

Exam 1 Review.

✓

$$\begin{array}{ccccccc} & & 2 & & & & \\ & & 1 & 3 & 3 & & 1 \\ & 1 & 4 & 6 & 4 & & 1 \\ 1 & 5 & 10 & 10 & 5 & & 1 \\ 1 & 6 & 15 & 20 & 15 & 6 & 1 \end{array}$$

$$\begin{aligned} d) (\sqrt{x} - \sqrt{2})^6 &= (\sqrt{x})^6 (-\sqrt{2})^0 + 6 (\sqrt{x})^5 (-\sqrt{2})^1 + 15 (\sqrt{x})^4 (-\sqrt{2})^2 \\ &\quad + 20 (\sqrt{x})^3 (-\sqrt{2})^3 + 15 (\sqrt{x})^2 (-\sqrt{2})^4 + 6 (\sqrt{x}) (-\sqrt{2})^5 \\ &\quad + (-\sqrt{2})^6 \\ &= x^3 - 6x^2\sqrt{x}\sqrt{2} + 30x^2 - 40\sqrt{2}x\sqrt{x} \\ &\quad + 60x - 24\sqrt{2x} + 8 \\ &= x^3 - 6x^2\sqrt{2x} + 30x^2 - 40x\sqrt{2x} \\ &\quad + 60x - 24\sqrt{2x} + 8 \end{aligned}$$

