Review Lesson

Binomial Multiplication (FOIL)

Definitions

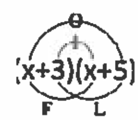
- A binomial is a combination (addition or subtraction) of two monomials.
- Ex. 5 - x, 5x + 6, 17x + 5xyz, etc.
- Again, if a variable doesn't have a coefficient or exponent, assume that it's 1. Ex. $x = 1x^1$

Binomial Multiplication (aka FOIL)

- When two binomials are being multiplied perform the following steps:
  - Multiply the First terms in each binomial.
  - Multiply the Outer terms of the binomials.
  - Multiply the Inner terms of the binomials.
  - Multiply the Last terms in each binomial.
  - Combine any like terms (terms with the same combinations and exponents of variables).

Examples

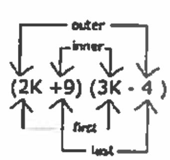
- Problem: (x + 3)(x + 5)
- F: $x \bullet x = x^2$
- O: $x \bullet 5 = 5x$
- I: $3 \bullet x = 3x$
- L: $3 \bullet 5 = 15$



- Combining 5x + 3x = 8x
- Answer = $x^2 + 8x + 15$

Example

- Problem: (2k + 9)(3k - 4)
- F: $2k \bullet 3k = 6k^2$
- O: $2k \bullet -4 = -8k$
- I: $9 \bullet 3k = 27k$
- L: $9 \bullet -4 = -36$



- Combining -8k + 27k = 19k
- Answer = $6k^2 + 19k - 36$

Check for Understanding

- Ex. (3x + 2)(-2x + 2) = ?

Algebra 2

Name____________________________

Review Lesson Binomial Multiplication (FOIL)

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Find each product.

1) $(2v-3)(2v-8)$

2) $(8x-1)(7x+6)$

3) $(4x+2)(x+6)$

4) $(3k+1)(3k-1)$

5) $(a+4)(5a+4)$

6) $(8x-3)(5x-4)$

7) $(7p+6)(p-5)$

8) $(3n-8)(6n-6)$

9) $(6m-3)(5m+7)$

10) $(7r+4)(8r-5)$

11) $(4n-4)(8n+1)$

12) $(2x-1)(x+2)$

13) $(8b+2)(6b+5)$

14) $(v-1)(3v-6)$

15) $(4x+4)(2x-4)$

16) $(7n+1)^2$

17) $(8+5a)(8-5a)$

18) $(3+3k)(3-3k)$

19) $(6+x)(6-x)$

20) $(5x-2)^2$

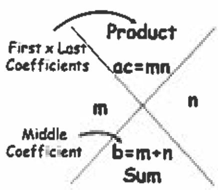
X-box Factoring

X-box Factoring

- This is a guaranteed method for factoring quadratic equations—no guessing necessary!
- Background knowledge needed:
  - General form of a quadratic equation
  - Factoring Monomials

Factor the x-box way

Given : $y = ax^2 + bx + c$



	GCF	GCF
GCF	ax^2	nx
GCF	mx	c

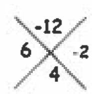
Solution: (GCF + GCF)(GCF + GCF)

Examples

Factor using the x-box method.

1. $x^2 + 4x - 12$

a)



b)

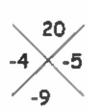
	x	$+6$
x	x^2	$6x$
-2	$-2x$	-12

Solution: $x^2 + 4x - 12 = (x + 6)(x - 2)$

Examples continued

2. $x^2 - 9x + 20$

a)



b)

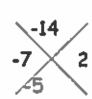
	x	-4
x	x^2	$-4x$
-5	$-5x$	20

Solution: $x^2 - 9x + 20 = (x - 4)(x - 5)$

Examples continued

3. $2x^2 - 5x - 7$

a)



b)

	$2x$	-7
x	$2x^2$	$-7x$
$+1$	$2x$	-7

Solution: $2x^2 - 5x - 7 = (2x - 7)(x + 1)$

Examples continued

4. $15x^2 + 7x - 2$

a)

