Getting Ready for Algebra II - Radicals

I. Express in simplest form. Assume all variables represent positive real numbers.

1. $\sqrt{24} \cdot \sqrt{10}$ $4\sqrt{15}$ $\sqrt{4 \cdot 6 \cdot 2 \cdot 5}$

2. $\sqrt{5} \cdot \sqrt{63} \cdot \sqrt{5}$ $15\sqrt{7}$ $5\sqrt{9 \cdot 7}$

3. $\sqrt{\frac{20}{7}} \cdot \sqrt{\frac{14}{25}}$ $\frac{2\sqrt{10}}{5}$ $\sqrt{\frac{20}{7} \cdot \frac{14}{25}} = \sqrt{4 \cdot \frac{2}{5}} = 2\frac{\sqrt{2}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{2\sqrt{10}}{5}}$

4. $\sqrt{2\frac{1}{2}} \cdot \sqrt{1\frac{3}{8}}$ $\frac{\sqrt{55}}{4}$

5. $\sqrt{\frac{7}{12}} \cdot \sqrt{\frac{48}{49}}$ $\frac{2\sqrt{7}}{7}$ $\frac{2}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{2\sqrt{7}}{7}$

6. $\sqrt{\frac{3}{5}}$ $\frac{\sqrt{15}}{5}$ $\frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15}}{5}$

7. $\sqrt{\frac{5}{8}}$ $\frac{\sqrt{10}}{4}$ $\frac{\sqrt{5}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{10}}{4}$