2/ a) $\{(1, 2), (2, 3), (3, 2), (4, 5), (5, 4), (6, 1), (7, 2)\}$

Function: Yes

Domain: $\{1, 2, 3, 4, 5, 6, 7\}$

Range: $\{2, 3, 5, 4, 1\}$

4/ $f(x) = \frac{2x-3}{x-4}$

a) $f(0) = \frac{-3}{-4} = \frac{3}{4}$ $\bullet -3$

c) $f(x+h) = \frac{2(x+h)-3}{x+h-4}$
 $= \frac{2x+2h-3}{x+h-4}$

$$b) 3(x-3)^2 = -84$$

$$(x-3)^2 = -28$$

$$x-3 = \pm \sqrt{-28}$$

$$4 \times 7$$

$$\underline{x = 3 \pm 2\sqrt{7}i}$$

$$d) 3(x-3)^{3/2} = 8$$

$$(x-3)^{3/2} = \frac{8}{3}$$

$$x-3 = \left(\frac{8}{3}\right)^{2/3}$$

$$\sqrt[3]{\frac{8 \cdot 2}{3}}$$

$$x = 3 + \frac{(2^3)^{2/3}}{3^{2/3}}$$

$$8 = (2)^3$$

$$= 3 + \frac{4}{\sqrt[3]{9}}$$

$$e) 2x^2 + 12x + 3 = 0$$

$$x = \frac{-12 \pm \sqrt{144 - 4(2)(3)}}{4}$$

$$= \frac{-12 \pm \sqrt{144 - 24}}{4}$$

$$= \frac{-12 \pm \sqrt{120}}{4}$$

$$120 = 4 \times 30$$

$$= \frac{-12 \pm 2\sqrt{30}}{4}$$

$$\underline{= \frac{-6 \pm \sqrt{30}}{2}}$$

$$d) x^2 + x + 2 = 0$$

$$x = \frac{-1 \pm \sqrt{1-4(2)}}{2} \quad 1-7$$

$$\sqrt{1-8}$$

$$\sqrt{-7}$$

$$= \frac{-1 \pm i\sqrt{7}}{2}$$

$$h) \sqrt{4x+5} = 2x-5$$

$$\frac{1}{2} \rightarrow \frac{2}{1}$$

$$4x+5 = (2x-5)^2$$

$$= 4x^2 - 20x + 25$$

$$4x^2 - 24x + 20 = 0$$

$$x^2 - 6x + 5 = 0$$

$$\begin{cases} x = 1 \\ x = 5 \end{cases}$$

$$\sqrt{25} = 5 \checkmark$$

$$i) 4x-5 = 16x^3 - 20x^2$$

$$16x^3 - 20x^2 - 4x + 5 = 0$$

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

$$(4x-5)(4x^2-1) = 0$$

$$\begin{matrix} 4x-5=0 \\ 4x=5 \end{matrix}$$

$$x = \frac{5}{4}$$

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

$$4x^2=1$$

$$x^2 = \frac{1}{4} \Rightarrow x = \pm \frac{1}{2}$$

$$j) 4x^4 - x^2 - 3 = 0$$

$$x^2 = 1$$

$$x = \pm 1$$

$$x^2 = \frac{-3}{4}$$

$$x = \pm \frac{\sqrt{3}i}{2}$$

$$\pm \sqrt{-\frac{3}{4}} = \pm i \frac{\sqrt{3}}{2}$$

$$= \pm i \frac{\sqrt{3}}{2}$$

$$2x^2 - x - 3 \geq 0$$

$$x = -1, \frac{3}{2}$$

$$\leq 0$$

$$\leq x \leq$$

$$x \leq -1, x \geq \frac{3}{2}$$

#6

$$k) \frac{3-x}{x+5} \geq 0$$

$$x \neq -5, x = 3$$

$$-5 < x \leq 3$$

$$\frac{-5 \quad 0 \quad 3}{- \quad | \quad + \quad | \quad -}$$

$$l) \frac{x-2}{x+3} \leq 4 \quad [x \neq -3]$$

$$\frac{x-2}{x+3} - 4 = 0$$

$$x-2 - 4(x+3) = 0$$

$$x-2-4x-12=0$$

$$-3x-14=0$$

$$-3x=14$$

$$x = -\frac{14}{3}$$

$$\frac{-\frac{14}{3} \quad -3 \quad 0}{- \quad | \quad + \quad | \quad -}$$

$$x \leq -\frac{14}{3} \quad x > -3$$

$$\#7/ f(x) = -x^2 + 6x - 5$$

$$a) x = -\frac{b}{2a} = -\frac{6}{-2} = 3$$

$$y = -9 + 18 - 5 = 4$$

Vertex point: (3, 4)

b) line of symmetry: $x = 3$

c) Max. point @ (3, 4)

$$d) x = 1, 5 \quad \frac{-5}{-1} \quad (\sim)$$

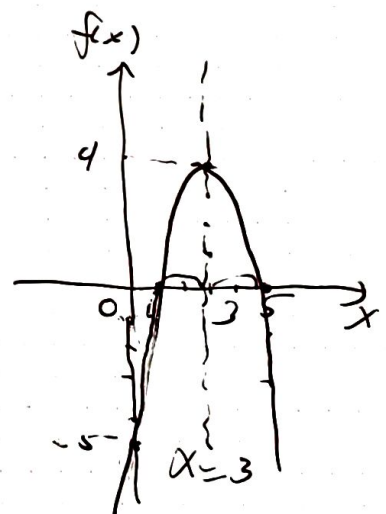
e) Range: $(-\infty, 4]$

Domain: \mathbb{R}

g) Incr: $(-\infty, 3)$

Decr: $(3, \infty)$

H



$$9/ \quad S(t) = -16t^2 + 128t = 192$$

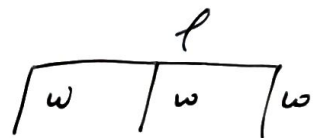
$$\frac{-16t^2 + 128t - 192}{-16} = 0$$

$$t^2 - 8t + 12 = 0$$

$$t = 2, 6$$

$$10/ \quad P = l + 3w = 360$$

$$l = 360 - 3w$$



$$A = lw$$

$$= (360 - 3w)w$$

$$= 360w - 3w^2$$

$$A(w) = -3w^2 + 360w$$

$$w = -\frac{360}{2(-3)} = 60$$

$$l = 360 - 180 = 180$$



$$14/ \quad S(t) = -16t^2 + 96t \geq 80$$

$$\frac{-16t^2 + 96t - 80}{-16} \geq 0$$

$$t^2 - 6t + 5 \leq 0$$

$$t = 1, 5$$

$$1 \leq t \leq 5$$

Solve: 2nd deg. $\mathbb{Q}, \mathbb{R}, \mathbb{C}$, $()^2 = \frac{b}{a}t + \frac{c}{a}$, $\sqrt{t} = ax + b$
 x^3 (grouping), x^4 (factoring or any method)

