Word Problems ANSWERS

Problem Set #3

1) a) $y = 13$

b) $y = -\frac{49}{2} = -24\frac{1}{2}$

c) $x = \frac{11}{5} = 2\frac{1}{5}$

2)

a) $x = \frac{3}{2} = 1\frac{1}{2}$

b) $x = \frac{33}{4} = 8\frac{1}{4}$

c) $y = 5$

3) Three possible solutions:
$x = 0, y = -3$
$x = 1, y = -1$
$x = -1, y = -5$

4) Three possible solutions:
$x = 0, y = -\frac{4}{3}$
$x = 1, y = \frac{1}{3}$
$x = 2, y = 2$

5) $x = 5, y = 7$

6) Let x be the larger number and y be the smaller number.
There are six two-number riddles possible:

a) $x + y = 7$; $x = 2y$
Solution: $x = \frac{14}{3} = 4\frac{2}{3}$,
$y = \frac{7}{3} = 2\frac{1}{3}$

b) $x + y = 7$
$3x = 4y + 35$
Solution: $x = 9, y = -2$

c) $x + y = 7$; $x = y^2 + 1$
Solution #1: $x = 10$,
$y = -3$;
Solution #2: $x = 5, y = 2$

d) $x = 2y$
$3x = 4y + 35$
Solution: $x = 35$,
$y = \frac{35}{2} = 17\frac{1}{2}$

e) $x = 2y$
$x = y^2 + 1$
Solution: $x = 2, y = 1$

f) $3x = 4y + 35$
$x = y^2 + 1$
Solution #1: $x = 17$,
$y = 4$;
Solution #2: $x = \frac{73}{9} = 8\frac{1}{9}$,
$y = -\frac{8}{3} = -2\frac{2}{3}$

7) $10x + 8 = 120 \rightarrow$
$x = \frac{56}{5} = 11\frac{1}{5}$

8) $x^2 = 10x - 21 \rightarrow x = 3, 7$

9) $T = A + 18$; $2T = 3A - 6$
The Apes scored 42 so the Tigers scored 60.

10)

a) $y = 8$

b) $x = -\frac{33}{2} = -16\frac{1}{2}$

c) $y = \frac{7}{2} = 3\frac{1}{2}$

11) Three possible solutions:
$x = 0, y = \frac{7}{2} = 3\frac{1}{2}$
$x = 1, y = 3$
$x = -2, y = \frac{9}{2} = 4\frac{1}{2}$

Problem Set #4

1) $x+y = 17$ and $x^2+y^2 = 185$
The numbers are 13 and 4.

2) $x-y = 16$ and $4y = 3x - 13$
The numbers are 51 and 35.

3) $x + y = 31$ and $y = x + 1$.
The numbers are 15 and 16.

4) $x + y = 48$ and $x = y + 2$
The numbers are 23 and 25.

5) $x + y = 34$ and $x = y + 2$
The numbers are 16 and 18.

6) $x = -2$ and $y = 3$

7) $x + y = 210$ and $x - y = 40$
The numbers are 125 and 85.

8) $x = y + 1$ and $4y = 3x + 4$
The numbers are 7 and 8.

9) $xy = 80$ and $x = 3y + 1$
There are two solutions:
$x = 16$ and $y = 5$
$x = -15$ and $y = -\frac{16}{3} = -5\frac{1}{3}$

10) $x = 3, y = 5$

11) $x = 1, y = 3$

12) $x = \frac{5}{3} = 1\frac{2}{3}$, $y = -\frac{22}{9} = -2\frac{4}{9}$

13) $x + y = 335$ and $x = 2y - 40$
The numbers are 125 and 210.

14) C + D = 3.35 and
D = 2C – 0.4
The donut costs $2.10.

