

$$\begin{aligned}
 +5/ (x - \sqrt{2})^5 &= x^5 (\sqrt{2})^0 - 5x^4 (\sqrt{2})^1 + 10x^3 (\sqrt{2})^2 \\
 &\quad - 10x^2 (\sqrt{2})^3 + 5x (\sqrt{2})^4 - (\sqrt{2})^5 \\
 &= x^5 - 5x^4 \sqrt{2} + 20x^3 - 20x^2 \sqrt{2} + 20x - 4\sqrt{2}
 \end{aligned}$$

$\begin{matrix} & 1 & 2 & 1 \\ & 1 & 3 & 3 & 1 \\ & 1 & 4 & 6 & 4 & 1 \\ & 1 & 5 & 10 & 10 & 5 & 1 \end{matrix}$

$$\begin{aligned}
 \#6/ \left(\frac{1}{x} - 2x\right)^3 &= \left(\frac{1}{x}\right)^3 (2x)^0 - 3\left(\frac{1}{x}\right)^2 (2x)^1 + 3\left(\frac{1}{x}\right)^1 (2x)^2 - \left(\frac{1}{x}\right)^0 (2x)^3 \\
 &= \frac{1}{x^3} - 6\frac{1}{x} + 12x - 8x^3
 \end{aligned}$$

2- #9

$$\begin{aligned}
 f(t) &= 0.2t + 1 \\
 f(34) &= 0.2(34) + 1 \\
 &= 6.8 + 1 \\
 &= 7.8 \approx 8
 \end{aligned}$$

$$0.2 = \frac{2}{10} = \frac{1}{5}$$

$$0.02 = \frac{2}{100}$$

#10

$$\begin{aligned}
 p(d) &= 1 + \frac{d}{33} \\
 d(54) &= 1 + \frac{54}{33} \\
 &= 1 + \frac{18}{11} \\
 &= \frac{29}{11}
 \end{aligned}$$

$$\frac{3 \times 18}{3 \times 11}$$

$$\frac{a}{b} + 1 = \frac{a+b}{b}$$

$$\begin{array}{r}
 54 \\
 11 \overline{) 54} \\
 \underline{55} \\
 59
 \end{array}$$

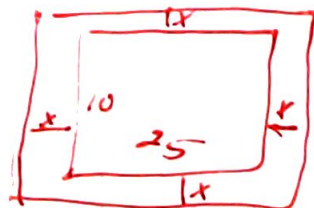
$$\begin{array}{r}
 69 \\
 11 \overline{) 69} \\
 \underline{75} \\
 759
 \end{array}$$

Ex

10 x 25

$$A_T = 496 \text{ ft}^2$$

$$x = ?$$



$$(2x+25)(2x+10) = 496$$

$$4x^2 + 20x + 50x + 250 = 496$$

$$4x^2 + 70x + 250 = 496 \quad (\div 2)$$

$$2x^2 + 35x + 125 - 248 = 0$$

$$2x^2 + 35x - 123$$

$$\begin{array}{r} 248 \\ 125 \\ \hline \end{array}$$

$$x = \frac{-35 \pm \sqrt{35^2 - 4(2)(-123)}}{4}$$

$$\begin{array}{r} \text{p } 3 \\ \text{ } \end{array} \quad \begin{array}{r} -35 \\ \hline 4 \end{array}$$

$$x = 3$$

Maximizing Area

(Minimize)

$$\text{Vertex } x = -\frac{b}{2a}, \quad y = f\left(-\frac{b}{2a}\right)$$

Ex

$$P = 120 \text{ ft} = 2l + 2w \quad (\div 2)$$

$$A_{\text{max}}? \quad 60 = l + w$$

$$A = l \cdot w \quad \begin{array}{l} l = 60 - w \\ = 60 - 30 = 30 \end{array}$$

$$= (60 - w)w$$

$$= 60w - w^2$$

$$= -w^2 + 60w$$

$$Lw = -\frac{60}{-2} = 30$$

Dimension: 30 x 30

$$A = (30)(30) = 900 \text{ ft}^2$$

Summation of all Sides.