8. $\sqrt{27x^4y^8}$ $3x^2y^4\sqrt{3}$ $3x^2y^4\sqrt{3}$

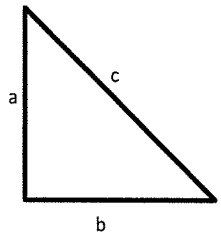
16. $9\sqrt{800}$ $180\sqrt{2}$

III. Solve!!!!!!

17. $25x^2 = 144$ $x = \pm\frac{12}{5}$

18. $36y^2 - 49 = 0$ $y = \frac{7}{6}$ or $-\frac{7}{6}$

IV. Refer to the right triangle shown below. Find the missing length correct to the nearest hundredth.



19. a = 13, b = 9, c = 15.81 $13^2 + 9^2 = c^2$

20. a = 13.00 b = 11, c = 17 $a^2 + 11^2 = 17^2$

21. State whether or not the three given numbers could represent the lengths of the sides of a right triangle.

17, 34, 39 $17^2 + 34^2 \stackrel{?}{=} 39^2$

$1445 \neq 1521$ NO

22. Find the length of each diagonal of a rectangle whose dimensions are 5 cm by 8 cm.

$5^2 + 8^2 = d^2$

$d = \sqrt{89} \approx 9.43$

Getting Ready for Algebra II - Factoring

KEY

I. Factor out the common factors from the terms of the polynomial.

1. $14m^4 - 12m$
$2m(7m^3 - 6)$

2. $2x^2 + 2x - 8$
$2(x^2 + x - 4)$

3. $x^3y + 6x^5y^2$
$x^3y(1 + 6x^2y)$

4. $x^5 + x^4 + x^3 - x^2$
$x^2(x^3 + x^2 + x - 1)$

5. $4a^4b^4 - 2a^3b^2 + 6a^2$
$2a^2(2a^2b^4 - ab^2 + 3)$

6. $2x^3y - 4x^2y + x^2$
$x^2(2xy - 4y + 1)$

II. Factor the difference of two perfect squares.

7. $16x^4 - 25y^2$
$(4x^2 + 5y)(4x^2 - 5y)$

8. $9a^2 - 16$
$(3a + 4)(3a - 4)$

9. $81x^2 - 25y^6$
$(9x + 5y^3)(9x - 5y^3)$

10. $36x^2 - 121y^2$
$(6x + 11y)(6x - 11y)$

11. $100a^4 - 49b^6$
$(10a^2 + 7b^3)(10a^2 - 7b^3)$

12. $64x^2 - 169y^8$
$(8x + 13y^4)(8x - 13y^4)$

III. In each problem below, factor out the GCF and then factor the difference of two perfect squares.

13. $27x^2 - 48y^2$
$3(9x^2 - 16y^2)$
$\Rightarrow 3(3x + 4y)(3x - 4y)$

14. $16x - 81x^3 \rightarrow x(16 - 81x^2)$
$x(4 + 9x)(4 - 9x)$

15. $24x^2 - 54y^4$
$6(4x^2 - 9y^4)$
$\Rightarrow 6(2x + 3y^2)(2x - 3y^2)$

16. $32x^3y - 50y^3x$
$2xy(16x^2 - 25y^2)$
$2xy(4x + 5y)(4x - 5y)$

IV. Factoring a trinomial in the form $x^2 + bx + c$

17. $x^2 + 9x + 14$
$(x + 7)(x + 2)$

18. $x^2 - 14a + 48$
$(x - 6)(x - 8)$

19. $x^2 - 9x + 20$
$(x - 5)(x - 4)$

20. $x^2 - 2x - 99$
$(x - 11)(x + 9)$

21. $x^2 + x - 56$
$(x + 8)(x - 7)$

22. $a^2 + 2x - 35$
$(a + 7)(a - 5)$

Take the Factoring Challenge

Factor each of the following, ***completely.***

1. $5x^2 + x - 18$

$(5x - 9)(x + 2)$

2. $3x^2 - 27$

$3(x^2 - 9) \rightarrow 3(x+3)(x-3)$

3. $14x^2 + 19x - 3$

$(7x - 1)(2x + 3)$

4. $a^2 - 14a + 45$

$(a - 9)(a - 5)$

5. $b^2 + 5b - 24$

$(b+8)(b-3)$

6. $75x^2 - 147$

$3(25x^2 - 49)$

$\rightarrow$ $3(5x + 7)(5x - 7)$

7. $8x^2 - 98y^2$

$2(4x^2 - 49y^2)$

$\rightarrow$ $2(2x + 7y)(2x - 7y)$

8. $2x^2 - 40x + 200$

$2(x^2 - 20x + 100)$

$\rightarrow$ $2(x - 10)(x - 10)$

9. $16x^2 - 8x + 1$

$(4x - 1)(4x - 1)$

10. $x^2 - 8x + 15$

$(x - 5)(x - 3)$

11. $9x^2 + 18x + 8$

$(3x + 4)(3x + 2)$

12. $15x^2 - 19x + 6$

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

13. $3x^2 - 5x - 2$

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

14. $6x^2 - 33x + 15$

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

15. $20x^2 - 25x + 5$

$5(4x^2 - 5x + 1)$

$5(4x - 1)(x - 1)$

16. $18y^2 - 21y - 9$

$3(6y^2 - 7y - 3)$

$3(3y + 1)(2y - 3)$

TURN THE PAPER OVER!!!

Getting Ready for Alg 2 – Prob. Solv. Day 1

① Let x = smaller #
$x+20$ = larger #

$4(x+20) = 70 + 5x$

$x = 10$

Ans: 10 & 30

Ck $4(30) = 120$ ✓
$70 + 5(10) = 120$

② Let x = small #
$3x+1$ = lg #

$8x - 2(3x+1) = 10$

Ans 6 & 19

Ck $48 - 38 = 10$ ✓

③ Let T = # #10 bills
$3T$ = # #5 bills
$3T+30$ = # one $ bills

$10T$ = value of
$5(3T)$ = value
$3T+30$ = value

$10T + 15T + 3T + 30 = 170$

$T = 5$

Ans: 5 #10
15 #5
45 #1

Ck: 50
75
+ 45
170

④ Let N = # nickels → $5N$ = value
$N+5$ = # dimes → $10(N+5)$ = value
$N-16$ = # qtrs → $25(N-16)$ = value

$5N + 10(N+5) + 25(N-16) = 450$

$N = 20$

Ans: 20 nickels, 25 dimes, 4 qtrs
Ck: #1 + #2.50 + 1.00 = 4.50 ✓

⑤ Let N = # nickels → $.05N$
$45-N$ = # dimes → $.10(45-N)$

$.05N + .10(45-N) = 3.50$

$N = 20$

Ans: 20 nickels, 25 dimes
Ck: 1.00 + 2.50 = 3.50

⑥ Let x = # of 80¢ pd nuts
$30-x$ = # of 50¢ " "

$.8x + .5(30-x) = .75(30)$

$x = 25$

Ans: 25 pds @ 80¢
5 pds @ 50¢

Ck: $25(.80) + 5(.5) = 22.5$ ✓
$30(.75) = 22.5$

⑦ Let W = # pds of walnuts → $.75W$ = valu
$(45-W)$ = # " " almonds → $1.20(45-W)$

$.75W + 1.20(45-W) = 1(45)$

$W = 20$

Ans: 20 pounds walnuts
25 " almonds

Ck: $20(.75) + 25(1.20) = \#45$ ✓

⑧ Let C = # of pounds @ 60¢
$90-C$ = # of pounds @ 87¢

$.6(C) + .87(90-C) = .69(90)$

$C = 60$

Ans: 60 pounds @ 60¢
30 pounds @ 87¢

Ck: $60(.6) + 30(.87) = 62.1$
$90(.69) = 62.1$ ✓

(9) Let C = # of pounds @ $.95
(45-C) = " " " " 1.70

$.95C + 1.70(45-C) = 45(1.25)$
$C = 27$

Ans: 27 pounds @ $.95
18 pounds @ 1.70

ck: $25.65 + 30.60 = 56.25$ ✓
$45(1.25) = 56.25$

(10) Let X = # 5¢ bars
130-X = # 10¢ bars

$.05X + .10(130-X) = 9$
$X = 80$

Ans: 80 @ 5¢
50 @ 10¢

ck: $80(.05) + (50)(.10) = 9$ ✓

(11) Let R = # dozen of roses
(14-R) = # dozen carnations

$3.5R + 2.5(14-R) = 43$
$R = 8$

Ans: 8 dozen roses
6 dozen carn.