15) $x = -3, y = -2$

16) $x = \frac{31}{11} = 2\frac{9}{11}$, $y = \frac{5}{11}$

17) $x = 2, y = 7$

Problem Set #5

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

2) $x = 5$, $y = 2$

3) Two possible solutions:
$x = 7, y = 0$ and $x = 0, y = -3$

4) 78.5% or C+

5) 75.25% or C

6) 76.55% or C

7) 81.3% or B-

8) B = 2J – 1 and
B – 5 = 3(J – 5)
Bill is 17 years old.

9) $x - y = 11$ and $2y = x - 18$
The numbers are -7 and 4.

10) $x - y = 5$ and $x^2 + y^2 = 233$
The two solutions are 8, 13
13 or -8, -13.

11) F = 2M – 2 and F + M = 41.5
Mary has $14.50.

12) 83.8%

13)

a) $x = \frac{7}{2} = 3\frac{1}{2}$, $y = -\frac{5}{2} = -2\frac{1}{2}$

b) $x = -\frac{32}{9} = -3\frac{5}{9}$, $y = \frac{1}{3}$

c) $x = -\frac{13}{3} = -4\frac{1}{3}$, $y = 9$

14) Two possible equations:

$y = \frac{2}{3}x - \frac{7}{3}$

$6x - 9y = 21$

15) $x^2 + (x + 2)^2 = 394$
The two solutions are
13, 15 or -13, -15.

16) C

17)

a) $x = -2, y = -7$

b) $x = 5, y = -\frac{1}{2}$

c) $x = \frac{10}{3} = 3\frac{1}{3}$,
$y = -\frac{5}{3} = -1\frac{2}{3}$

Word Problems ANSWERS

Problem Set #6

1) .25Q + .1D = 3.95 and
Q + D = 20.
Jeff has 7 dimes and 13 quarters.
2) .05N + .1D = 2.45 and
N = D + 4
Bob has 15 dimes.
3) (87.5)(.7) + x(.3) = 90
Kate must score a 96 or higher on her final exam.
4) $x = \frac{29}{8} = 3\frac{5}{8}$, $y = -\frac{17}{3} = -5\frac{2}{3}$
5) $x = 3$, $y = \frac{12}{7} = 1\frac{5}{7}$
6) $x = \frac{1}{2}$, $y = -3$
7) $x = y + 3$ and $4y = 3x + 7$
The numbers are 16 and 19.
8) $x - y = 7$ and $y = .65x$
The numbers are 20 and 13.
9) 2B = F – 12 and 3B = F+3
Frank weighs 42 kg.
10) 79%
11) B = $\frac{2}{3}$M and M = B + 5
Bill is 10 years old.

12) The two possible solutions are:
$x = 4$, $y = 2$ or
$x = -2$, $y = -10$
13) J = $\frac{1}{2}$P and
(J + 1) + (P + 1) = 35
Jeff is 11 years old.
14) S = G – 20 and
S + 9 = $\frac{3}{5}$ (G + 9)
Sue is 21 years old.

Problem Set #7

1) 8A + 4.25B = 30,000 and
A + B = 4500
2900 tickets in section A and 1600 tickets in section B were sold.
2) 10.5R + 8M = 159.75 and
R + M = 17
Joe worked 7.5 hours at the movie theater and 9.5 hours at the restaurant.
3) $x = -\frac{7}{2} = -3\frac{1}{2}$, $y = \frac{41}{16} = 2\frac{9}{16}$
4) $x = 2$, $y = 1$
5) $x = \frac{34}{19} = 1\frac{15}{19}$, $y = -\frac{9}{19}$
6) No Solution.
7) H = F – 22 and H = $\frac{1}{2}$F.
When her father is 44, Hannah will be 22 so the answer is in 14 years.
8) Speed = $\frac{distance}{time}$
Tim travels 15 miles in 80 minutes ($\frac{4}{3}$ of an hour) so his average speed for the entire trip is $\frac{15}{80} = \frac{3}{16}$ miles per minute or $11\frac{1}{4}$ miles per hour.
9) 12 quarters.
10) Let d to be the distance and s be the speed Ben jogged on Saturday. Thus $s = \frac{d}{2.5}$ and $s + 3 = \frac{d+2}{2}$. Thus Ben jogged 20 km on Saturday.
11) 11 mph
12) It took Mary 4.5 hours to climb the hill and 1 hour to descend. Therefore her average speed for the entire trip was $\frac{36}{5.5} = 6\frac{6}{11}$ mph or ≈ 6.55 mph
13) $6\frac{6}{11}$ mph or ≈ 6.55 mph
14) $6\frac{6}{11}$ mph or ≈ 6.55 mph. An algebraic explanation of this is:
d = distance up or down the hill.
$\frac{d}{4} = t_1$ (time up the hill). $\frac{d}{18} = t_2$ (time down the hill).
$\frac{2d}{t_1+t_2}$ = Average speed of trip.
15) -80 and -20.

