BASIC ALGEBRA Exam 2 (One Step Ch 2) FORMS A and B   Dr. Rapalje

BASIC ALGEBRA Exam 2A*   **Name**_____
Show all work on this test or on separate paper!   Calculators ARE allowed on this test!

In 1 - 6, multiply the expressions:

1. $(x + 2)(x + 5)$

2. $-4x(3x - 5)$

3. $(2x + 3)(x - 6)$

4. $(2x - 5y)(2x + 5y)$

5. $(2x + 5y)^2$

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

In 7 - 15, factor completely.

7. $3x^2 + 6x$

8. $x^2 - 2x - 8$

9. $x^2 - 49$

10. $x^2 + 20x + 36$

11. $3x^2 + 23x + 14$

12. $2x^2 - 3x - 5$

13. $3x^3 + 12x^2 + 9x$

14. $x^4 - 16$

15. $x^4 - 13x^2 + 36$

In 16 - 20, solve for x.
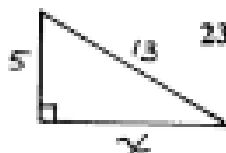
16. $(x - 9)(x + 4) = 0$

17. $x^2 - 4x - 21 = 0$
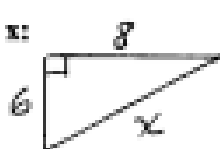
18. $x(x + 10) = -24$

19. $x^2 = 3 + 2x$

20. $4(x^2 + 10) = 26x$

21. According to the Theorem of a) _____, where "a" and "b" are legs, and "c" is the b) _____, it may be concluded that c) _____.
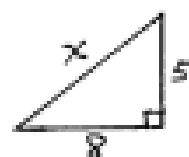
22. Find x:

23. Find x:

24. Find x:

In 25 - 35, simplify using the laws of exponents. Eliminate all negative exponents.

25. $x^6 \cdot x^3$

26. $\dfrac{x^{12}}{x^4}$

27. $(x^3)^4$

28. $\left(\dfrac{2x^3}{y^2}\right)^3$

29. $4x^0$

30. $(4x)^{-1}$

31. $4x^{-1}$

32. $(4x)^{-2}$

33. $(x^{-5}x^2)^0$

34. $\left(\dfrac{5}{2}\right)^{-2}$

35. $(3x^3y^{-2})^3$

In 36 - 39, express answers in scientific notation.

36. 420,000,000

37. 0.000235

38. $500,000 \cdot 7,000,000$

39. $\dfrac{0.00025}{5000}$

In 40 - 41, find all values of x for which the equation is true:

40. $x^2 = 9^2 + 6^2$

41. $x^2 + 9^2 = 15^2$

Basic Algebra   Exam 2A* Solutions

1. $(x+2)(x+5)$ 2. $-4x(3x-5)$ 3. $(2x+3)(x-6)$ 4. $(2x-5y)(2x+5y)$
$\boxed{x^2+7x+10}$ $\boxed{-12x^2+20x}$ $\boxed{2x^2-9x-18}$ $\boxed{4x^2-25y^2}$

5. $(2x+5y)^2$ 6. $(x-2)(x^2-3x+7)$ 7. $3x^2+6x$ 8. x^2-2x-8
$(2x+5y)(2x+5y)$ x^3-3x^2+7x $\boxed{3x(x+2)}$ $\boxed{(x-4)(x+2)}$
$\boxed{4x^2+20xy+25y^2}$ $\underline{\quad -2x^2+6x-14}$
$\boxed{x^3-5x^2+13x-14}$

9. x^2-49 10. $x^2+20x+36$ 11. $3x^2+23x+14$ 12. $2x^2-3x-5$
$\boxed{(x-7)(x+7)}$ $\boxed{(x+18)(x+2)}$ $\boxed{(3x+2)(x+7)}$ $\boxed{(2x-5)(x+1)}$

