$5^2 = 25$
$5^3 = 125$
$\times 5$
625

Algebra B
Final Exam Review

Name Key

Simplify with positive exponents.

1) $(a^3)(a^5)$ a^8

2) $(a^4b)(a^5b^2)$ a^9b^3

3) $(5xy^3)(-3x^7)$ $-15x^8y^3$

4) $2^3 \cdot 2^2$ way 1: $8 \cdot 4 = 32$ way 2: $2^5 = 32$

5) $(x^2)^6$ x^{12}

6) $(2x^4)^3$ $2^3x^{4\cdot3}$ $8x^{12}$

7) $(-2x^3y^4)^5$ $(-2)^5x^{3\cdot5}y^{4\cdot5}$ $-32x^{15}y^{20}$

8) $\frac{x^6}{x^4}$ x^{6-4} x^2

9) $\frac{5^6}{5^2}$ $5^{6-2} = 5^4 = 625$

10) $\frac{25x^3}{-5x}$ $\frac{25}{-5} \cdot \frac{x^3}{x}$ $-5x^2$

11) $\frac{x^4y^7}{x^5y^2}$ $\frac{y^5}{x}$

12) $\frac{x^{-4}}{xy}$ $\frac{1}{x^4xy}$ $\frac{1}{x^5y}$

13) $\frac{x^{-5}}{x^{-2}}$ $\frac{x^2}{x^5}$ $\frac{1}{x^3}$

14) $2x^{-3}y^5z^{-1}$ $\frac{2y^5}{x^3z}$

15) $\frac{14x^{-3}yz}{2y^{-4}}$ $\frac{14}{2} \cdot x^{-3} \cdot \frac{y}{y^4} \cdot z$ $7 \cdot \frac{1}{x^3} \cdot y^5 \cdot z$ $\frac{7y^5z}{x^3}$

16) $(4a^{-2})(-5a^6)$ $4 \cdot (-5)a^{-2}a^6$ $-20a^4$ or $\frac{4 \cdot (-5)a^6}{a^2}$ $-20a^4$

17) $(5x^{-3}y^4)(3x^{-1}y^{-7})$ $5 \cdot 3x^{-3} \cdot x^{-1}y^4 \cdot y^{-7}$ $15 \cdot \frac{1}{x^4} \cdot \frac{1}{y^3}$ $\frac{15}{x^4y^3}$

18) $\left(\frac{2}{3}\right)^{-1}$ $\frac{3}{2}$

19) $\left(\frac{x}{y}\right)^{-2}$ $\frac{y^2}{x^2}$

20) $\left(\frac{a^{-2}}{b^3}\right)^5$ $\frac{1}{a^2b^3}^5$ $\frac{1}{a^{10}b^{15}}$

21) $(2)^{-3}$ $\frac{1}{2^3} = \frac{1}{8}$

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Simplify.

22) $\frac{3x^4}{8xy} \cdot \frac{4x^2}{-12}$

$\frac{x^4}{-8x4} = \frac{x^3}{-84}$

23) $\frac{-3a^4}{21b} \div \frac{6ab}{14b^4}$

$\frac{-a^4}{7b} \div \frac{3a}{7b^3} = \frac{-a^{3}}{7b} \cdot \frac{7b^{3}}{3a} = \frac{-a^3b^2}{3}$

24) Which expressions aren't in scientific notation? Rewrite them correctly.

a) $3.4x10^4$ ✓

b) $365x10^4$ → 3.65×10^6

c) $5x10^4$ ✓

d) $0.6x10^{-2}$ → 6×10^{-3}

25) Rewrite each number in scientific notation.

a) 23,070,000,000 → 2.307×10^{10}

b) 0.0000000509 → 5.09×10^{8}

26) Evaluate the expressions. Write the results in scientific notation.

left → add
right → subtract

a) $(3.2x10^7)(4x10^3)$

12.8×10^{10}

1.28×10^{11}

3.2 × 4 = 12.8

b) $(5x10^{-2})(4.6x10^5)$

23×10^3

2.3×10^4

34.6 × 5 = 23.0

c) $\frac{2.4x10^9}{3x10^4}$

0.8×10^5

8×10^4

0.8 | 2.4

d) $\frac{8.4x10^6}{4x10^9}$

2.1×10^{-3}

2.1 | 8.4

27) You bought a 32-inch television for $600. the television is depreciating at the rate of 8% per year. What is the value of the television after 6 years? Let y= the value of television. Use $y = C(1-r)^t$ to solve the problem.

