Bell Work

Solve: $3x^2 - 4x = -7$

$1\cdot3 \downarrow \quad 1\cdot7$

$3x^2 - 4x + 7 = 0$

$$x = \frac{4 \pm \sqrt{16 - 4(3)(7)}}{2(3)}$$

$$x = \frac{4 \pm \sqrt{-68}}{6} = \frac{4 \pm 2i\sqrt{17}}{6} = \frac{2 \pm i\sqrt{17}}{3}$$

Solve problems using numerical, graphical, and algebraic models.

Numerical model: numbers or data are analyzed

Year	Minimum Hourly Wage	Purchasing Power in 1996 Dollars
1955	.075	4.39
1960	1.00	5.30
1965	1.25	6.23
1970	1.60	6.47
1975	2.10	6.12
1980	3.10	5.9
1985	3.35	4.88
1990	3.8	4.56
1995	4.25	4.38
2000	5.15	4.69
2005	5.15	4.15

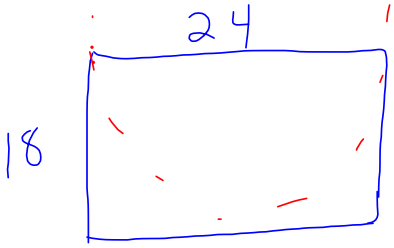
a) In what five-year period did the actual MHW increase the most?

b) In what year did a worker earning the MHW enjoy the greatest purchasing power?

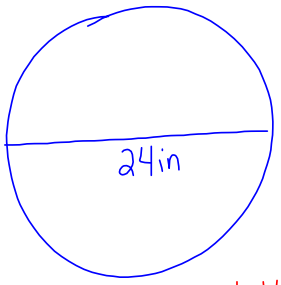
c) A worker on minimum wage in 1980 was earning nearly twice as much as a worker on minimum wage in 1970, and yet there was great pressure to raise minimum wage again. Why?

Algebraic Model: uses formulas to relate variable quantities associated with the phenomena being studied.

Ex: A pizzeria sells a rectangular 18" by 24" pizza for the same price as its large round pizza (24" diameter). If both pizzas are of the same thickness, which option give the most pizza for the money?



$432\ in^2$



πr^2

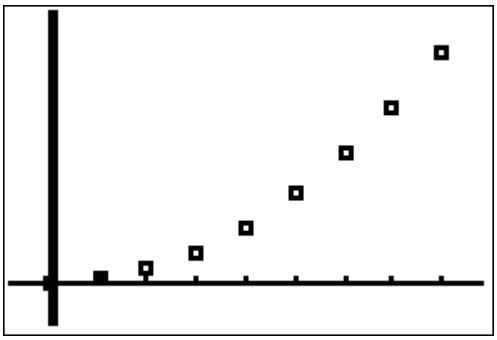
144π

$452\ in^2$

Graphical Model: a visible representation of a numerical model or an algebraic model that gives insight into the relationships between variable quantities

Galileo's Gravity Experiment

Elapsed time (seconds)	0	1	2	3	5	6	7
Distance traveled (inches)	0	.75	3	6.75	12	18.75	27



← Graphical model

Numerical model: $d = .075t^2$

Zero Factor Property:

A product of real numbers is zero if and only if at least one of the factors in the product is zero.

$(4)(0) = 0$

$(0)(-3) = 0$

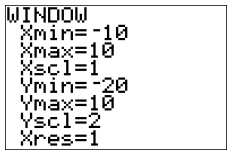
$(x - 4)(x + 2) = 0 \rightarrow x = 4$ or $x = -2$

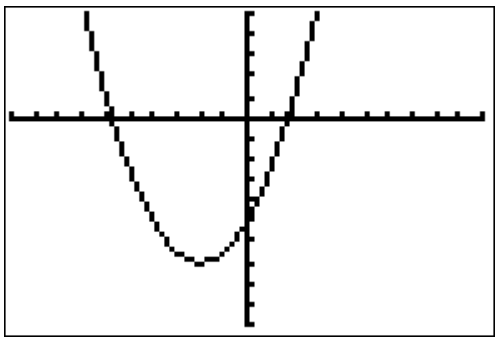
$x - 4 = 0$ or $x + 2 = 0$

$x = 4$ or $x = -2$

Solve the equation $x^2 = 10 - 4x$

Graphically





Algebraically

$X^2 = 10 - 4X$

$X^2 + 4X - 10 = 0$

$X = \frac{-4 \pm \sqrt{16 - 4(1)(-10)}}{2(1)}$

$X = \frac{-4 \pm \sqrt{56}}{2} \approx$

$\frac{-4 + \sqrt{56}}{2}$

1.74

$\frac{-4 - \sqrt{56}}{2}$

-5.74

If *a* is a real number that solves the equation f(x) = 0, then these three statements are equivalent.

1. The number *a* is a root (or solution) of the equation f(x) = 0.
2. The number *a* is a zero of y = f(x).
3. The number *a* is an x-intercept of the graph of y = f(x). (Sometimes the point (*a*, 0) is referred to as an x-intercept.)

Caution: Grapher Failure and Hidden Behavior

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

$x^3 - 1.1x^2 - 65.4x + 229.5 = 0$

Assignment: Section 1.1

Pg. 81 QR: 1-10

EX: 1-17 odd, 22, 29-45 odd, 51, 55-60