13. $3x^3+12x^2+9x$ 14. x^4-16 15. x^4-13x^2+36 16. $(x-9)(x+4)=0$
$3x(x^2+4x+3)$ $(x^2-4)(x^2+4)$ $(x^2-9)(x^2-4)$ $\begin{array}{c|c} x-9=0 & x+4=0 \\ \hline \boxed{x=9} & \boxed{x=-4} \end{array}$
$\boxed{3x(x+3)(x+1)}$ $\boxed{(x-2)(x+2)(x^2+4)}$ $\boxed{(x-3)(x+3)(x-2)(x+2)}$

17. $x^2-4x-21=0$ 18. $x(x+10)=-24$ 19. $x^2=3+2x$ 20. $4(x^2+10)=26x$
$(x-7)(x+3)=0$ $x^2+10x+24=0$ $x^2-2x-3=0$ $4x^2+40=26x$
$\begin{array}{c|c} x-7=0 & x+3=0 \\ +7+7 & -3-3 \\ \hline \boxed{x=7} & \boxed{x=-3} \end{array}$ $(x+6)(x+4)=0$ $(x-3)(x+1)=0$ $4x^2-26x+40=0$
    $\begin{array}{c|c} x+6=0 & x+4=0 \\ -6-6 & -4-4 \\ \hline \boxed{x=-6} & \boxed{x=-4} \end{array}$ $\begin{array}{c|c} x-3=0 & x+1=0 \\ \hline \boxed{x=3} & \boxed{x=-1} \end{array}$ $2(2x^2-13x+20)=0$
    $2(2x-5)(x-4)=0$

21 a) Pythagoras $\begin{array}{c|c} 2x-5=0 & x-4=0 \\ 2x=5 & \boxed{x=4} \\ \boxed{x=\frac{5}{2}} & \end{array}$
b) hypotenuse   22. $x^2+5^2=13^2$ 23. $6^2+8^2=x^2$
c) $a^2+b^2=c^2$ $x^2+25=169$ $36+64=x^2$
    $x^2=144$ $100=x^2$
24. $8^2+5^2=x^2$ $x=\pm12$ $\boxed{x=12}$ $x=\pm10$ $\boxed{x=10}$ 29. $4x^0=4\cdot1$
$64+25=x^2$ 25. $x^6\cdot x^3=\boxed{x^9}$ 27. $(x^3)^4=\boxed{x^{12}}$ $=\boxed{4}$
$x^2=89$ $\boxed{x=\sqrt{89}}$ 26. $\dfrac{x^{12}}{x^4}=\boxed{x^8}$ 28. $\left(\dfrac{2x^3}{y^2}\right)^3=\boxed{\dfrac{8x^9}{y^6}}$ 30. $(4x)^{-1}=\boxed{\dfrac{1}{4x}}$

32. $(4x)^{-2}$ 33. $\left(x^{-5}x^2\right)^8$ 34. $\left(\dfrac{5}{2}\right)^{-2}=\left(\dfrac{2}{5}\right)^2$ 35. $(3x^3y^{-2})^3$ 36.   31. $4x^{-1}=\boxed{\dfrac{4}{x}}$
$\dfrac{1}{(4x)^2}$ $(x^{-3})^8$ $=\boxed{\dfrac{4}{25}}$ $3^3x^9y^{-6}$ $420{,}000{,}000$
$\boxed{\dfrac{1}{16x^2}}$ x^{-24} $27x^9y^{-6}$ $\boxed{4.2\times10^8}$
    $\boxed{\dfrac{1}{x^{24}}}$ $\boxed{\dfrac{27x^9}{y^6}}$ 37. 0.000235
38. Calculator says   40. $x^2=9^2+6^2$ $\boxed{2.35\times10^{-4}}$
$3.5E12$ or 3.5^{12} $x^2=81+36$ 41. $x^2+9^2=15^2$
ANS: $\boxed{3.5\times10^{12}}$ $x^2=117$ $x^2+81=225$
39. $5E-8$ or 5^{-8} $\boxed{x=\pm\sqrt{117}}$ $x^2=144$
ANS: $\boxed{5\times10^{-8}}$ $\boxed{x=\pm12}$

BASIC ALGEBRA   EXAM 2 B*   NAME _____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE PERMITTED ON THIS TEST.