Problem Set #8

1) The police car catches up to the thief at 10:37 PM, 60 miles from the bridge.
2)
a) $x = 2$, $y = -1$
b) $x = \frac{9}{13}$, $y = \frac{20}{13} = 1\frac{7}{13}$
3) Two solutions:
6, 11 or -6, -11
4) $8.00
5) 0.5 miles per minute or 30 mph
6) 16, $\frac{17}{2} = 8\frac{1}{2}$
7) $\frac{x}{y} = \frac{4}{5}$ and $\frac{x+y}{2} = 18$
The two numbers are 16, 20
8) Bill is 3 years old.
9) Three equations and three unknowns!
.25Q + .1D + .05N = 2.4
Q + D + N = 20
N = 2.5D
Substitute 2.5D in for N in the first two equations. Now we have two equations and two unknowns.
Maria has 6 quarters, 4 dimes and 10 nickels.
10) Let T and K be the number of miles Thomas and Keith have gone respectively. At the moment they pass,
T + K = 12 miles. Thomas bikes at 15 mph which means he goes $\frac{1}{4}$ miles per minute. Keith bikes at $\frac{7}{20}$ miles per minute. Thomas travels T miles in M minutes. Therefore M = 4T. Keith travels K miles in M minutes. Therefore M = $\frac{20K}{7}$. When they pass, their travel times will be equal so 4T = $\frac{20K}{7}$. Solve this system of equations and you will find that Thomas and Keith pass each other at 2:40 PM.

11) These are identical equations. The bottom equation is the top equation times two. Therefore there are an infinite number of solutions.
12) One example is:
$2y - 3x = -7$

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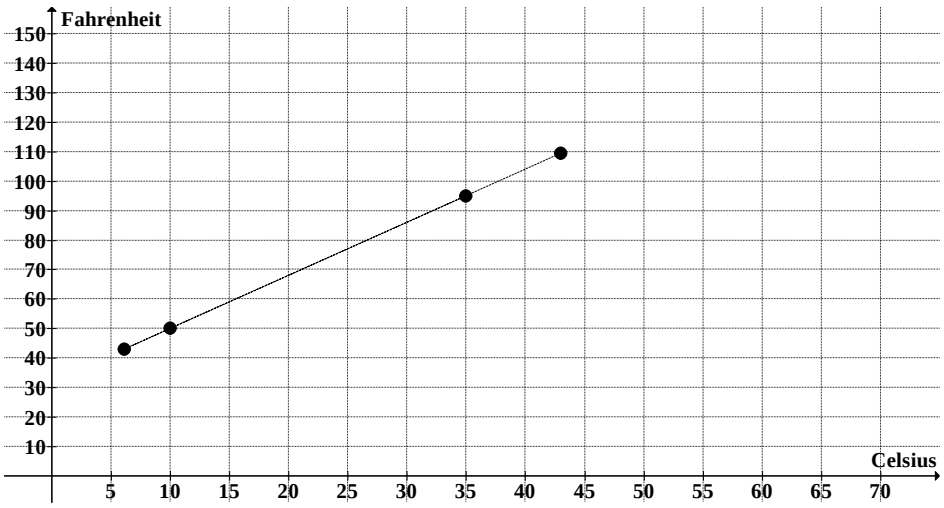
Problem Set #9

