Write the standard form of the equation of each line given the slope and y-intercept.

$Ax+By=C$

no fractions

43) Slope = -4, y-intercept = 3

44) Slope = $\frac{1}{2}$, y-intercept = -1

Do Now: #s 45 and 47 (this is from Friday night's hw packet)

45) Slope = $-\frac{9}{2}$, y-intercept = 4

$y = -\frac{9}{2}x + 4$ ← slope-intercept

$2\left(\frac{9}{2}x + y = 4\right)$

$\boxed{9x + 2y = 8}$

46) Slope = $\frac{1}{5}$, y-intercept = -4

47) Slope = $\frac{5}{4}$, y-intercept = 1

$y = \frac{5}{4}x + 1$ ← slope-intercept

$4\left(-\frac{5}{4}x + y = 1\right)$

$\boxed{-5x + 4y = 4}$

48) Slope = -5, y-intercept = 3

Write the slope-intercept form of the equation of the line through the given point with the given slope.

49) through: $(-1, 1)$, slope = 1

50) through: $(2, 5)$, slope = 2

51) through: $(1, -1)$, slope = $-\frac{3}{5}$

52) through: $(5, 1)$, slope = -1

Answer Key for
Exam 3 Review sheet (Q1)

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

①

(a) $f(1) = 1^3 - 3(1) + 5 = 1 - 3 + 5 = 3$

(b) $f(-2) = (-2)^3 - 3(-2) + 5 = -8 + 6 + 5 = 3$

(c) $f(x-2) = (x-2)^3 - 3(x-2) + 5$

$(x-2)(x-2)(x-2) - 3x + 6 + 5$

$(x^2 - 4x + 4)(x-2) - 3x + 11$

$x^3 - 4x^2 + 4x - 2x^2 + 8x - 8 - 3x + 11$

$x^3 - 6x^2 + 12x - 3x + 3$

$x^3 - 6x^2 + 9x + 3$

(d) $f(2x) = (2x)^3 - 3(2x) + 5$

$8x^3 - 6x + 5$

(e) $f(x+h) = (x+h)^3 - 3(x+h) + 5$

$(x+h)(x+h)(x+h) - 3x - 3h + 5$

$(x^2 + 2xh + h^2)(x+h) - 3x - 3h + 5$

$x^3 + 2x^2h + xh^2 + x^2h + 2xh^2 + h^3 - 3x - 3h + 5$

$x^3 + 3x^2h + 3xh^2 + h^3 - 3x - 3h + 5$

② $h(x) = \sqrt{x^2 - 16}$ $f(x) = x - 1$ $g(x) = x^2$

(a) $(g \circ f)(x) = g(x-1) = (x-1)^2 = x^2 - 2x + 1$

(b) $(g \circ h)(x) = g(\sqrt{x^2 - 16}) = (\sqrt{x^2 - 16})^2 = x^2 - 16$

(c) $(f \circ g \circ h)(x)$

$f(g(\sqrt{x^2-16})$

$f((\sqrt{x^2-16})^2)$

$f(x^2-16) = \quad x^2-16-1 = x^2-17$

(d) $(f \circ h \circ g)(x)$

$f(h(x^2)$

$f(\sqrt{x^4-16}) = \quad \sqrt{x^4-16} \; -1$

③

(a) $\dfrac{(x+h)^2 - 3(x+h) - 4 - (x^2-3x-4)}{h}$

$$\frac{\cancel{x^2}+2xh+h^2\cancel{-3x}-3h\cancel{-4}\cancel{-x^2}\cancel{+3x}\cancel{+4}}{h}$$

$$\frac{2xh+h^2-3h}{h}$$

$2x+h-3, \quad h \neq 0$

(b) $\dfrac{3(x+h)-2-(3x-2)}{h}$

$\dfrac{\cancel{3x}+3h-\cancel{2}-\cancel{3x}+\cancel{2}}{h}$

$\dfrac{3h}{h} = 3 \quad h \neq 0$

(c) $^{x(x+h)}\dfrac{\dfrac{1}{x+h} - \dfrac{1}{\cancel{x}}\,\cancel{x}(x+h)}{h \quad x(x+h)}$ $\quad x \neq 0, -h$

$h \neq 0$

$\dfrac{x-(x+h)}{xh(x+h)} = \dfrac{x-x-h}{xh(x+h)} = \dfrac{-\cancel{h}}{x\cancel{h}(x+h)} = \dfrac{-1}{x(x+h)}$

④ (a) $f(x) = 3x-2$

$y = 3x-2$

$x = 3y-2$

$x+2 = 3y$

$f^{-1}(x) = \dfrac{x+2}{3} = y$

Since the inverse is a function, $f(x)$ is 1-1.

(b) $y = x + 20$

$x = y + 20$

$x - 20 = y$

Since the inverse is a function, $y = x + 20$ is 1-1.

(c) $f(x) = \sqrt{3x - 6}$

$y = \sqrt{3x - 6}$

$x = \sqrt{3y - 6}$

$x^2 = 3y - 6$

$x^2 + 6 = 3y$

$\frac{x^2 + 6}{3} = y = f^{-1}(x)$

Since the inverse is a function, f(x) is 1-1.