In 1 - 6, multiply the expressions:

1. $(x + 3)(x + 4)$

2. $-5x(3x - 6)$

3. $(x - 6)(x + 6)$

4. $(2x - 7y)(2x - 5y)$

5. $(5x - 2y)^2$

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

In 7 - 15, factor completely.

7. $3x^2 - 12x$

8. $x^2 - 81$

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

10. $x^2 + 22x + 40$

11. $3x^2 + 13x + 14$

12. $2x^2 + 3x - 5$

13. $x^4 - x^3 - 20x^2$

14. $x^3 + 3x^2 - 25x - 75$

15. $x^2 + xy - 6y^2$

In 16 - 20, solve for x.

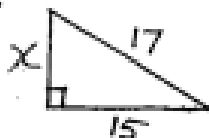16. $(x + 5)(x - 3) = 0$

17. $x^2 - 10x + 21 = 0$
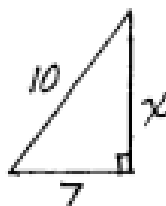
18. $x(x + 10) = 24$

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

20. $x(2x - 9) = 5$

21.   According to the Theorem of a) _____, where "a" and "b" are legs, and
"c" is the b) _____, it may be concluded that c) _____.

22. Find x:
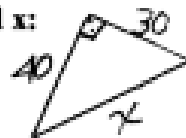
x 17

15

23. Find x:

10 x

7

24. Find x:

30 40 x

In 25 - 35, simplify using the laws of exponents. Eliminate all negative exponents.

25. $2^4 \cdot 2^3$

26. $(x^4)^2$

27. $\dfrac{x^8}{x^2}$

28. $\left(\dfrac{3y^4}{4x^2}\right)^2$

29. $5x^0$

30. $5x^{-1}$

31. $(5x)^{-1}$

32. $(5x)^{-3}$

33. $(x^7 x^{-4})^{-3}$

34. $\left(\dfrac{5}{3}\right)^{-2}$

35. $(5x^2 y^{-6})^3$

In 36 - 39, express answers in scientific notation.

36. 725,000

37. 0.0000835

38. $0.004 \cdot 0.00000008$

39. $\dfrac{5000}{0.00025}$

In 40 - 41, find all values of x for which the equation is true:

40. $x^2 + 24^2 = 25^2$

41. $6^2 + 10^2 = x^2$

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Basic Algebra Exam 28* Solutions

1. $(x+3)(x+4)$
$\boxed{x^2 + 7x + 12}$

2. $-5x(3x-6)$
$\boxed{-15x^2 + 30x}$

3. $(x-6)(x+6)$
$\boxed{x^2 - 36}$

4. $(2x-7y)(2x-5y)$
$\boxed{4x^2 - 24xy + 35y^2}$

5. $(5x-2y)^2$
$(5x-2y)(5x-2y)$
$\boxed{25x^2 - 20xy + 4y^2}$

6. $(x-3)(x^2-3x+4)$
$x^3 - 3x^2 + 4x$
$\underline{\quad -3x^2 + 9x - 12}$
$\boxed{x^3 - 6x^2 + 13x - 12}$

7. $3x^2 - 12x$
$\boxed{3x(x-4)}$

8. $x^2 - 81$
$\boxed{(x-9)(x+9)}$

9. $x^2 - 14x + 49$
$(x-7)(x-7)$
$\boxed{(x-7)^2}$

10. $x^2 + 22x + 40$
$\boxed{(x+20)(x+2)}$

11. $3x^2 + 13x + 14$
$\boxed{(3x+7)(x+2)}$

12. $2x^2 + 3x - 5$
$\boxed{(2x+5)(x-1)}$

13. $x^4 - x^3 - 20x^2$
$x^2(x^2 - x - 20)$
$\boxed{x^2(x-5)(x+4)}$

14. $x^3 + 3x^2 - 25x - 75$
$x^2(x+3) - 25(x+3)$
$(x+3)(x^2-25)$
$\boxed{(x+3)(x-5)(x+5)}$