1)

a) 35° C
b) 50° F
c) $6\frac{1}{9}$° C
d) $109\frac{2}{5}$° F

2)



3)

a) 60°
b) 32°
c) 25°
d) 68°
e) 122°

4) $x = \frac{11}{29}$, $y = -\frac{5}{29}$

5) $\frac{76}{3} = 25\frac{1}{3}$, $\frac{20}{3} = 6\frac{2}{3}$

6) -22, -21, -20

7) 28, 42

8) 8 years old.

9) 22.5 miles.

10) 27 first class seats.

11) 14 years.

12) Notice that the fruit is 0.80 less than 5 and the nuts are 0.50 more than 5. \$5 is closer to the price of the nuts so there must be more nuts in the trail mix. The ratio of nuts to fruit is 8:5. We can also solve this algebraically by taking the weighted average: $\frac{4.2F+5.5N}{F+N} = 5$. If we take F = 1 then N = $\frac{8}{5}$ therefore the ratio of nuts to fruit is 8:5.

13) 3 miles.

14) Let t_b and t_s be the times that the Bigtown and Smallville trains have traveled respectively. Then $t_b - t_s = \frac{1}{2}$ hour. Let B and S be the distances the Bigtown and Smallville trains have travelled in miles respectively. When they pass, B + S = 545. Using $\frac{distance}{time} = speed$, we get the equations $\frac{B}{t_b}$ = 70 mph and $\frac{S}{t_s}$ = 50 mph. Thus $t_b = \frac{B}{70}$ and $t_s = \frac{S}{50}$ which means $t_b - \frac{1}{2} = \frac{S}{50}$. Use substitution to get that the two trains pass 332.5 miles from Bigtown at 6:05 PM.

15) $R_A = \frac{2R_1R_2}{R_1+R_2}$

Mid-Year Review ANSWERS

NOTE: All conversions are done using a *Unit Conversion Table*. Student's answers may vary slightly in the case of using approximations for conversions.

Problem Set #1

1) $x = \frac{1}{5}y - \frac{6}{5}$
2) $x = 5y + 15$
3) $2y^3$
4) y^6
5) $4w^5$
6) $5x^3 + 2x^5$
7) $\frac{1}{36}$
8) $4x^3y^2$
9) $-5x^6y^4$
10) $25x^6y^4$
11) $25x^6 - 10x^3y^2 + y^4$
12) $5x^3 + 15x^2$
13) $x^2 + 8x + 15$
14) $x^2 - 6x + 5$
15) $x^2 - 36$
16) $2x^2 - x - 15$
17) $(x + 8)(x + 2)$
18) $(x + 2)(x + 3)$
19) $(x + 6)(x - 1)$
20) $(x - 2)(x - 3)$
21) $(x - 6)(x + 1)$
22) $(x + 5)(x - 5)$
23) Can't factor.
24) $(x + 10)(x - 10)$
25) Can't factor.
26) $(x + 5)^2$
27) $(x - 9)(x - 2)$
28) $(x + 7)(x - 7)$
29) $(x^6 + 9)(x^3 + 3)(x^3 - 3)$
30) $3x^3(x^4 + 4)$
31) $x(x - 12)(x + 2)$
32) $x = 9$
33) $x = -5$
34) $x = -2, -4$
35) $x = -10, 4$
36) $x = 10, 3$
37) $x = 6$
38) $x = \frac{11}{10} = 1\frac{1}{10}$
39) $x = \pm 1$
40) 350
41) $\approx 20.93\%$
42) 46%
43) $\approx 4.69\%$
44) 810
45) 810
46) 24%
47) $\approx 19.35\%$
48) 28.8
49) 7210
50)
    a) 72 ft
    b) 2600 cm
    c) $\approx$ 33.069 lb.
    d) $\approx$ 280.724 m
    e) $\approx$ 838.2 mm
51) $x = -\frac{3}{7}y + \frac{5}{7}$
52) $x = 3y + \frac{9}{8}$
53) $55\frac{5}{9}$
54) \$562.50
55)
    a) $2500 \text{ yd} \cdot \frac{1 \text{ m}}{1.09 \text{ yd}} \cdot \frac{1 \text{ km}}{1000 \text{ m}} \approx 2.294 \text{ km}$
    b) $\approx$ 591.6 ml
    c) $\approx$ 0.529 oz
    d) $\approx$ 29.528 ft
    e) $\approx$ 2.913 in
56) $2.5 \frac{m^3}{\text{hectare}} \approx 35.724 \frac{\text{ft}^3}{\text{acre}}$