	-30	
10		-3
	7	

b)

	$3x$	$+2$
$5x$	$15x^2$	$10x$
-1	$-3x$	-2

Solution: $15x^2 + 7x - 2 = (3x + 2)(5x - 1)$

Factor the x-box way

Example: Factor $3x^2 -13x -10$

	$(3)(-10)=$ -30	
-15		2
	-13	

	x	-5
$3x$	$3x^2$	$-15x$
$+2$	$2x$	-10

$3x^2 -13x -10 = (x-5)(3x+2)$

Factoring

Name ______________________

Date ________________ Period ______

Factor.

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

2. $x^2 + 9x + 20$

3. $x^2 + 7x + 6$

4. $x^2 + 10x + 21$

5. $x^2 + 15x + 56$

6. $x^2 + 3x + 2$

7. $x^2 + 8x + 16$

8. $x^2 + 2x + 1$

9. $x^2 + 7x + 12$

10. $x^2 + 13x + 42$

11. $x^2 + 5x + 4$

12. $x^2 + 14x + 45$

13. $x^2 + 6x + 9$

14. $x^2 + 6x + 5$

15. $x^2 + 10x + 24$

16. $x^2 + 4x + 4$

17. $x^2 + 8x + 7$

18. $x^2 + 12x + 36$

19. $x^2 + 9x + 18$

20. $x^2 + 16x + 63$

21. $x^2 + 10x + 16$

22. $x^2 + 12x + 27$

23. $x^2 - 6x + 8$

24. $x^2 - 11x + 30$

25. $x^2 - 3x + 2$

26. $x^2 - 9x + 8$

27. $x^2 - 13x + 36$

28. $x^2 - 15x + 56$

29. $x^2 - 8x + 16$

30. $x^2 - 8x + 12$

31. $x^2 - 12x + 27$

32. $x^2 - 17x + 72$

33. $x^2 - 11x + 28$

34. $x^2 - 6x + 9$

Factoring

Name ______________________

Date ________________ Period ______

Factor.

1. $x^2 + 7x + 10$ $(x+2)(x+5)$

2. $x^2 + 13x + 40$

3. $x^2 + 4x + 3$

4. $x^2 + 6x + 8$

5. $x^2 + 10x + 25$

6. $x^2 + 10x + 9$

7. $x^2 + 8x + 12$

8. $x^2 + 14x + 49$

9. $x^2 + 15x + 54$

10. $x^2 + 11x + 28$

11. $x^2 + 16x + 64$

12. $x^2 + 8x + 15$

13. $x^2 + 18x + 81$

14. $x^2 + 11x + 24$

15. $x^2 + 11x + 30$

16. $x^2 + 9x + 14$

17. $x^2 + 11x + 18$

18. $x^2 + 12x + 35$

19. $x^2 + 9x + 8$

20. $x^2 + 14x + 48$

21. $x^2 + 13x + 36$

22. $x^2 + 17x + 72$

23. $x^2 - 12x + 32$

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

25. $x^2 - 15x + 54$

26. $x^2 - 6x + 5$

27. $x^2 - 12x + 36$

28. $x^2 - 4x + 4$

29. $x^2 - 9x + 14$

30. $x^2 - 13x + 40$

31. $x^2 - 10x + 9$

32. $x^2 - 4x + 3$

33. $x^2 - 14x + 49$

34. $x^2 - 10x + 24$

Factoring

Name ____________________

Date ______________ Period ______

Factor.

