

Key

Algebra I Flashback

A) Solving one-variable equations.

1) $(2x-1)-(4x+6)=8$

$-2x-7=8$

$-2x=15$

$x = -15/2$

2) $4-7x+2x=5(4-9x)$

$4-5x=20-45x$

$40x=16$

$x = 2/5$

$3) \left[\frac{5}{6}x + \frac{2}{3} = \frac{11}{4} \right]$

$10x + 8 = 33$

$10x = 25$

$x = 5/2$

B) Solving Systems of Equations Algebraically

4) $y = 3x - 12$

$x - 2y = 14$

$x - 2(3x - 12) = 14$

$x - 6x + 24 = 14$

$-5x = -10$

$x = 2$ (2, -6)

$y = -6$

5) $3x + 5y = -12$

$2x = 3y - 8$

$3(2x - 3y = -8)$

$6x - 9y = -24$

$-6x - 10y = 24$

$-19y = 0$

$y = 0$ (-4, 0)

$x = -4$

6) $\begin{cases} \frac{2}{5}x = \frac{1}{2}y + 6 \\ -8 = \frac{3}{2}y + \frac{4}{5}x \end{cases}$

$4x = 5y + 30$

$3(4x - 5y = 30)$

$8x - 15y = 90$

$12x - 15y = 180$

$20x = 100$

$x = 5$

$y = -8$ (5, -8)

7) Stephen has 14 coins in his pocket, all of which are dimes and quarters. If the total value of his change is \$2.75, how many dimes and quarters does he have?

Qty Value

$-10(D + Q = 14)$

$.10D + .25Q = 2.75$

$-10D - .10Q = -1.40$

$-.15Q = 1.35$

$Q = 9$

$D = 5$

Q: # of quarters
D: # of dimes

8) You are in charge of allocating funds for the UConn basketball teams and need to order new sneakers. The players can choose from the new Air Jordan's costing \$100 or the new Reebok's costing \$125. If 50 pairs are ordered and the total cost is \$5,850, how many of each type of sneaker were ordered?

Qty Value

$-100(J + R = 50)$

$100J + 125R = 5850$

$-100J - 100R = -5000$

$25R = 850$

$R = 34$

$J = 16$

R: # Reebok's
J: # Air Jordan's

- 9) The total cost of 15 gallons of regular unleaded gasoline and 10 gallons of premium gasoline is \$35.50. Premium costs \$0.20 more per gallon than regular unleaded. What is the cost per gallon of each type of gasoline?

$$15R + 10P = 35.50$$

$$P = R + .20$$

$$15R + 10(R + .20) = 35.50$$

$$25R + 2 = 35.50$$

$$25R = 33.50$$

R: # of regular gallon
P: # of premium "

$$R = \$1.34$$

$$P = \$1.54$$

Algebra 2 Flashback

C) Factoring

10) $m^2 - 6m + 8$

$$(m-4)(m-2)$$

11) $3x^2 + 2x - 16$

$$(3x+8)(x-2)$$

12) $6x^2 + 7x + 2$

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

13) $r^3 + 3r^2 - 54r$

$$r(r^2 + 3r - 54)$$

$$r(r+9)(r-6)$$

14) $4a^2 - 81$

$$(2a+9)(2a-9)$$

15) $3x^2 + 26x - 9$

$$(3x-1)(x+9)$$

16) $16x^2 + 56x + 49$

$$(4x+7)^2$$

re-arrange
17) $15x^2 - 2 - x$

$$(5x-2)(3x+1)$$

re-arrange
18) $-10m + 8m^2 + 3$

$$(4x-3)(2x-1)$$

19) $x^2 + 25$

not factorable

Use SOAP
20) $x^3 - 64$

x 4 D.O.C.

$$(x-4)(x^2 + 4x + 16)$$

Use SOAP

21) $8x^3 + 27$ S.O.C.

