BASIC ALGEBRA   EXAM 2 E*   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. $5x(3x - 9)$ 2. $(x - 8)(x - 7)$ 3. $(x + 3)(x - 12)$

4. $(2x - 5)(x - 5)$ 5. $(3x + 2)^2$ 6. $(x - 4)(x^2 + 3x - 6)$

In 7 – 9, express each number as a product of prime numbers.

7. 36   8. 90   9. 4800

In 10 - 23, factor completely.

10. $13x - 26$ 11. $12x^3 + 18x$ 12. $x^2 + 9x + 8$

13. $x^2 + 3x - 18$ 14. $x^2 - 49$ 15. $x^2 - 10x + 25$

16. $x^2 - 7x - 30$ 17. $x^3 + 14x^2 + 24x$ 18. $x^4 - 16$

19. $xy - 5x + 2y - 10$ 20. $x^3 - 9x^2 - 4x + 36$

21. $12x^2 - 75y^2$ 22. $5x^2 + 17x + 6$ 23. $5x^2 + 13x + 6$

In 24 - 29, solve for x.

24. $(x - 2)(x + 5) = 0$ 25. $x^2 - 8x + 12 = 0$ 26. $x^2 + 6x = 16$

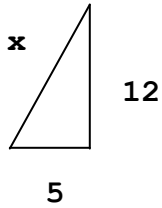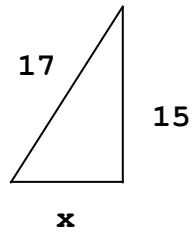27. $x(x - 4) = 45$ 28. $(x-3)(x+3) = 8x$ 29. $x^3 - 36x = 0$

30.   According to the Theorem of _____, where   a and b
      are legs and c is the _____, it may be concluded
      that _____.
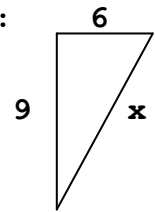
BASIC ALGEBRA   EXAM 2 E*   NAME _____

31.   Find x: 32.   Find x: 33.   Find x: 6

x   17   9   x

12   15

5   x

34.   Find the diagonal   35. A guy wire to the top of a pole is
      of rectangle whose   50 feet long. It reaches the
      width is 12 and whose   ground 15 feet from the base of
      length is 16.   the pole. How tall is the pole?

In 36 – 46, simplify using the laws of exponents. Eliminate all
         negative and zero exponents.

36. $2x^0$ 37. $(2x)^0$ 38. $2x^{-1}$ 39. $(2x)^{-1}$

40. $(2x)^{-2}$ 41. $x^4\,x^2$ 42. $(2x^2)^4$ 43. $\dfrac{48x^3}{6x^6}$

44. $\dfrac{x^{-6}}{x^{-2}}$ 45. $\left(\dfrac{2}{3}\right)^{-2}$ 46. $\dfrac{(x^3)^6 x^4}{x^{10}}$ 47. $\left(2x^{-2}y^4\right)^3$

In 48 – 51, express answers in scientific notation (any method!).

48.   0.00048   49. 369,000,000

50.   3,000,000,000 • 20,000,000   51. $\dfrac{0.000484}{121,000}$

3

BASIC ALGEBRA EXAM 2E Solutions

1. $5x(3x-9)$
   $\boxed{15x^2-45x}$

2. $(x-8)(x-7)$
   $\boxed{x^2-15x+56}$

3. $(x+3)(x-12)$
   $\boxed{x^2-9x-36}$

4. $(2x-5)(x-5)$
   $\boxed{2x^2-15x+25}$

5. $(3x+2)(3x+2)$
   $\boxed{9x^2+12x+4}$
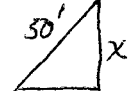
6. $(x-4)(x^2+3x-6)$
   x^3+3x^2-6x
   $-4x^2-12x+24$
   $\boxed{x^3-x^2-18x+24}$

7. 36
   6 6
   2 3 2 3
   $\boxed{36=2^2\cdot3^2}$

8. 90
   9 10
   3 3 2 5
   $\boxed{90=2\cdot3^2\cdot5}$

9a. 4800
   48   100
   8 6 10 10
   2 2 2 2 3 2 5 2 5
   $\boxed{4800=2^6\cdot3\cdot5^2}$