1. $3x^2 + 13x + 12$ $(3x + 4)(x + 3)$

2. $2x^2 + 11x + 14$

3. $4x^2 + 17x + 15$

4. $2x^2 + 15x + 28$

5. $3x^2 + 19x + 28$

6. $5x^2 + 17x + 6$

7. $6x^2 + 11x + 5$

8. $2x^2 + 9x + 10$

9. $3x^2 + 8x + 4$

10. $4x^2 + 13x + 10$

11. $5x^2 + 28x + 15$

12. $2x^2 + 11x + 9$

13. $3x^2 + 16x + 21$

14. $5x^2 + 26x + 5$

15. $5x^2 + 37x + 42$

16. $6x^2 + 23x + 15$

17. $4x^2 + 13x + 3$

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

19. $2x^2 + 23x + 63$

20. $5x^2 + 42x + 16$

21. $6x^2 + 53x + 40$

22. $2x^2 + 13x + 20$

23. $3x^2 - 22x + 24$

24. $5x^2 - 38x + 21$

25. $4x^2 - 25x + 25$

26. $6x^2 - 47x + 35$

27. $2x^2 - 19x + 42$

28. $6x^2 - 31x + 28$

29. $5x^2 - 49x + 36$

30. $3x^2 - 19x + 20$

31. $4x^2 - 5x + 1$

32. $2x^2 - 7x + 5$

33. $5x^2 - 47x + 18$

34. $3x^2 - 31x + 36$

Name ______________________

Date ________________ Period ______

Factor.

1. $2x^2 + 7x + 6$ $(2x + 3)(x + 2)$
2. $2x^2 + 13x + 21$
3. $2x^2 + 3x + 1$
4. $2x^2 + 13x + 20$
5. $2x^2 + 13x + 18$
6. $2x^2 + 21x + 54$
7. $2x^2 + 15x + 7$
8. $2x^2 + 10x + 12$
9. $3x^2 + 10x + 3$
10. $3x^2 + 17x + 20$
11. $3x^2 + 26x + 16$
12. $4x^2 + 11x + 6$
13. $4x^2 + 27x + 18$
14. $4x^2 + 19x + 21$
15. $2x^2 + 15x + 18$
16. $2x^2 + 17x + 36$
17. $3x^2 + 14x + 8$
18. $4x^2 + 9x + 5$
19. $2x^2 + 21x + 49$
20. $3x^2 + 20x + 12$
21. $4x^2 + 19x + 12$
22. $2x^2 + 11x + 15$
23. $3x^2 - 10x + 8$
24. $4x^2 - 35x + 49$
25. $3x^2 - 26x + 35$
26. $2x^2 - 21x + 40$
27. $3x^2 - 13x + 14$
28. $2x^2 - 9x + 7$
29. $4x^2 - 17x + 18$
30. $3x^2 - 22x + 35$
31. $2x^2 - 23x + 63$
32. $3x^2 - 16x + 5$
33. $4x^2 - 27x + 35$
34. $3x^2 - 34x + 63$

Lesson 5-4 Part 1

Greatest Common Factors of Polynomials

Greatest Common Factor of Polynomials

- For a group of numbers, the Greatest Common Factor (GCF) is the largest number that will divide evenly into the group. (Ex. for 24 and 12, the GCF is 12.)
- For a polynomial, the GCF is the largest monomial that will divide evenly into that polynomial.

Example

- Factor: $6x^3y + 8xy^2 - 4xyz$
- Since 2 is the GCF of the coefficients, and only one x and one y is common to all terms the GCF is; 2xy
- So the final answer (with the GCF factored out) is: $2xy\ (\ 3x^2 + 4y - 2z\ )$

Check for Understanding

- Factor: $14x^2 - 7xy + 35y$
- Factor: $3x^3y^2 + 19xyz - 5yz^3$

Homework

- Worksheet on GCF of Polynomials

Algebra 2

Name________________________________

Greatest Common Factor of Polynomials

Date________________ Period____

Factor the common factor out of each expression.

