099 §8.2 #s 1-21, 23, 25, 27, 29, 33, 35, 51
every 4th

#s 1-22 Use the quadratic formula to solve (sol'ns are real)

(1) $m^2+5m-6=0$ $\quad m \in \{-6, 1\}$

$(m-1)(m+6) = m^2+6m-1m-6 = m^2+5m-6$ ✓

oops!

$a=1,\ b=5,\ c=-6$

$b^2-4ac = 5^2-4(1)(-6) = 25+24 = 49$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-5 \pm \sqrt{49}}{2(1)} = \frac{-5 \pm 7}{2}$$

$\frac{-5+7}{2} = 1$

$\frac{-5-7}{2} = -6$

$\boxed{\{-6, 1\}}$

(5) $x^2-6x+9=0$

$a=1,\ b=-6,\ c=9$

$b^2-4ac = (-6)^2-4(1)(9)$

$= 36-36 = 0$!

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-6) \pm \sqrt{0}}{2(1)} = \frac{6}{2} = 3$$

$\boxed{\{3\}}$

099 §8.2 #5 9, 13, ..., 21, 23, 25, 27, 29, 33, 35, 51

(9) $x^2 + 7x + 4 = 0$

$a=1,\ b=7,\ c=4$

$b^2-4ac = 7^2-4(1)(4)$

$= 49-16$ Hmm $\sqrt{33} = \sqrt{3\cdot 11}$ doesn't simplify!

$= 33$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-7 \pm \sqrt{33}}{2(1)} = \frac{-7 \pm \sqrt{33}}{2}$$

$$\boxed{\left\{ \frac{-7 \pm \sqrt{33}}{2} \right\}}$$

(13) $\frac{1}{2}x^2 - x - 1 = 0$ Clear fractions

$x^2 - 2x - 2 = 0$

$a=1,\ b=-2,\ c=-2$

$b^2-4ac = (-2)^2-4(1)(-2)$

$= 4+8 = 12$

$\sqrt{12} = \sqrt{2^2 \cdot 3}$

$= 2\sqrt{3}$

$2 \mid 12$
$2 \mid 6$
3

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-2) \pm 2\sqrt{3}}{2(1)} = \frac{2 \pm 2\sqrt{3}}{2}$$

$$= \frac{2(1 \pm 1\sqrt{3})}{2} = \boxed{1 \pm \sqrt{3}}$$

099 §8.2 #s 17, 21, 23, 25, 27, 29, 33, 35, 51

(17) $\frac{1}{3}y^2 = y + \frac{1}{6}$

$\frac{1}{3}y^2 - y - \frac{1}{6} = 0$ TIMES 6

$2y^2 - 6y - 1 = 0$

$a = 2, b = -6, c = -1$

$b^2 - 4ac = (-6)^2 - 4(2)(-1)$

$= 36 + 8 = 44$

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

$= \frac{-(-6) \pm 2\sqrt{11}}{2(2)}$

$= \frac{6 \pm 2\sqrt{11}}{4} = \frac{2 \cdot 3 \pm 2\sqrt{11}}{2 \cdot 2} = \frac{2(3 \pm \sqrt{11})}{2 \cdot 2} = \frac{3 \pm \sqrt{11}}{2}$

$2 | 44$
$2 | 22$
11

$\sqrt{44} = \sqrt{2 \cdot 2 \cdot 11}$
$= 2\sqrt{11}$

$\left\{ \frac{3 \pm \sqrt{11}}{2} \right\}$

(21) $(m+2)(2m-6) = 5(m-1) - 12$

$2m^2 - 2m - 12 = 5m - 5 - 12$

$2m^2 - 2m - 12 = 5m - 17$

$-5m + 17 = -5m + 17$

$2m^2 - 7m + 5 = 0$

$a = 2, b = -7, c = 5$

$b^2 - 4ac = (-7)^2 - 4(2)(5)$

$= 49 - 40 = 9$

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

$= \frac{7 \pm \sqrt{9}}{2(2)} = \frac{7 \pm 3}{4}$

$\frac{7+3}{4} = \frac{10}{4} = \frac{5}{2}$

$\frac{7-3}{4} = \frac{4}{4} = 1$

$\left\{ 1, \frac{5}{2} \right\}$

099 §8.2 #s 23, 25, 27, 29, 33, 35, 51

23–40 Solve w/ quadratic formula. Some answers may be non-real.