Problem Set #2

1) $9x^3y^4$
2) $\frac{x^{10}}{16}$
3) $\frac{3z^3}{5x^5y^5}$
4) $7x^6$
5) $10x^{12}$
6) $6x^3 + 2x^2$
7) $1000x^{12}$
8) $x^2 - 2x - 80$
9) $6x^2 + 11x + 4$
10) $6x^9 - 21x^5$
11) $x^2 + 8x + 16$
12) $x^2 - 81$
13) $x^2 - 18x + 81$
14) $3x^3 - 13x^2 + 33x - 28$
15) $(x - 11)(x - 4)$
16) $(x + 4)(x + 6)$
17) $(x - 4)(x - 6)$
18) $(x + 12)(x - 2)$
19) $(x - 12)(x + 2)$
20) $(x^3 + 4)(x^3 - 4)$
21) Can't factor.
22) Can't factor.
23) $10y^3(2y^2 + 3)$
24) $x = -10$
25) $x = -\frac{3}{8}$
26) $x = 8, 5$
27) $x = 10, -7$
28) $x = -7, 4$
29) $x = -10, -4$
30) $x = 2$
31) $x = 0$
32) All real numbers.
33) No solution.
34) $x = 0, 22$
35) 11.16
36) 1.116
37) 90%
38) 9%
39) 0.9%
40) 75%
41) 100%
42) 200%
43) 125%
44) 225%
45) 20%
46) $16\frac{2}{3}\%$
47)
    a) 870 ml
    b) 160 oz
    c) 0.0009 kg
    d) 0.079 cm
    e) 12.5 qt
    f) 50 m
    g) 0.00062 liters
    h) 49,000 mm
    i) 48,000 oz
    j) $\approx$ 1.532 gal.
    k) $\approx$ 2.438 km
48) $10x^5(x - 9)(x - 3)$
49) $10x^2y(9y - 25)$

50)

a) $\frac{12\text{ yd}}{1\text{ s}} \cdot \frac{1\text{ m}}{1.09\text{ yd}} \cdot \frac{1\text{ km}}{1000\text{ m}} \cdot \frac{60\text{ s}}{1\text{ min}} \cdot \frac{60\text{ min}}{1\text{ hr}} \approx 39.633\ \frac{\text{km}}{\text{h}}$