1) $48x^2 + 36x + 54$

2) $63r^4 + 42r^3 + 49r^2$

3) $81n^4 + 45n^2 + 45n$

4) $48b^2 - 48b - 30$

5) $8 + 8v^2 - 6v^6$

6) $7x^6 - 2x^2 + 3x$

7) $2x^8 - 3x^7 + 2x^6$

8) $-45a^6 + 15a + 35$

9) $10k^3 + 15k^2 - 20k$

10) $-7p^4 + 9p^3 + 9p^2$

11) $-30u^2v^3 + 20u^4 + 45u^2v^2$

12) $-7x^2y - 70x^2 + 21y$

13) $25x^4y^5 - 10x^6y^2 + 20x^4y^2$

14) $-2b^8 + 4ba^2 + 3ba$

15) $48x^6y^3 - 6x^3y + 24x^4$

16) $21a^3b^4 + 27ab^4 + 27ab^3$

17) $-36x^2 + 6x^4y + 18x^5$

18) $-x^4y^{14} + x^4y^2 - x^5y$

19) $40m^2n^2 + 40m^3n^2 - 16m^4n^9$

20) $2mn^6 + 20mn^2 + 10mn$

Algebra 2

Name________________________________

GCF First, Then Use X-Box

Date________________ Period____

Factor each completely.

1) $10k^2 + 66k - 28$

2) $42k^2 + 300k - 288$

3) $6a^2 - 40a - 14$

4) $6p^2 + 68p + 80$

5) $21k^2 + 207k - 30$

6) $9n^2 + 84n + 147$

7) $10p^2 + 84p - 160$

8) $6x^2 - 74x + 180$

9) $10x^2 - 36x + 18$

10) $6p^2 - 76p + 160$

Lesson 5-6

Radical Numbers

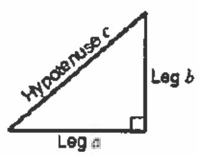
Standards and Notation

- Radicals are square roots that don't produce a whole, rational number, but produce an irrational number.
- Ex. √75 = ±8.66 … (non-repeating or terminating decimal)
- We can get more accuracy (with less writing) by simplifying the number, but leaving a prime number under a radical.
- Ex. √75 = ±5√3 (Just use calculator)

Examples (You try 'em)

- √56 =
- √104 =
- √202 =
- √169 =

Uses – Pythagorean Theorem



$c^2 = a^2 + b^2$

$c = \sqrt{a^2 + b^2}$

$a = \sqrt{c^2 - b^2}$

$b = \sqrt{c^2 - a^2}$

- Note: a, b, and c are distances, and always +If a = 6 and b = 9; then c = √6² + 9² = 3√13
- If c = 20 and a = 8; then b = √20² - 8² = 4√21
- Your turn: b = 15 and c = 20, so a = ?

Assignment

- Worksheet

Radicals

Name________________________________

Date_______________ Period____

Simplify.

1) $\sqrt{192}$

2) $\sqrt{288}$

3) $\sqrt{180}$

4) $\sqrt{200}$

5) $\sqrt{45}$

6) $\sqrt{80}$

7) $\sqrt{32}$

8) $\sqrt{128}$

9) $\sqrt{18}$

10) $\sqrt{20}$

11) $\sqrt{384}$

12) $\sqrt{8}$

13) $\sqrt{320}$

14) $\sqrt{294}$

15) $\sqrt{6} \cdot -2\sqrt{8}$

16) $-4\sqrt{10} \cdot \sqrt{12}$

17) $\sqrt{10} \cdot \sqrt{8}$

18) $-5\sqrt{5} \cdot \sqrt{15}$

19) $\sqrt{6} \cdot -3\sqrt{15}$

20) $-3\sqrt{2} \cdot 5\sqrt{6}$

21) $\sqrt{10} \cdot \sqrt{15}$

22) $5\sqrt{6} \cdot 5\sqrt{3}$

23) $\dfrac{3\sqrt{15}}{\sqrt{5}}$

24) $\dfrac{4\sqrt{15}}{2\sqrt{12}}$

25) $\dfrac{3\sqrt{12}}{4\sqrt{27}}$

26) $\dfrac{2\sqrt{2}}{\sqrt{50}}$

27) $\dfrac{4\sqrt{5}}{\sqrt{45}}$

28) $\dfrac{\sqrt{10}}{\sqrt{18}}$

29) $\dfrac{4\sqrt{20}}{\sqrt{45}}$

30) $\dfrac{3\sqrt{12}}{2\sqrt{3}}$

Algebra 2 Name________________________

Pythagorean Theorem with Radicals

Date________________ Period____ Score______

Find the missing side of each triangle. Leave your answers in simplest radical form.