⑤ $(2, -4), (-2, 7)$

(a) $m = \frac{7 - (-4)}{-2 - 2} = \frac{11}{-4}$

(b) $-3x + 4y = 12$

$\frac{4y}{4} = \frac{3x}{4} + \frac{12}{4}$

$y = \frac{3}{4}x + 3$

$m = 3/4$

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

$m=2$

$m_{\text{of} \perp \text{line}} = -1/2$

(d) $y=3(2x-5)$

$y= 6x-15$

$m=6$

⑥ $m=3 \quad (2,-4)$

(a) point-slope: $y+4=3(x-2)$

Slope-intercept: $y+4=3x-6$

$\xrightarrow{} y=3x-10$

Standard $y-3x=-10$

$(2 -4), (-2, 7)$

(b)

$m = \frac{7-(-4)}{-2-2} = \frac{11}{-4}$

pant slope: $y+4= {}^{-11}/_{4}(x-2)$

or

$y-7=\frac{-11}{4}(x+2)$

$y+4 = \frac{-11}{4}x + \frac{11}{2}$

slope intercept $y= \frac{-11}{4}x + 3/2$

Standard form: $y+\frac{11}{4}x-\frac{3}{2}=0$

$4y+11x=6$

⑦ $7x-2$　　　　$\frac{12}{\sqrt{x+12}}$

(a) $f(h(x))$

where:

$h(x) = 7x$

$f(x) = x-2$

(b) $g(f(h(x)))$

where:

$h(x) = x+12$

$f(x) = \sqrt{x}$

$g(x) = \frac{12}{x}$

(c) $(x^4-6)^9$

$f(g(x))$

where

$g(x) = x^4-6$

$f(x) = x^9$

or

$f(g(h(x)))$

where

$h(x) = x^4$

$g(x) = x-6$

$f(x) = x^9$

⑧ a graph. I pasted it on last page.

⑨ $f(g(x)) = g(f(x)) = x$

$f(x) = \sqrt{x-5}$

$g(x) = x^2+5$

$f(x^2+5) = g(\sqrt{x-5}) = x$

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

$\sqrt{x^2}$　　$x-5+5$

x　　x

* need to show EACH step *

⑩ (a) $f(g(2))$

$f(3) = 1$

(b) $g(f(0))$

$g(2) = 3$

(c) $(g \circ \underbrace{f)(6)}$

$g(0) = 2$

(d) $(f \circ f)(6)$

$f(6) = 0$

$f(0) = 2$

⑪

a) $b = -4$

$m = \frac{1}{4}$

$y = \frac{1}{4}x - 4$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

y-int: $(0, -4)$

x-int: $(16, 0)$

↓ (let $y = 0$)

$0 = \frac{1}{4}x - 4$

$4 = \frac{1}{4}x\,)\,4$

$16 = x$

b) $b = 4$

$m = -1$

$y = -x + 4$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

y int: $(0, 4)$

x-int: $(4, 0)$

c) $b = -3$

$m = -3/4$

$y = -\frac{3}{4}x - 3$

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

y int: $(0, -3)$

x-int: $(-4, 0)$

↓ (let $y = 0$)

$0 = -\frac{3}{4}x - 3$

$4\left(3 = -\frac{3}{4}x\right)$

$12 = -3x$

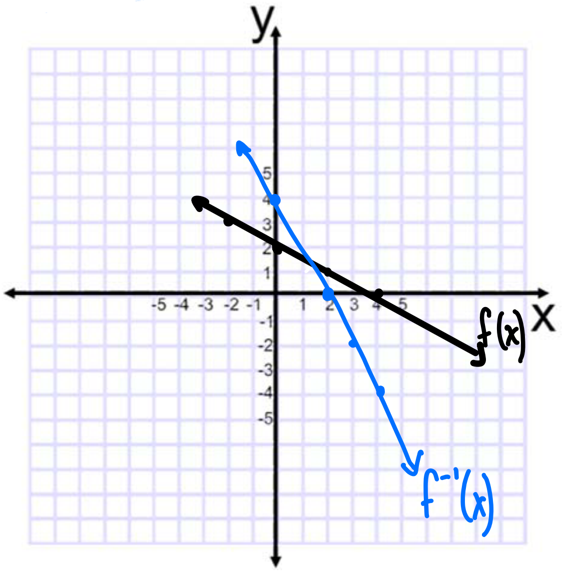
$x = -4$ or look at graph

8. Graph:

a. $f(x)=\frac{-1}{2}x+2$

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

b. $f^{-1}(x)$



points on f(x)	points on $f^{-1}(x)$
(0,2)	(2,0)
(-2,3)	(3,-2)
(-4,4)	(4,-4)
(4,0)	(0,4)

switch x and y

12. Express each of the following below as composites of two or more of the following:

$$a(x) = x - 1 \qquad g(x) = x^4 \qquad b(x) = x + 2 \qquad h(x) = \frac{1}{x}$$

$$e(x) = 4x \qquad k(x) = \sqrt[3]{x} \qquad f(x) = x^2$$

(a) $4x - 1$

$a(e(x))$

(b) $4x - 4$

$e(a(x))$

(c) $4x^2$

$e(f(x))$

(d) $16x^2$

$f(e(x))$

(e) $(x^4 - 1)^2$

$f(a(g(x))))$

(f) $16x - 4$

$e(a(e(x)))$

(g) $x + 1$

$a(b(x))$ or $b(a(x))$

(h) $x - 2$

$a(a(x))$

(i) $x^2 + 1$

$a(b(f(x)))$

or $b(a(f(x))$

(j) $\sqrt[3]{x^4 + 1}$

$k((a(b(g(x)))))$

or $k(b(a(g(x)))$

(k) $\dfrac{1}{\sqrt[3]{x+2}}$

$h(k(b(x)))$

(l) $\sqrt[3]{x+1}$

$k(a(b(x))$

or

$k(b(a(x))$

(m) $x^{\frac{4}{3}} = \sqrt[3]{x^4}$

$k(g(x))$

(n) $\dfrac{1}{\sqrt[3]{x+2}}$

$h(k(b(x)))$

(o) $\dfrac{1}{\sqrt[3]{x}+2}$

$h(b(k(x))$