b) $\approx 11.623\ \frac{\text{m}}{\text{s}}$

c) ≈ 3628.8 g

d) ≈ 9.296 yd

e) ≈ 565.564 gal

51) $60\ \frac{\text{lbs}}{\text{ft}^3}$

52) 90 lbs

53) $\approx 0.3913\ \text{ft}^3$

Problem Set #3

1) $15x^3$
2) $8x^2$
3) $6x^2y^4$
4) $7x^2y^4 + 3x^3y^4$
5) $20x^5$
6) $25x^6$
7) $30x^3$
8) $9x^7 + 27x^3$
9) $x^2 + x - 2$
10) $x^2 - 16x + 48$
11) $x^2 - 100$
12) $y^2 - 12y + 36$
13) $x^8 - 25y^6$
14) $x^8 - 10x^4y^3 + 25y^6$
15) $(x + 7)(x - 3)$
16) $(x + 10)(x + 3)$
17) $(x + 15)(x - 2)$
18) $(x - 15)(x + 2)$
19) $(x - 10)(x - 3)$
20) $(x + 1)(x - 1)$
21) $(x^5 + 7)(x^5 - 7)$
22) Can't factor.
23) $6x^2y(3x + 4y^4)$
24) $(x^4 + 100)(x^2+10)(x^2-10)$
25) $8x^2y^4w^5(x^3 + 2)(x^3 - 2)$
26) $x = -4$
27) $x = 4$
28) $x = -7, 2$
29) $x = -8, 7$
30) $x = -10, -2$
31) 93.86
32) 12
33) 805.704
34) ≈ 0.803%
35) 7500
36) 140
37) $360
38)
   a) 580 cm
   b) 0.081 liters
   c) 1.25 gal
   d) 15,840 ft
   e) ≈ 243.84 cm
   f) ≈ 2.495 kg
   g) ≈ 13.182 fl. oz.
39) $y^6 - 9y^4 + 27y^2 - 27$
40) $(x + 24)(x + 10)$
41) $(x + 40)(x - 6)$
42) $(x - 24)(x - 10)$
43) $(x - 40)(x + 6)$
44) $x = -\frac{1}{2}y + \frac{3}{8}$
45) $x = \frac{4}{3}y + 14$
46) No Solution.
47) $x = -5, 3$
48) 55
49) 620
50)
   a) 72 cm
   b) 200 cm
51)
   a) 75 cm
   b) 192 cm
52)
   a) ≈ 19,845 mg
   b) $\approx 77.22\ \text{mi}^2$
   c) $\approx 518\ \text{km}^2$
   d) $\approx 168.977\ \frac{\text{m}}{\text{s}}$
   e) ≈ 29.528 ft
   f) $\approx 5509.716\ \frac{\text{kg}}{\text{m}^3}$
53) 28 mph
54) ≈ 50.074 lbs
55) $22\frac{2}{9}$ ml ≈ 0.751 fl. oz.
56) $\approx 33.796\ \frac{\text{g}}{\text{cm}^3}$

Problem Set #4

1) $3z^4$
2) $8z^4 + 5z^8$
3) $40z^{12}$
4) $-10x^2y^6$
5) $-39x^4y^{12}$
6) $9x^8y^6$
7) $\frac{5x^2}{3y^6}$
8) $\frac{64}{27} = 2\frac{10}{27}$
9) $50x^3y^2$
10) $x^2 + 12x + 32$
11) $4x^2 - 43x + 30$
12) $x^{10} - 4$
13) $x^2 - 2xy - 35y^2$
14) $x^8 + 6x^4 + 9$
15) $18y^5 - 42y^4$
16) $(x - 7)(x + 5)$
17) $(x + 12)(x + 5)$
18) $(x + 20)(x - 3)$
19) $(x - 12)(x - 5)$
20) $(x - 20)(x + 3)$
21) $(x + 2)(x - 2)$
22) $(x^2 + 9)(x + 3)(x - 3)$
23) $3x^3(x + 4)(x - 2)$
24) $7x(x + 2)(x - 2)$
25) $2x^3y^4(2x^3 + 3)(2x^3 - 3)$
26) $x = 5$
27) $x = 7, -6$
28) $x = -20, -2$
29) $x = 7$
30) $x = -14, -1$
31) $x = 0$
32) $x = \frac{11}{4} = 2\frac{3}{4}$
33) ≈ 2.833%
34) 54
35) 54
36) ≈ 23.529%
37) 75%
38) 460
39) 460
40) 14,440 people
41)
   a) 3 cups
   b) ≈ 12.795 ft
   c) 7400 ml
   d) 0.0014 km
   e) 0.57 km
   f) ≈ 769.08 ml
42) $4y^3(y - 9x^2)(y - x^2)$
43) $(8x - 3)(x - 10)$
44) $2(2x - 1)(2x + 15)$
45) $(8x + 15)(x - 2)$
46) $x = \pm 2, \pm \frac{3}{2}$
47) 2000