Max. Perfect Rectangle: $2l = 60 = \frac{120}{2}$

$$120 = 4l$$

is square (form) rectangle
 $l = w$

Ex $r = l + 2\omega = 60$
 $l = 60 - 2\omega = 60 - 30 = 30$

$$A = l \cdot \omega$$

$$= (60 - 2\omega) \omega$$

$$= 60\omega - 2\omega^2$$

$$= -2\omega^2 + 60\omega$$

$$\omega = -\frac{60}{-4}$$

$$= 15$$

dimension: 30×15

$$A = (30)(15)$$

$$= 450 \text{ ft}^2$$



$$\frac{60}{2} = 30$$

$$2\omega = 30$$

$$\omega = 15$$

Ex $s(t) = -\frac{1}{2}gt^2 + v_0t + s_0$

\downarrow position displacement \uparrow initial velocity \leftarrow initial position

$g = 9.8 \text{ m/sec}^2$
 $= 32.2 \text{ ft/sec}^2$

Ex $s(t) = -16t^2 + 100t$

a) $t?$ $s(t) = 50$

$$50 = -16t^2 + 100t$$

$$16t^2 - 100t + 50 = 0$$

$$8t^2 - 50t + 25 = 0$$

$$t = \frac{50 \pm \sqrt{2500 - 4(25)(8)}}{16}$$

$$2500 - 800$$

$$= \frac{50 \pm \sqrt{1700}}{16} = \frac{50 \pm 10\sqrt{17}}{16}$$

$$t = \frac{25 - 5\sqrt{17}}{8} > 0 \quad t = \frac{25 + 5\sqrt{17}}{8} > 0$$



c)

$$0 = -16t^2 + 100t$$

$$= -4t(4t - 25)$$

$$t = 0,$$

$$t = \underline{\frac{25}{4} \text{ sec}}$$

$$4t - 25 = 0$$

$$4t = 25$$

$$t = \frac{25}{4}$$

c)

t? h_{\max}

$$s(t) = -16t^2 + 100t$$

$$t = -\frac{b}{2a} = -\frac{100}{-32}$$

$$= \underline{\frac{25}{8} \text{ sec}}$$

d)

$$s\left(\frac{25}{8}\right) = -16\left(\frac{25}{8}\right)^2 + 100\left(\frac{25}{8}\right)$$