$2x$ 3

$$(2x+3)(4x^2 - 6x + 9)$$

D) Solving Quadratic Equations. Leave answers in simplest radical form.

$$\begin{aligned} &4x^2 + 28x + 49 \\ &\quad \quad \quad -25 \\ \hline &4x^2 + 28x + 24 = 0 \\ &x^2 + 7x + 6 = 0 \\ &\sqrt{(2x+7)^2} = \sqrt{25} \end{aligned}$$

22) $5x^2 = 6 - 13x$

$$\begin{aligned} 0 &= (5x - 2)(x + 3) \\ x &= 2/5, -3 \end{aligned}$$

23) $2x^2 = 250$

$$\begin{aligned} \sqrt{x^2} &= \sqrt{125} \\ x &= \pm 5\sqrt{5} \end{aligned}$$

25) $2x^2 + 3x = 1$

$$\begin{aligned} &(\cancel{2x} - \cancel{x}) \\ x &= \frac{-3 \pm \sqrt{9 - 4(2)(-1)}}{4} \\ &= \frac{-3 \pm \sqrt{17}}{4} \end{aligned}$$

26) $\sqrt{(2x+7)^2} = \sqrt{25}$

$$\begin{aligned} 2x + 7 &= \pm 5 \\ 2x &= 12, 2x = -2 \\ x &= \{6, -1\} \end{aligned}$$

26) $(2x - 5)(x + 1) = 2$

$$\begin{aligned} 2x^2 - 3x - 5 &= 2 \\ 2x^2 - 3x - 7 &= 0 \\ x &= \frac{3 \pm \sqrt{9 - 4(2)(-7)}}{4} \\ &= \frac{3 \pm \sqrt{65}}{4} \end{aligned}$$

27) $n^3 + 5n^2 - 9n = 45$

$$\begin{aligned} n^2(n+5) - 9(n+5) &= 0 \\ (n^2 - 9)(n+5) &= 0 \\ (n+3)(n-3)(n+5) &= 0 \\ n &= \{-3, 3, -5\} \end{aligned}$$

28) $45x - 30x^2 + 5x^3 = 0$

$$\begin{aligned} 5x(x^2 - 6x + 9) &= 0 \\ 5x(x-3)(x-3) &= 0 \\ x &= \{0, 3\} \end{aligned}$$

29) $3x^2 - 27 = 0$

$$\begin{aligned} 3(x^2 - 9) &= 0 \\ 3(x+3)(x-3) &= 0 \\ x &= \pm 3 \end{aligned}$$

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

$$\begin{aligned} x^2(x+4) - 1(x+4) &= 0 \\ (x^2 - 1)(x+4) &= 0 \\ (x+1)(x-1)(x+4) &= 0 \\ x &= \{-1, 1, -4\} \end{aligned}$$

31) $(3x + 2)^2 - 25 = 0$

$$\begin{aligned} (3x+2)^2 &= 25 \\ 3x+2 &= \pm 5 \\ 3x+2 &= 5 \quad 3x+2 = -5 \\ 3x &= 3 \quad 3x = -7 \\ x &= 1 \quad x = -7/3 \end{aligned}$$

32) b. water $\rightarrow h=0$
so $y=0$

$$0 = -16x^2 + 24x + 40$$

$$0 = -4(4x^2 - 6x - 10)$$

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

$$0 = (2x - 5)(x + 1)$$

$x = 2.5$ $x = -1$

2.5 seconds

c). $y = -16(2)^2 + 24(2) + 40$
 $= 24$ feet high

d) $20 = -16x^2 + 24x + 40$ ← could use Calc intersect here
 $\frac{0}{-4} = \frac{-16x^2 + 24x + 20}{-4}$
 $0 = 4x^2 - 6x - 5$ DNF \rightarrow use DF OR Calc zero
 $x = 2.096$ seconds

e). max ht \rightarrow Calc max or

when $x = \frac{-b}{2a} = \frac{-24}{-32} = \frac{3}{4} = \boxed{.75 \text{ seconds}}$

max ht: $y = -16\left(\frac{3}{4}\right)^2 + 24\left(\frac{3}{4}\right) + 40$
 $= -9 + 18 + 40 = \boxed{49 \text{ feet.}}$

$$33. \quad P(x) = -5x^2 + 40x + 3$$

$x \rightarrow$ in 1000's

$P(x) \rightarrow$ in 100's

$$a) \quad \underline{\text{max}} \quad x = \frac{-b}{2a} = \frac{-40}{-10} = 4 \rightarrow \boxed{4000 \text{ units}}$$

b). Sub in 4 for x

$$P(4) = -5(4)^2 + 40(4) + 3$$

$$= 83 \rightarrow$$

$$\boxed{\$8300}$$