

Solutions to the Sample Final Exam

You should attempt to answer the questions before looking at the answers.

May 2-11:04 AM

01

$$2(x+1) = 4x-6$$

$$2x+2 = 4x-6$$

$$\begin{array}{r} -2x \qquad \qquad -2x \\ \hline \end{array}$$

$$2 = 2x-6$$

$$\begin{array}{r} +6 \qquad \qquad +6 \\ \hline \end{array}$$

$$8 = 2x$$

$$4 = x$$

May 2-11:08 AM

02

$$ax + b = 0$$

$$ax = -b$$

$$x = \frac{-b}{a}$$

May 2-11:09 AM

03

$$(.09)14000$$

$$1260$$

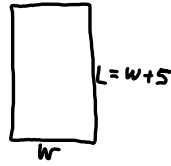
May 2-11:10 AM

04

$$14000 + (.09)14000$$

$$15260$$

May 2-11:11 AM

05

$$P = 2L + 2w$$

$$50 = 2(w+5) + 2w$$

$$= 2w + 10 + 2w$$

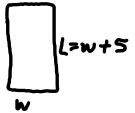
$$50 = 4w + 10$$

$$40 = 4w$$

$$10 = w$$

$$L = w + 5 = 15$$

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06

$$A = L w$$

$$150 = (w+5)w$$

$$0 = w^2 + 5w - 150$$

$$0 = (w-10)(w+15)$$

$$w = 10 \quad w = -15$$

$$L = w + 5 = 15$$

WRONG Sol.

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07

$$x^2 - 7x + 12 = 0$$

$$(x-4)(x-3) = 0$$

$$x = 4, 3$$

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08 $x^2 - 4x - 6 = 0$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-6)}}{2(1)}$$

$$= \frac{4 \pm \sqrt{40}}{2}$$

(b)

May 2-11:18 AM

09 $\Delta = -16t^2 + v_0 t + \Delta_0$

$$\Delta = -16t^2 + 112$$

what is Δ when $t=1$

$$\Delta = -16(1)^2 + 112$$

$$= 96 \text{ ft}$$

"dropped" means $v_0 = 0$

May 2-11:19 AM

10 $\Delta = -16t^2 + 112$

what is $t =$ when $\Delta = 0$

$$0 = -16t^2 + 112$$

$$16t^2 = 112$$

$$t = \frac{112}{16} \Rightarrow t = \sqrt{112/16} \approx 2.6 \text{ sec}$$

(c)

May 2-11:21 AM

11 $i^2 = -1$

$$(6 + 10i) - (3 - 2i)$$

$$6 + 10i - 3 + 2i$$

$$3 + 12i$$

May 2-11:23 AM

11b

$$(5-i)(2+i)$$

$$10 + 5i - 2i - i^2$$

$$10 + 3i - (-1)$$

$$11 + 3i$$

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12

$$6x^3 = 12x^2$$

$$6x^3 - 12x^2 = 0$$

$$6x^2(x-2) = 0$$

\downarrow \downarrow
 $x=0$ $x=2$

Set each factor=0

May 2-11:26 AM

13

$$\frac{-4 < 3x + 2 \leq 14}{\begin{matrix} -2 & -2 & -2 \\ \hline -6 < 3x \leq 12 \\ \frac{-2}{3} & \frac{-2}{3} & \frac{-2}{3} \end{matrix}}$$

a) $-2 < x \leq 4$

b) $(-2, 4]$

c) Bounded

d)

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14

$\frac{\text{rise}}{\text{run}} = \frac{-2}{1} = -2$
 $m = \frac{0-2}{1-0} = \frac{-2}{1} = -2$

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15)

$$F = 20 + 6h$$

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16

in	-1	-2	0	-3	4
out	5	6	7	8	9

Yes

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b)

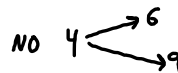
in	-1	2	0	3	4
out	5	6	5	8	9

Yes

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c)

in	-1	4	0	3	4
out	5	6	7	8	9



input 4 has multiple outputs.

d)

in	-1	-2	0	3	4
out	5	5	5	5	5

Yes!

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$$17 \quad h(x) = 3x - 4$$

a) x

b) h

c) $h(4) = 3(4) - 4 = 8$

d) $0 = 3x - 4$

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

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$$18) \quad g(x) = x^2 - 4x - 5$$

$$0 = x^2 - 4x - 5$$

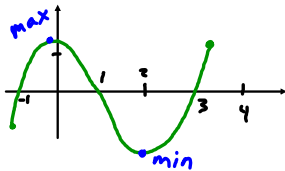
$$0 = (x-5)(x+1)$$

$$x = 5, -1$$

$$g(5) = 0$$

$$g(-1) = 0$$

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a) F f) $x = -1, 1, 3$

b) T g) $f(2) = -1.5$

c) T

d) T

e) F

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$$20) \quad f(x) = x^3 \quad g(x) = 2x + 1$$

i) $(f+g)(x) = x^3 + 2x + 1$

ii) $(f-g)(x) = x^3 - (2x + 1)$
 $x^3 - 2x - 1$

iii) $(fg)(x) = x^3(2x + 1)$

iv) $\left(\frac{f}{g}\right)(x) = \frac{x^3}{2x+1}$

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$$v) (f \circ g)(x) = f(g(x))$$

$$f(2x+1)$$

$$(2x+1)^3$$

$$vi) (g \circ f)(x) = g(f(x))$$

$$g(x^3) = 2x^3 + 1$$

May 2-11:47 AM

21)

$$f(g(19)) \quad g(19) = 8$$

$$f(8) = 52$$

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22)

$$g(x) = 4x - 20$$

$$y = 4x - 20$$

$$x = 4y - 20$$

Switch
x w/ y

$$x + 20 = 4y$$

$$\frac{x+20}{4} = y$$

$$g^{-1}(x) = \frac{x+20}{4} = \frac{x}{4} + 5$$

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23)

a) y

b) NO

$$5 \begin{cases} -1 \\ 0 \end{cases}$$

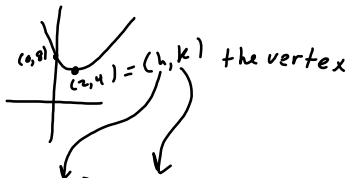
c) y

d) NO

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26.

$$f(0) = 8$$



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

$$f(x) = a(x-2)^2 + 4$$

$$8 = a(0-2)^2 + 4$$

$$8 = a4 + 4$$

$$1 = a$$

$$f(x) = (x-2)^2 + 4$$

May 6-3:44 PM