$$\frac{16 \cdot 625}{64}$$

$$= -\frac{625}{4} + \frac{625}{2}$$

$$= 625\left(-\frac{1}{4} + \frac{1}{2}\right)$$

$$= \underline{\frac{625}{4} \text{ ft}}$$

#11

$$d^2 = 6^2 + 2^2$$

$$d = \sqrt{36 + 4}$$

$$= \sqrt{40}$$

$$= 2\sqrt{10}$$

miles
~~unit~~

$$40 = 4(10)$$



~~28~~

$$P = 132 = 2l + 3w$$

$$2l = \frac{132}{2} - \frac{3}{2}w$$

$$A = 576$$

$$A = lw$$

$$= \left(66 - \frac{3}{2}w\right)w$$

$$= 66w - \frac{3}{2}w^2$$

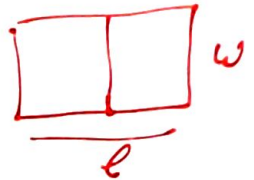
$$= -\frac{3}{2}w^2 + 66w$$

$$w = -\frac{66}{2(-\frac{3}{2})} = 22$$

$$l = 66 - \frac{3}{2}(22)$$

$$= 66 - 33$$

$$= 33$$



18

$$L: (r-7)t = d_L$$

$$C: (r)t = d_C$$

$$u \text{ hr} \rightarrow d = 68$$

$$((r-7)t)^2 + (rt)^2 = 68^2$$

$$16[(r-7)^2 + r^2] = 68^2$$

$$r^2 - 14r + 49 + r^2 = 17^2$$

$$2r^2 - 14r = 289 - 49$$

$$2r^2 - 14r - 240 = 0$$

$$r^2 - 7r - 120 = 0$$

$$r = \frac{7 \pm \sqrt{49 - 4(-120)}}{2} = \frac{7 \pm \sqrt{529}}{2}$$

$$\sqrt{\frac{2-23}{2} \pm \frac{2+23}{2} = 15}$$

$$\text{Logan! } 15 - 7 = 8$$



$$\begin{array}{r} 17 \quad 17 \\ 68 \cdot 68 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 17 \\ 12 \\ \hline 119 \\ 17 \end{array}$$

ufo

#10

$$10 \times 20$$

(x)

$$A = 600$$

$$A = l \cdot w$$

$$= (20 + 2x)(10 + 2x) = 600$$

$$200 + 40x + 20x + 4x^2 - 600 = 0$$

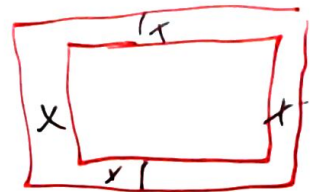
$$4x^2 + 60x - 400 = 0$$

$$x^2 + 15x - 100 = 0$$

$$x = \frac{-15 \pm \sqrt{225 + 400}}{2}$$

$$x = \frac{-15 - 25}{2} \quad \#$$

$$\boxed{x = \frac{-15 + 25}{2} = 5}$$



$$\frac{15}{25}$$

$$\sqrt{625} = 25$$

#47

$$P = 240 = l + 3w$$

$$l = 240 - 3w$$

$$A = lw$$

$$= (240 - 3w)w$$

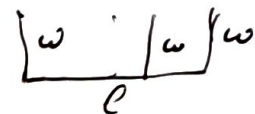
$$= 240w - 3w^2$$

$$= -3w^2 + 240w$$

$$\boxed{w = -\frac{240}{-6} = 40}$$

$$l = 240 - 3(40)$$

$$= 120 \quad \checkmark$$



square



$$l = 120$$

$$3w = 120$$

1.6

$x^n \rightarrow$ n solutions

Ex $4x^4 = 12x^2$

4 solns

divide by x^2

$x = 0, 0$

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

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

$$x^2 = 0$$

$$x = 0, 0$$

$$x^2 = 3$$

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

$$4x^2 = 12$$

$$x^2 = 3$$

$2x^3 + 3x^2 = 8x + 12$

By Grouping

3 solns

$$2x^3 + 3x^2 - 8x - 12 = 0$$

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

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

$$2x+3 = 0$$

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

$$x^2 - 4 = 0$$

$$x^2 = 4$$

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

$$x = -\frac{3}{2}, \pm \sqrt{2}$$

$$ax^2 + bx + c = 0 \rightarrow \text{Quadratic Formula}$$

or factoring

or mine formula

$$a(\cancel{H})^2 + b(\cancel{H}) + c = 0$$

$$a(\underbrace{u}_{x^2})^2 + b(\underbrace{u}_{x^2}) + c = 0$$

$$a(x^n)^2 + b(x^n) + c = 0$$

$$ax + b\sqrt{x} + c = 0 \rightarrow \sqrt{x} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2}$$

$$ax^4 + bx^2 + c = 0 \rightarrow x^2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2}$$

Ex $x^4 - 5x^2 + 6 = 0$

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

$$x^2 - 2 = 0$$

$$x^2 = 2$$

$$x^2 = 3$$

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

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

27 $x^4 - 4x^2 + 3 = 0$

$$a + b + c = 0$$

$$x^2 = 1$$

$$x^2 = 3$$

$$x = \pm 1, \pm \sqrt{3}$$

(:-)

$$x^4 + 4x^2 + 3 = 0$$

$$1(-4) + 3$$

$$x^2 = -1$$

$$x^2 = 3$$

$$x = \pm i, \pm \sqrt{3}$$

All hook up 1.4 (1.5)