(11)

fail (1 or 2), $\leq n \geq 0$, $[fct/D/R]$ (Graphing 2nd)

$$\text{#1 (1.6)} \quad 4x - 16 \frac{5}{16} \leq 16 \frac{3}{16} + 3x \quad (16)$$

$$\begin{array}{r} 64x - 5 \\ -48x + 5 \end{array} \leq \begin{array}{r} 3 \\ + 48x \\ - 15 \end{array}$$

$$16x \leq 8$$

$$\left[x \leq \frac{8}{16} = \frac{1}{2} \right]$$

$$4x - 3x \leq \frac{3}{16} + \frac{5}{16}$$

$$\left[x \leq \frac{8}{16} = \frac{1}{2} \right]$$

$$\text{(16x)} \quad 4x - \frac{5}{16} \leq \frac{3}{16} + 3x$$

$$x^2 - 6x + 13 = 0$$

$$x = \frac{6 \pm \sqrt{36 - 4(13)}}{2}$$

$$= \frac{6 \pm \sqrt{36 - 52}}{2}$$

$$= \frac{6 \pm \sqrt{-16}}{2}$$

$$= \frac{6 \pm 4i}{2}$$

$$= 3 \pm 2i$$

$$\frac{6}{2} \pm \frac{4i}{2}$$

$$\text{#2 (1.6)} \quad x - 5\sqrt{x} - 24 = 0$$

$$(\sqrt{x})^2 - 5\sqrt{x} - 24 = 0$$

$$\sqrt{x} = \frac{5 \pm \sqrt{25 - 4(-24)}}{2} \rightarrow \textcircled{=121}$$

$$= \frac{5 \pm 11}{2}$$

$$\sqrt{x} = \frac{5-11}{2} = -\#$$

$$\sqrt{x} = \frac{5+11}{2} = 8 \rightarrow$$

$$\left[x = 8^2 = 64 \right]$$

#4

$$\sqrt[3]{x+3} = 2$$

$$(x+3)^{\frac{1}{3}} = 2$$

$$x+3 = 2^3$$

$$\begin{aligned} x &= 8 - 3 \\ &= \underline{5} \end{aligned}$$

3
①

#1/ $3x^3 + x^2 - 3x - 1 = 0$

$$x^2(\underline{3x+1}) - (\underline{3x+1}) = 0$$

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

$$3x+1=0$$

$$3x = -1$$

$$x = \underline{-\frac{1}{3}}$$

$$x^2 - 1 = 0 \quad \#$$

$$x^2 = 1$$

$$x = \underline{\pm 1}$$

1.7 #10

$$x^2 - 10x + 23 \geq 0$$

$$x = \frac{10 \pm \sqrt{100 - 4(23)}}{2}$$

$$= \frac{10 \pm \sqrt{8}}{2}$$

④x2

$$= \frac{10 \pm 2\sqrt{2}}{2}$$

$$= 5 \pm \sqrt{2}$$

$$\underline{x \leq 5 - \sqrt{2} \quad x \geq 5 + \sqrt{2}}$$

100
92

$$\begin{array}{c|c|c} 0 & 5-\sqrt{2} & 5+\sqrt{2} \\ \hline + & - & + \\ \hline \leftarrow & & \rightarrow \end{array}$$

Review # 13

$$T = 2\pi \sqrt{\frac{L}{32}} = 4$$

$$\sqrt{\frac{L}{32}} = \frac{4}{2\pi}$$



$$\frac{L}{32} \Rightarrow \left(\frac{4}{\pi}\right)^2$$

$$L = 32 \frac{4}{\pi^2}$$

$$= \frac{128}{\pi^2}$$

#15

A: $29 + .12m$

B: $22 + .21m$

m?

$$A = B$$

$$29 + .12m = 22 + .21m$$

$-.21m \quad -29$

$$(.12 - .21)m = 22 - 29$$

$$f.09m = -7$$

$$Lm = \frac{7}{.09} = \frac{700}{9}$$