(23) $x^2+6x+13=0$

$a=1,\ b=6,\ c=13$

$b^2-4ac = 6^2-4(1)(13)$

$= 36-52 = -16$

$\sqrt{-16} = 4i$

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

$= \dfrac{-6 \pm 4i}{2(1)} = \dfrac{2(-3 \pm 2i)}{2}$

$= \boxed{-3 \pm 2i}$

$\boxed{\{-3 \pm 2i\}}$

(25) $(x+5)(x-1) = 2$

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

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

$a=1,\ b=4,\ c=-7$

$b^2-4ac = 4^2-4(1)(-7)$

$= 16+28 = 44$

$\sqrt{44} = 2\sqrt{11}$ by previous work

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

$= \dfrac{-4 \pm 2\sqrt{11}}{2(1)} = \dfrac{2(-2 \pm \sqrt{11})}{2}$

$= -2 \pm \sqrt{11}$

$\boxed{\{-2 \pm \sqrt{11}\}}$

Obj 5 8.2 #s 27, 29, 33, 35, 51

(27) $6 = -4x^2 + 3x$

$4x^2 - 3x + 6 = 0$

$a = 4, b = -3, c = 6$

$b^2 - 4ac = (-3)^2 - 4(4)(6)$

$= 9 - 96 = -87$

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

$= \dfrac{-(-3) \pm \sqrt{-87}}{2(4)}$

$= \dfrac{3 \pm i\sqrt{87}}{8}$

$3 \mid 87$
29

$\sqrt{87} = \sqrt{3 \cdot 29}$ No factors.

$\dfrac{3 \pm i\sqrt{87}}{8}$

$\left\{ \dfrac{3 \pm i\sqrt{87}}{8} \right\}$

(29) $\dfrac{x^2}{3} - x = \dfrac{5}{3}$ TIMES 3

$x^2 - 3x = 5$

$x^2 - 3x - 5 = 0$

$a = 1, b = -3, c = -5$

$b^2 - 4ac = (-3)^2 - 4(1)(-5)$

$= 9 + 20 = 29$ is prime

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

$= \dfrac{-(-3) \pm \sqrt{29}}{2(1)}$

$= \dfrac{3 \pm \sqrt{29}}{2}$

$\left\{ \dfrac{3 \pm \sqrt{29}}{2} \right\}$

099 §8.2 #s 33, 35, 51

(33) $10y^2 + 10y + 3 = 0$

$a = 10, b = 10, c = 3$

$b^2 - 4ac = 10^2 - 4(10)(3)$

$= 100 - 120$

$= -20$

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

$= \frac{-10 \pm 2i\sqrt{5}}{2(10)}$

$= \frac{2(-5 \pm i\sqrt{5})}{2 \cdot 10}$

$= \boxed{\frac{-5 \pm i\sqrt{5}}{10}}$

$\sqrt{-20} =$

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

$2\sqrt{5}$

so $\sqrt{-20} = 2i\sqrt{5}$

$\boxed{\left\{ \frac{-5 \pm i\sqrt{5}}{10} \right\}}$

(35) $\frac{2}{5}y^2 + \frac{1}{5}y + \frac{3}{5} = 0$ TIMES 5

$2y^2 + y + 3 = 0$

$a = 2, b = 1, c = 3$

$b^2 - 4ac = 1^2 - 4(2)(3)$

$= 1 - 24 = -23$

$\sqrt{-23} = i\sqrt{23}$

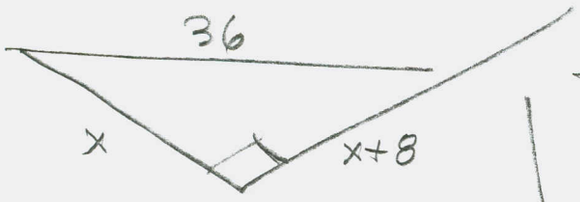
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-1 \pm i\sqrt{23}}{2(2)} = \boxed{\frac{-1 \pm i\sqrt{33}}{4}}$

$\boxed{\left\{ \frac{-1 \pm i\sqrt{33}}{4} \right\}}$

099 §8.2 #51

(51) How much distance is saved by cutting the corner?



Let

s = distance saved (ft)

$x^2 + (x+8)^2 = 36^2$

$x^2 + x^2 + 16x + 64 = 1296$

$2x^2 + 16x - 1232 = 0$ Divide by 2

$x^2 + 8x - 616 = 0$

$a=1, b=8, c=-616$

$b^2 - 4ac = 8^2 - 4(1)(-616)$

$= 64 + 2464$

$= 2528$

$\sqrt{2528} \approx 50.27922036$

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

$= \frac{-8 \pm \sqrt{2528}}{2(1)} = \frac{-8 \pm 4\sqrt{158}}{2}$

$= -4 \pm 2\sqrt{158} \approx 21.13961018$

2 | 2528
2 | 1264
2 | 632
2 | 316
2 | 158
79

$\sqrt{2528} = \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 79}$

$2 \cdot 2\sqrt{2 \cdot 79} = 4\sqrt{158}$

So $x + x + 8 \approx 50.27922 \approx 50$

$\therefore 50 - 36 = \boxed{14 = s}$