15. $x^2 + xy - 6y^2$
$\boxed{(x+3y)(x-2y)}$

16. $(x+5)(x-3)=0$
$x+5=0 \quad | \quad x-3=0$
$\underline{-5 \; -5} \quad | \quad \underline{+3 \; +3}$
$\boxed{x=-5} \; \boxed{x=3}$

17. $x^2 - 10x + 21 = 0$
$(x-3)(x-7) = 0$
$\boxed{x=3 \quad x=7}$

18. $x(x+10) = 24$
$x^2 + 10x - 24 = 0$
$(x+12)(x-2) = 0$
$\boxed{x=-12, \quad x=2}$

19. $x^2 = 8 + 2x$
$x^2 - 2x - 8 = 0$
$(x-4)(x+2) = 0$
$\boxed{x=4 \quad x=-2}$

20. $x(2x-9) = 5$
$2x^2 - 9x - 5 = 0$
$(2x+1)(x-5) = 0$
$2x+1=0 \quad | \quad x-5=0$
$2x=-1 \quad \boxed{x=5}$
$\boxed{x=-\frac{1}{2}}$

21(a) Pythagoras
(b) hypotenuse
(c) $a^2 + c^2 = c^2$

22. $x^2 + 15^2 = 17^2$
$x^2 + 225 = 289$
$\underline{\quad -225 \; -225}$
$x^2 = 64$
$x = \pm 8 \quad \boxed{x=8}$

23. $7^2 + x^2 = 10^2$
$49 + x^2 = 100$
$\underline{-49 \qquad -49}$
$x^2 = 51$
$x = \pm\sqrt{51}$
$\boxed{x=\sqrt{51} \approx 7.14}$

24. $30^2 + 40 = x^2$
$900 + 1600 = x^2$
$2500 = x^2$
$x = \pm\sqrt{2500}$
$x = \pm 50 \quad \boxed{x=50}$

25. $2^4 \cdot 2^? = \boxed{27}$

26. $(x^4)^2 = \boxed{x^8}$

27. $\dfrac{x^8}{x^2} = \boxed{x^6}$

28. $\left(\dfrac{3y^4}{4x^2}\right)^2 = \boxed{\dfrac{9y^8}{16x^4}}$

29. $5x^0 = 5 \cdot 1$
$= \boxed{5}$

30. $5x^{-1} = 5 \cdot \dfrac{1}{x}$
$= \boxed{\dfrac{5}{x}}$

31. $(5x)^{-1} = \boxed{\dfrac{1}{5x}}$

32. $(5x)^{-3} = \dfrac{1}{(5x)^3}$
$= \boxed{\dfrac{1}{125x^3}}$

33. $(x^7 \cdot x^{-4})^{-3}$
$(x^3)^{-3}$
x^{-9}
$\boxed{\dfrac{1}{x^9}}$

34. $\left(\dfrac{5}{3}\right)^{-2}$
$\left(\dfrac{3}{5}\right)^2$
$\boxed{\dfrac{9}{25}}$

35. $(5x^3y^{-6})^3$
$5^3 x^9 y^{-18}$
$125x^9 \cdot \dfrac{1}{y^{18}}$
$\boxed{\dfrac{125x^9}{y^{18}}}$

36. 725000
$\boxed{7.25 \times 10^5}$

37. 0.0000835
$\boxed{8.35 \times 10^{-5}}$

38. $\boxed{3.2 \times 10^{-10}}$

39. $20,000,000.$
$\boxed{2 \times 10^7}$

40. $x^2 + 24^2 = 25^2$
$x^2 + 576 = 625$
$x^2 = 49$
$\boxed{x = \pm 7}$

41. $6^2 + 10^2 = x^2$
$36 + 100 = x^2$
$x^2 = 136$
$\boxed{x = \pm\sqrt{136} \approx 11.66}$