10. $13x-26$
    $\boxed{13(x-2)}$

11. $12x^3+18x$
    $\boxed{6x(2x^2+3)}$

12. x^2+9x+8
    $\boxed{(x+8)(x+1)}$

13. $x^2+3x-18$
    $\boxed{(x+6)(x-3)}$

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

15. $x^2-10x+25$
    $\boxed{(x-5)^2}$

16. $x^2-7x-30$
    $\boxed{(x-10)(x+3)}$

17. x^3+14x^2+24x
    $x(x^2+14x+24)$
    $\boxed{x(x+12)(x+2)}$

18. x^4-16
    $(x^2-4)(x^2+4)$
    $\boxed{(x-2)(x+2)(x^2+4)}$

19. $xy-5x+2y-10$
    $x(y-5)+2(y-5)$
    $\boxed{(y-5)(x+2)}$

20. $x^3-9x^2-4x+36$
    $x^2(x-9)-4(x-9)$
    $(x-9)(x^2-4)$
    $\boxed{(x-9)(x-2)(x+2)}$

21. $12x^2-75y^2$
    $3(4x^2-25y^2)$
    $\boxed{3(2x-5y)(2x+5y)}$

22. $5x^2+17x+6$
    $(5x+2)(x+3)$
    $2x$ $15x$

23. $5x^2+13x+6$
    $(5x+3)(x+2)$
    $3x$ $10x$

24. $(x-2)(x+5)=0$
    $\boxed{x=2 \quad x=-5}$

25. $x^2-8x+12=0$
    $(x-6)(x-2)=0$
    $\boxed{x=6 \quad x=2}$

26. $x^2+6x=16$
    $x^2+6x-16=0$
    $(x+8)(x-2)=0$
    $\boxed{x=-8 \quad x=2}$

27. $x(x-4)=45$
    $x^2-4x-45=0$
    $(x-9)(x+5)=0$
    $\boxed{x=9 \quad x=-5}$

28. $(x-3)(x+3)=8x$
    $x^2-9-8x=0$
    $x^2-8x-9=0$
    $(x-9)(x+1)=0$
    $\boxed{x=9 \quad x=-1}$

29. $x^3-36x=0$
    $x(x^2-36)=0$
    $x(x-6)(x+6)=0$
    $\boxed{x=0 \quad x=6 \quad x=-6}$

30 a) Pythagoras
   b) hypotenuse
   c) $a^2+b^2=c^2$

31. $5^2+12^2=x^2$
    $25+144=x^2$
    $169=x^2$
    $x=\pm13$
    $\boxed{x=13}$

32. $x^2+15^2=17^2$
    $x^2+225=289$
    $\underline{-225 \quad -225}$
    $x^2=64$
    $x=\pm8$
    $\boxed{x=8}$

33. $6^2+9^2=x^2$
    $36+81=x^2$
    $117=x^2$
    $x=\pm\sqrt{117}$
    $\boxed{x=\sqrt{117} \text{ or } 10.82}$

34. [diagram: rectangle with x, 12, 16]
    $16^2+12^2=x^2$
    $256+144=x^2$
    $400=x^2$
    $x=\sqrt{400}=\boxed{20}$

35. [triangle: 50', 15', x]
    $x^2+15^2=50^2$
    $x^2+225=2500$
    $x^2=2275$
    $\boxed{x\approx47.70'}$

36. $2x^6=2\cdot1$
    $=\boxed{2}$

37. $(2x)^0=\boxed{1}$

38. $2x^{-1}=\boxed{\dfrac{2}{x}}$

39. $(2x)^{-1}=\boxed{\dfrac{1}{2x}}$

40. $(2x)^{-2}=\dfrac{1}{(2x)^2}$
    $=\boxed{\dfrac{1}{4x^2}}$

41. $x^4\cdot x^2=\boxed{x^6}$

42. $(2x^2)^4=\boxed{16x^8}$

43. $\dfrac{48x^3}{6x^6}=\boxed{\dfrac{8}{x^3}}$

44. $\dfrac{x^{-6}}{x^{-2}}=x^{-6-(-2)}$
    $=x^{-6+2}$
    $=x^{-4}=\boxed{\dfrac{1}{x^4}}$

45. $\left(\dfrac{2}{3}\right)^{-2}$
    $=\left(\dfrac{3}{2}\right)^2$
    $=\boxed{\dfrac{9}{4}}$

46. $\dfrac{(x^3)^6 x^4}{x^{10}}$
    $=\dfrac{x^{18}x^4}{x^{10}}$
    $=\dfrac{x^{22}}{x^{10}}$
    $=\boxed{x^{12}}$

47. $(2x^{-2}y^4)^3$
    $=8x^{-6}y^{12}$
    $=8\dfrac{1}{x^6}y^{12}$
    $=\boxed{\dfrac{8y^{12}}{x^6}}$

48. 0.00048
    $\boxed{4.8\times10^{-4}}$

49. 369,000,000
    $\boxed{3.69\times10^8}$

50. $\boxed{6\times10^{16}}$

51. $\boxed{4\times10^{-9}}$