ck: $3.50(8) + 2.50(6) =$
$43 = 43$ ✓
$8+6 = 14$ ✓

(12) Let A = # adult tix
478-A = # child tix

$.85A + .50(478-A) = 375.50$
$A = 390$

Ans: 390 adults, 88 children

(13) Let C = # 65¢ pounds

$.65C + 10(.90) = .70(C+10)$
$C = 40$

Ans: 40 pounds

ck: $.65(40) = \$26$
$.90(10) = \$9$ } $35

$(40+10)(.70) = \$35$ ✓

(14) Let X = # 70¢ pounds

$.7X + 12(.50) = .65(12+X)$
$X = 36$

Ans: 36 pounds at 70¢

ck: $36(.70) + 12(.50) = 31.20$
$.65(48) = 31.20$ ✓

(15) Let X = amt invested at 5%
(4000-X) = " " " 3%

$.05X + .03(4000-X) = 152$
$X = 1600$

Ans: $1600 @ 5%
$2400 @ 3%

ck: $2400(.03) + 1600(.05) = 152$ ✓

(16) Let X = amt invested at 4%
25000-X = " " " 7%

$.04X + .07(25000-X) = 1450$
$X = 10,000$

Ans: $10,000 at 4%
$15,000 @ 7%

ck: $\$40 + 1050 = \$1450$ ✓

(17) Let R = Robert's age
$2R$ = father's age

$$R-12 = \frac{1}{3}(2R-12)$$

$$R = 24$$

Ans: Robert is 24
Father is 48.

ck: $24-12 = \frac{1}{3}(48-12)$

$12 = 12$ ✓

(18) Let C = Mrs Cook's age
$C+20$ = Mrs. Barry's

$$3(C-16) = C+20-16$$

$$C = 26$$

Ans: Mrs. Cook is 26.
Mrs. Barry is 46.

ck: $(26-16) \cdot (46-16)$

$10 \longleftrightarrow 30$

$3(10) = 30$ ✓

(19) Let F = Mrs. Fox
$3F$ = Mrs. Sanford

$$2(F+8)+14 = 3F+8$$

$$F = 22$$

Ans: Mrs. Fox is 22
Mrs. Sanf. is 66.

(20) Let W = width
$W+3$ = length
$W+3$ = side of square

$$(W+3)^2 = W(W+3)+24$$

$$W^2+6W+9 = W^2+3W+24$$

$$W = 5$$

Ans: width = 5, length = 8

(21) Let x = 1st cons. odd int.
$x+2$ = 2nd " " "
$x+4$ = 3rd " " "
$x+6$ = 4th " " "

$$x+x+2+x+4 = x+6+18$$

$$3x+6 = x+24$$

$$2x = 18$$

$$x = 9$$

Ans: 9, 11, 13, 15

ck: $9+11+13 = 33$ ✓
$15+18 = 33$

(22) Let x = 1st cons. even int.
$x+2$ = 2nd " "
$x+4$ = 3rd " " "

$$2(x+2+x+4) = 3x+34$$

$$x = 22$$

Ans: 22, 24, 26 ck: $100 \stackrel{\checkmark}{=} 3(22)+34$

(23) Let x = 1st con. int.
$x+1$ = 2nd
$x+2$ = 3rd

$$x+2(x+1) = x+2+24$$

$$x = 12$$

Ans: 12, 13, 14 ck:

(24) Let x = # hrs.

$180x + 330x = 1530$

$x = 3$

Ans: In 3 hrs.

Ck: East $3(180) = 540$ miles

West $3(330) = 990$

1530

(25) Let x = # hrs.

$42x + 48x = 390$

$x = 4\frac{1}{3}$

$4\frac{1}{3}$ = 4 hrs. 20 min.

Ans: 11:20 am

(26) Let x = # hrs.

$650x + 550x = 3000$

$x = 2\frac{1}{2}$

Ans: In $2\frac{1}{2}$ hrs.

(27) Let x = Harry's age

$x - 10$ = Mark's age

$x + 8 = 2(x - 10 - 3) + 4$

$x = 30$

Harry = 30

Mark = 20

Ck: Harry 8 yrs in future = 38

Mark 3 yrs ago = 17

$38 = 2(17) + 4$ ✓

(28) Let x = John's savings

$\frac{2}{3}x$ = Fred's

$\frac{x}{5}$ = Mary's

$x + \frac{2}{3}x + \frac{x}{5} = 14$

$15x + 10x + 3x = 210$

$x = 7.5$

John = $7.50

Fred = $5

Mary = $1.50

Ck: $7.50 + 5 + 1.50 = 14$ ✓

(29) Let x = son's share

$6x - 10{,}000$ = wife's

$x + 20{,}000$ = daughter's

$x + 6x - 10{,}000 + x + 20{,}000 = 90{,}000$

$x = 10{,}000$

Son = $10,000

wife = $50,000

daughter = 30,000