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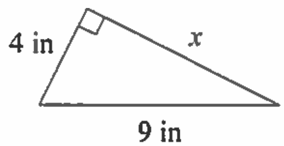

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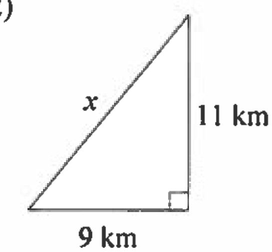

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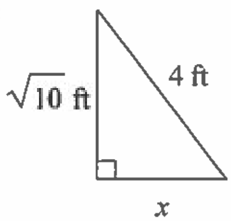

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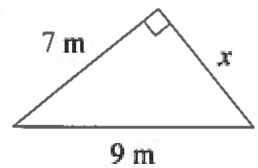

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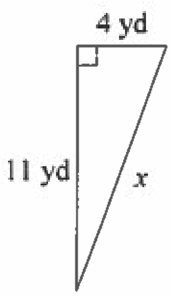

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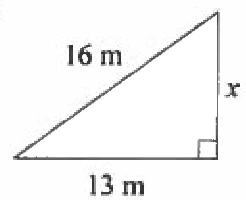

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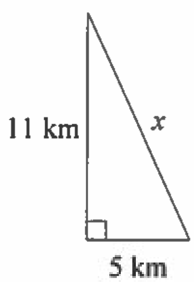

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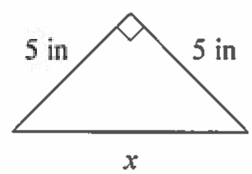

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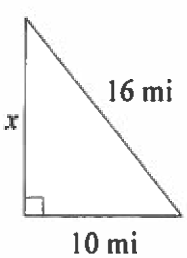

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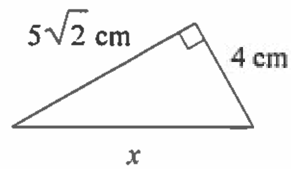

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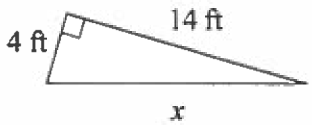

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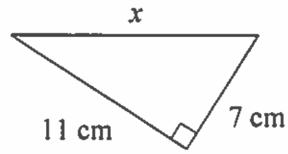

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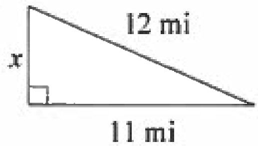

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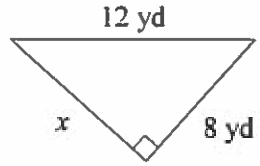

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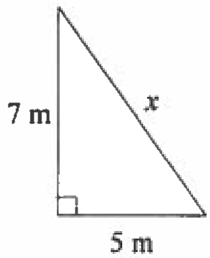

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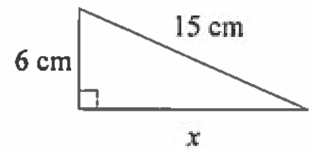

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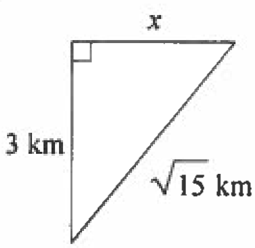

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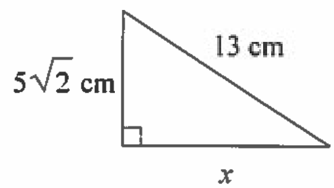

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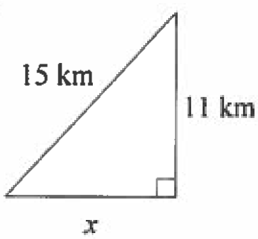

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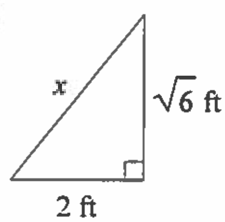

Lesson 5-5, 7 , 8

Solving Quadratic Equations

1st Method – Solve the Square Root

- If $x^2 = 64$, what values of x make this statement true?
- $\sqrt{64} = +8$ or -8
- If $20x^2 = 2000$, first divide both sides by 20 then take the square root, $x = +10$ or -10.
- If $x^2 - 25 = 0$, first add 25 to both sides, then take the square root, $x = +5$ or -5.