y = unknown
C = $600 (original cost)
r = 0.08 (rate)
t = 6 (time)

$y = 600(1-0.08)^6$
$= 600(0.92)^6$
$= \$363.81$

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28) You deposit $1200 in an account that pays 2% interest compounded yearly. What is the account balance after 8 years? Let A = the account balance. Use $A = P(1+r)^t$ to solve the problem.

$A = 1200(1+0.02)^8$

$= 1200(1.02)^8$

$A = \$1405.99$

If possible, simplify.

29) $\pm\sqrt{\frac{4}{9}}$ $\pm\frac{2}{3}$

30) $-\sqrt{0.0004}$ -0.02

31) $\sqrt{-64}$ $8i$

32) $\sqrt{75}$ $5\sqrt{3}$

33) $6\sqrt{28}$ $12\sqrt{7}$

28 → 4 · 7 → 2 2

Evaluate $\sqrt{b^2-4ac}$

34) when a = 2, b = 4, and c = -6

$\sqrt{4^2-4(2)(-6)}$

$\sqrt{16-8(-6)} = \sqrt{16+48}$

$= \sqrt{64} = 8$

35) when a = -2, b = 8, and c = -8

$\sqrt{8^2-4(-2)(-8)}$

$\sqrt{64+8(-8)}$

$= \sqrt{64-64} = 0$

Find the area of a square if

36) the length of its sides are $\sqrt{72}$ cms.

$A = s^2 = (\sqrt{72})^2 = 72$ cms

What is the value of x when

37) $2x^2 - 5 = 27$

$2x^2 = 32$

$x^2 = 16$

$x = \pm 4$

38) $5x^2 + 5 = 20$

$5x^2 = 15$

$x^2 = 3$

$x = \pm\sqrt{3}$

Find the coordinates of the vertex.

39) $y = -12x^2$ (0, 0)

40) $y = -x^2 + 8x + 32$

$x = \frac{-b}{2a} = \frac{-8}{2(-1)} = 4$

$y = -(4)^2 + 8(4) + 32$

$= -16 + 32 + 32$

$= 48$

(4, 48)

41) $y = x^2 - 6x + 8$

$x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$

$y = (3)^2 - 6(3) + 8$

$= 9 - 18 + 8$

$= -9 + 8 = -1$

(3, -1)

Find the solutions of the equations. How would you show them on a graph?

42) $x^2 + 2x = 3$

$x^2 + 2x - 3 = 0$

$(x+3)(x-1) = 0$

$x+3=0 \quad x-1=0$

$x = -3 \quad x = 1$

$\{-3, 1\}$

43) $x^2 - 4x - 5 = 0$

$(x-5)(x+1) = 0$

$x-5=0 \quad x+1=0$

$x = 5 \quad x = -1$

$\{-1, 5\}$

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

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = -3 \quad x = 2$

$\{-3, 2\}$

*Solutions are x-intercepts on a graph

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If you were using the quadratic formula, what would you identify as a, b, and c?

45) $2x^2 - 8x - 10 = 0$ 46) $x^2 - 4 = 0$

47) You are holding a protected and wrapped egg 20 above the ground. You release the egg. How long will it take the egg to reach the ground? Use $y = -16t^2 + 20$.

Find the value of the discriminant. Then, determine whether the equation has two solutions, one solution, or no real solution.

48) $-3x^2 + x - 2 = 0$ 49) $x^2 - 4x + 4 = 0$ 50) $5x^2 - 2x - 6 = 0$

Use the quadratic formula to solve the equation.

51) $-x^2 + 3x + 10 = 0$ 52) $3x^2 + 4x - 7 = 0$

Sketch the graph of each inequality.

53) $y < x^2 + 2x - 3$ 54) $y \leq -x^2 + 5x - 4$

55) What is the number of terms of each polynomial? Then give their degree.

a) $x^3 - 4x^2 - 5x + 7$ b) x^3yz^5 c) $8x^4 - 5x^3y^2$