48) 2000
49) $1782
50) $550
51) $36.50
52) $60
53)
a) ≈ 36.546 pts.
b) 6,912 in^3
c) $\frac{4}{27}$ yd^3 ≈ 0.148 yd^3
d) 0.07 $\frac{g}{cm^3}$
e) ≈ 8.864 mph
54) ≈ 58.799 mpg
55) 31.5 kg
56) ≈ 143.522 in^3 ≈ 0.083 ft^3
57)
a) ≈ 43.035%
b) ≈ 3.266%
58) 60 girls and 90 boys.

Problem Set #5

1) $4x^7$
2) $4x^7 + 5x^6$
3) $20x^{13}$
4) $8x^{15}$
5) $\frac{4z^4}{7y^7x^3}$
6) $\frac{64x^6y^9}{125}$
7) $6x^5y^2 - y^2$
8) $45x^{10}y^7$
9) $x^{12} - 16$
10) $x^2 + 15x + 54$
11) $x^6 - 20x^3 + 99$
12) $x^4 - 64$
13) $6x^2 - 17x + 5$
14) $-8x^9 + 12x^7$
15) $w^2 + 18w + 81$
16) $6x^3 + 60x^2 + 150x$
17) $(x + 6)(x + 1)$
18) $(x - 15)(x - 10)$
19) $(x - 30)(x + 5)$
20) $(x + 30)(x - 5)$
21) $(x + 15)(x + 10)$
22) $(x + 12)(x - 12)$
23) Can't factor.
24) Can't factor.
25) $2x^2y^4(5xy^3 + 4)$
26) $5x^5(x + 3)(x - 3)$
27) $2x(x + 3)(x + 4)$
28) $7x^3(x^3 - 3)$
29) $(x - 7)(x - 10)$
30) $3x^3(x + 2)(x - 2)$
31) $x = -\frac{1}{2}$
32) $x = -2$
33) $x = -12, -4$
34) $x = 0, -5, 1$
35) $x = -4, 4$
36) $x = -5$
37) 1.02
38) 75%
39) 14,000
40) 14,000
41) ≈ 173.81%
42) ≈ 270.37
43)
a) 10 yds
b) 90,000,000 mg
c) 90 mm
d) ≈ 3.175 kg
e) ≈ 275.591 in
f) ≈ 85.05 kg
44) 0.0006875 m = 0.6875 mm
45) $x^3(1 - x)(1 + x)$
46) $5x^6(x - 4)(x - 2)$
47) $(2x^3 + 3y^4)(2x^3 - 3y^4)$
48) $x = -3, 10$
49) $x = 0, \pm 5$
50) $x = \pm 2, \pm 3$
51) 137.5
52) $792
53) $1237.50
54)
a) 120%
b) $83\frac{1}{3}$%
c) $16\frac{2}{3}$%
55)
a) ≈ 0.396 m^3
b) 93.6 $\frac{km}{h}$
c) ≈ 45.455 mph
56) ≈ 39.007 in^3
57)
a) 250 $\frac{lb}{ft^3}$ and 2.315 $\frac{oz}{in^3}$
b) ≈ 20.764%
c) ≈ 400.449%
58) ≈ $409,363.76 per acre

