Friday — Week 3 ─────────────────────────

Study Guide
Webwork

#14

$$8y^3 - 10y^2 - 25y$$

① observe: common factor: y.

$$y(8y^2 - 10y - 25)$$

dead end

② AC $y(8y^2 - 8y - 2y - 25)$ ⊗

③ group $y(8y(y-1)$

AC-method: $AC = 8(-25) = -200$

Factors of -200

1, 200
2, 100
2, 2, 50
2, 2, 2, 25,
2, 2, 2, 5, 5

$$200 = 2^3 \cdot 5^2$$

1, 2, 4, 8, 25

② $y(8y^2 - 20y + 10y - 25)$

③ $y(4y(2y-5) + 5(2y-5))$

④ $y(4y+5)(2y-5)$

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Consider the function

$$f(x) = \frac{x}{2x+4}.$$

a) Find the inverse function for f

$f^{-1}(x) =$ [_____] ,

(b) The domain of f is $\{\, x \mid x \neq$ [-2] $\}$

(c) The domain of f^{-1} is $\{\, x \mid x \neq$ [$1/2$] $\}$

(d) The range of f is $\{\, y \mid y \neq$ [$1/2$] $\}$

(d) The range of f^{-1} is $\{\, y \mid y \neq$ [-2] $\}$

$2x + 4 = 0$

$2x = -4$

$x = -2$ } exclude

$\left\{ \begin{array}{l} \text{Domain of } f \\ (-\infty, -2) \cup (-2, \infty) \end{array} \right.$

(a) Inverse: Set $y = \dfrac{x}{2x+4}$, swap $x = \dfrac{y}{2y+4}$, solve: Rational: ① cross multi.

$(2y+4)x = y$

② distribute: $2yx + 4x = y$

$2yx - y = -4x$

$y(2x-1) = -4x$

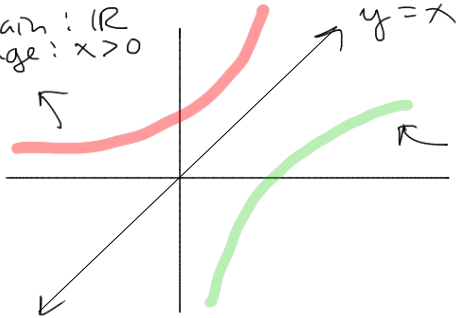$\Rightarrow \quad y = \dfrac{-4x}{2x-1}$

$\boxed{ f^{-1}(x) = \dfrac{-4x}{2x-1} }$ $\Rightarrow$ $\begin{array}{l} 2x-1 \neq 0 \\ 2x \neq 1 \\ x \neq 1/2 \end{array}$

FACT: Since f and f^{-1} are reflections of each other across $y = x$

$\Rightarrow \boxed{ \begin{array}{l} \text{domain}(f) = \text{range}(f^{-1}) \\ \text{range}(f^{-1}) = \text{domain}(f) \end{array} }$
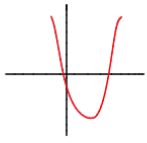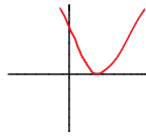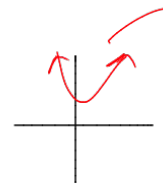
domain: $\mathbb{R}$
range: $x > 0$

$y = x$

domain, $x > 0$
range: $\mathbb{R}$

\# 16

$$ax^2 + bx + c = 0 \qquad , a > 0$$

①

②

③

$x^2 + 1 = 0$

$x^2 = -1$

$x = \pm\sqrt{-1}$

complex #

$$ax^2 + bx = -c$$

$$a\left(x^2 + \frac{b}{a}x\right) = -c$$

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

$$a\left(x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} - \frac{b^2}{4a^2}\right) = -c$$

$$\left[\frac{1}{2}\cdot\frac{b}{a}\right]^2 = \frac{b^2}{4a^2}$$

$$= a\left(\left(x + \frac{b}{2a}\right)^2 - \frac{b^2}{4a^2}\right) = -c$$

$$x^2 + 2\left(\frac{b}{2a}\right)x + \frac{b^2}{4a^2}$$

solve for x

$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}$$

$$=$$

$$\checkmark$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{4a\cdot c}{4a\cdot a} + \frac{b^2}{4a^2}$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

$$\left(x + \frac{b}{2a}\right) = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$x = -\frac{b}{2a} \pm \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$= -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{\sqrt{4a^2}} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
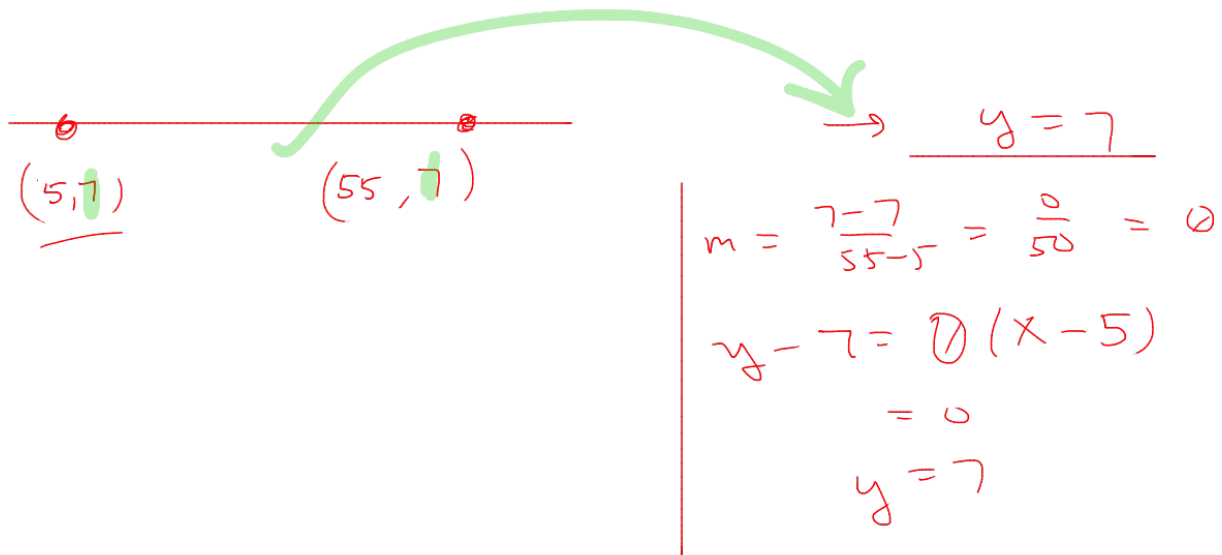
$(5,7)$

$(55,7)$

$y = 7$

$m = \dfrac{7-7}{55-5} = \dfrac{0}{50} = 0$

$y - 7 = 0 (x - 5)$

$= 0$

$y = 7$

- $(3, 4)$

- $(3, -2)$

the line b/w these pts
answer:

$: x = 3$

$m = \dfrac{4 - (-2)}{3 - 3} = \dfrac{6}{0} = $ und.

$(?)$

$(3, y)$

$$10x^2 - 32x + 24$$

$$2(5x^2 - 16x + 12)$$

$$2(5x^2 - 10x - 6x + 12)$$

$$5 \cdot 12 = 60$$

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

$$2(5x^2 - 6x - 10x + 12)$$

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

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

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

$$(2x-4)(5x-6)$$