1st Method – Solve the Square Root

- If $x^2 + 25 = 0$ subtract 25 to both sides, so you have $x^2 = -25$ and then take the square root, what do you get? No Solution – Say What? You cannot get a real number solution by taking the square root of a negative number, so this question has no real solution.

Assignment

- Worksheet – Solving Quadratics by Taking the Square Root.

Algebra 2

Name________________________

Solving Quadratics by Taking the Square Root

Date________________ Period____

Solve each equation by taking square roots.

1) $b^2 - 9 = 55$

2) $r^2 + 6 = 31$

3) $-9x^2 = 108$

4) $n^2 + 5 = -8$

5) $a^2 - 10 = 39$

6) $x^2 + 10 = 11$

7) $4x^2 = 324$

8) $a^2 + 8 = 12$

9) $a^2 + 10 = 46$

10) $k^2 - 9 = 27$

11) $9p^2 = -324$

12) $x^2 - 6 = -18$

13) $m^2 - 6 = -5$

14) $8n^2 = 72$

15) $8r^2 = 288$

16) $x^2 - 7 = 29$

17) $n^2 + 7 = 16$

18) $-8b^2 = 128$

19) $v^2 + 6 = -14$

20) $-8x^2 = 16$

Lesson 5-5, 7 , 8

Solving Quadratic Equations

Quadratics

- Recall: a quadratic has the form:
  y or $f(x) = ax^2 + bx + c$
- Now let the equation = 0 instead of y, and determine what the values of x must be.
- There are different methods to apply, we'll take them one at a time.

2nd Method – X-Box Factor and Solve the Factors

- If necessary, put the equation into quadratic format: $x^2 = -3x - 2$ becomes $x^2 + 3x + 2 = 0$
- Factor using the x-box method.
  Ex. $x^2 + 3x + 2 = 0$ becomes $(x + 1)(x + 2)$
- Set each factor equal to 0.
  Ex. $x + 1 = 0$ and $x + 2 = 0$
- Then solve each equation for x.
  Ex. $x = -1$ or $x = -2$.

Examples

- $x^2 + 6x + 9 = 0$
- $x^2 + 15x - 250 = 0$
- $x^2 + 21x = -110$
- $3x^2 - 7x + 4 = 0$
- $2x^2 + 24x = -54$

Assignment

- Worksheet

Algebra 2

Name________________________

Solving Quadratics by Factoring

Date________________ Period____

Solve each equation by factoring.

1) $k^2 + 2k - 48 = 0$

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

3) $m^2 - 6m + 9 = 0$

4) $p^2 - 3p - 4 = 0$

5) $x^2 + 10x + 24 = 0$

6) $n^2 + 5n + 4 = 0$

7) $b^2 + 8b + 15 = 0$

8) $r^2 - 5r - 14 = 0$

9) $3x^2 - 14x + 8 = 0$

10) $3n^2 - 22n + 35 = 0$

11) $5a^2 - 22a - 15 = 0$

12) $5v^2 - 13v + 8 = 0$

13) $14x^2 - 19x - 3 = 0$

14) $5x^2 - 11x + 2 = 0$

15) $6n^2 + 5n - 14 = 0$

16) $5k^2 + 16k + 12 = 0$

Solve each equation by factoring, taking the square root, then solving for X's.

17) $a^2 + 18a + 81 = 16$

18) $n^2 - 8n + 16 = 1$

19) $x^2 - 22x + 121 = 9$

20) $m^2 - 14m + 49 = 25$

21) $r^2 - 6r + 9 = 64$

22) $x^2 + 24x + 144 = 100$