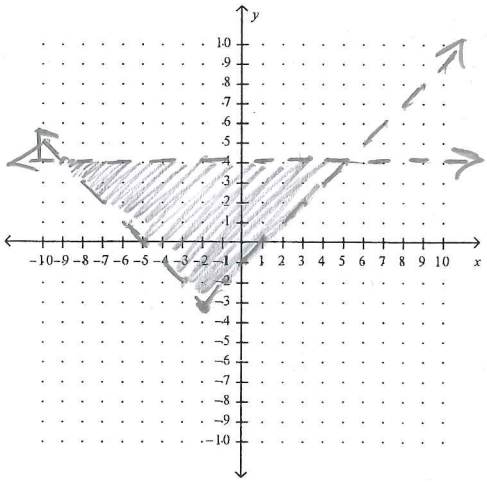
$-10 \le 2$ ✓



Make a complete graph of the system of inequalities:

$y > |x+2| - 3$ $y = a|x-h| + k$

$y < 4$



Chapter 5

Use the following functions:

$f(x) = 3x$

$g(x) = x + 1$

$h(x) = x^2 + 2$

Find the following:

$h(f(2)) =$ 38 $f(2) = 3(2) = 6$ $h(6) = (6)^2 + 2$ $36 + 2$	$f(g(0)) =$ 3 $g(0) = 0 + 1 = 1$ $f(1) = 3(1)$ $= 3$	$h(g(x)) =$ $x^2 + 2x + 3$ $g(x) = x + 1$ $h(x+1) = (x+1)^2 + 2$ $x^2 + 2x + 1 + 2$	$g(f(x)) =$ $3x + 1$ $f(x) = 3x$ $g(3x) = (3x) + 1$ $3x + 1$

Find the inverse of the following functions.

$f(x) = \frac{4}{3}(x-1)^3 + 6$ → $\boxed{f^{-1}(x) = \sqrt[3]{\frac{3}{4}(x-6)} + 1}$ $y = \frac{4}{3}(x-1)^3 + 6$ $x = \frac{4}{3}(y-1)^3 + 6$ $x - 6 = \frac{4}{3}(y-1)^3$ $\frac{3}{4}(x-6) = (y-1)^3$ $\sqrt[3]{\frac{3}{4}(x-6)} = y - 1$	$g(x) = \frac{2(x+6)}{3} + 10$ $\boxed{g^{-1}(x) = \frac{3}{2}(x-10) - 6}$ $y = \frac{2(x+6)}{3} + 10$ $x = \frac{2(y+6)}{3} + 10$ $(x-10) = \frac{2(y+6)}{3}$ $\frac{3}{2}(x-10) = y + 6$ $\frac{3}{2}(x-10) - 6 = y$

Solve each equation.

$\frac{3x^4}{3} = \frac{27}{3}$ $x^4 = 9$ $\sqrt[4]{x^4} = \sqrt[4]{9}$ $\boxed{x \approx 1.7321}$	$\frac{2 \cdot 3^x}{2} = \frac{40.8}{2}$ $3^x = 20.4$ $\log 3^x = \log 20.4$ $\frac{x \cdot \log 3}{\log 3} = \frac{\log 20.4}{\log 3}$ $x = \frac{\log 20.4}{\log 3}$ $\boxed{x \approx 2.7449}$
$\log_7(3x - 2) = 2$ $7^2 = 3x - 2$ $49 = 3x - 2$ $\frac{51}{3} = \frac{3x}{3}$ $\boxed{x = 17}$	$\log(2x + 1) = -1$ $10^{-1} = 2x + 1$ $\frac{1}{10} = 2x + 1$ $\frac{-9}{10} = 2x$ $\boxed{x = \frac{-9}{20} \text{ or } x = -0.45}$
$\log_x(128) = 7$ $x^7 = 128$ $\sqrt[7]{x^7} = \sqrt[7]{128}$ $\boxed{x = 2}$	$\log_4(1024) = x$ $4^x = 1024$ $\log 4^x = \log 1024$ $x \cdot \log 4 = \log 1024$ $x = \frac{\log 1024}{\log 4}$ $\boxed{x = 5}$

Multiply.

$(x+2)(x^2-7x+12)$

$x^2-7x+12$
$x+2$

x^3-7x^2+12x
$+2x^2-14x+24$

$\boxed{x^3-5x^2-2x+24}$

$2x(x+5)(3x-1)(x+2)$

$(2x^2+10x)(3x^2+5x-2)$

$3x^2+5x-2$
$2x^2+10x$

$6x^4+10x^3-4x^2$
$30x^3+50x^2-20x$

$\boxed{6x^4+40x^3+46x^2-20x}$

Factor completely.

$4x^3-4x^2-24x$ $4x(x^2-x-6)$ $\boxed{4x(x-3)(x+2)}$	$16x^2-49y^2$ $\boxed{(4x+7y)(4x-7y)}$	$9-4n^2$ $\boxed{(3+2n)(3-2n)}$	$m^2+14m-32$ $\boxed{(m+16)(m-2)}$
$6v^2+7v-3$ $\boxed{(3v-1)(2v+3)}$	$6a^2-11ab-2b^2$ $\boxed{(6a+b)(a-2b)}$	$z^2-9z-22$ $\boxed{(z-11)(z+2)}$	p^3+4p^2+2p $\boxed{p(p^2+4p+2)}$

For each sequence give the explicit and recursive rule.

n	1	2	3	4	5	6
$t(n)$	-12	6	-3	$\frac{3}{2}$	$-\frac{3}{4}$	$\frac{3}{8}$

E $t(n)=24(-\frac{1}{2})^n$

R $t(n+1)=t(n)\cdot(-\frac{1}{2})$; $t(1)=12$

n	1	2	3	4	5	6
$t(n)$	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$	0

E $t(n)=1-\frac{1}{6}(n)$

R $t(n+1)=t(n)-\frac{1}{6}$; $t(1)=\frac{5}{6}$

-2, 5, 12, 19, … (+7)

E $t(n)=-9+7n$

R $t(n+1)=t(n)+7$

$t(1)=-2$

$\frac{1}{8}$, $\frac{1}{2}$, 2, 8, … (×4)

E $t(n)=\frac{1}{32}\cdot 4^n$

R $t(n+1)=t(n)\cdot 4$

$t(1)=\frac{1}{8}$