Problem Set #6

1) $6x^6$
2) $8y^2$
3) $3y^2 + 5x^2$
4) $15y^2x^2$
5) $81y^8$
6) $\frac{9y^{12}}{4x^4z^8}$
7) $8x^5y^2$
8) $15x^2 + 21xy - 18y^2$
9) $x^2 + 9x + 14$
10) $x^6 + 9x^3y + 14y^2$
11) $w^8 - 25$
12) $12x^2 + 8x - 15$
13) $2y^4 - 6y^3 - 36y^2$
14) $x^6 - 8x^3 + 16$
15) $(x - 11)(x - 1)$
16) $(x - 10)(x + 9)$
17) $(x - 40)(x + 6)$
18) $(x + 24)(x + 10)$
19) $(x + 40)(x - 6)$
20) $(x - 24)(x - 10)$
21) $10x^3(x - 6)(x - 3)$
22) $(x^4 + 3)(x^4 - 3)$
23) Can't factor.
24) $x^6(x^2 + 9)$
25) $x(x^3 + 3)(x^3 - 3)$
26) $(x^4 + 1)(x^2 + 1)(x+1)(x-1)$
27) $x = -\frac{1}{9}$
28) $x = 8, -3$
29) $x = -3, -1$
30) $x = -\frac{4}{5}$
31) $x = -9, 4$
32) $x = -4, 1$
33) $x = 1$
34) All real numbers.
35) 7456
36) ≈ 30.435%
37) $66\frac{2}{3}$%
38) 150%
39) ≈ 23.288%

Mid-Year Review ANSWERS

40)
- a) 0.000068 kg
- b) ≈ 0.847 oz
- c) 32 pts
- d) ≈ 1951.159 mi
- e) ≈ 6.761 fl.oz.
- f) ≈ 2296.651 yds

41) $x = -1$
42) $x = 0, 6, 8$
43) $x = 0, \pm 3$
44) 375
45) 62.5
46) 93.75
47) 1,440 and 2,160 votes
48) 1,350 and 2,250 votes
49) 1,500 and 2,100 votes
50) $198
51) $4950

52)
- a) ≈ 3.8025 cups
- b) ≈ 80.78 mph
- c) ≈ 141.233 ft^3
- d) ≈ 8.23 $\frac{km}{h}$
- e) ≈ 1217.57 liters
- f) ≈ 10334.588 $\frac{kg}{m^2}$

53) 231 boys

54)
- a) ≈ 6.369 mph
- b) ≈ 0.106 miles per minute
- c) 9.42 minutes per mile

55)
- a) ≈ 45.329%
- b) ≈ 6.15%

56) ≈ 228.447 $\frac{lb}{ft^3}$

≈ 3658.759 $\frac{kg}{m^3}$

Quadratic Formula ANSWERS

Problem Set #1

1) $x = -5, 13$
2) $x = -20, 4$
3) $x = -1, 7$
4) 9
5) 49
6) 36
7) $20x$
8) Solving the equation $8x + x^2 = 65$ gives us two answers: $x = -13$ and $x = 5$. Because this is a question asking for length, only positive answers are allowed. Therefore the answer is 5 inches.
9) 4
10) 81
11) 1
12) $\frac{25}{4} = 6\frac{1}{4}$
13) $12x$
14) $x = -1, -\frac{7}{3} = -2\frac{1}{3}$
15) No solution.
16) $x = -6, -4$
17) $x = -4, 10$
18) $x = \pm 10$
19) $x = -6, 26$
20) $\frac{76}{3} = 25\frac{1}{3}, \frac{20}{3} = 6\frac{2}{3}$
21) 5, 8

Problem Set #2

1) b.
As an example, the solution to $|x| = 4$ is $x = \pm 4$. The solution to $\sqrt{x^2} = 4$ is also $x = \pm 4$. Taking the absolute value of a number and squaring a number always yields a positive solution.

2)
$(x + 4)^2 = 49$
$\sqrt{(x+4)^2} = \sqrt{49}$
$\rightarrow |x + 4| = 7$
$x + 4 = \pm 7$
$x = 7 - 4$ or $x = -7 - 4$
$x = 3, -11$

3)
- a) $x = 9, -3$
- b) $x = \pm 3$

4) 12 inches.
5) The two possible solutions are: 6 inches or 4 inches.
6) $x = 1, -7$
7) $x = 4, 10$
8) $x = \pm 5$
9) $x = \pm 5$