Algebra II Second Semester Practice Final Exam

1. Simplify $\left(3x^0y^{-4}\right)\left(2x^2y\right)^3$ _____

2. Simplify $\frac{7y^4z^2}{21y^9}$ _____

3. Express 70,000,000 in scientific notation. _____

4. Simplify $\left(3a^3-7a^2+a\right)-\left(6a^3-4a^2-8\right)$ _____

5. Simplify $7x\left(4x^2-3y\right)$ _____

6. Simplify $\left(x^2+12x+35\right)\div\left(x+5\right)$ _____

7. Factor $m^2+10m+16$ completely. _____

8. Factor $x^3 - 4x^2 + 3x - 12$ completely _____

9. Factor $x^2 - 25$ completely. _____

10. Factor $2x^2+13x-7$ completely. _____

11. Simplify $\sqrt{196}$ _____

12. Use a calculator to approximate $\sqrt{341}$ to three decimal places. _____

13. Simplify $\sqrt{80}$ _____

14. Simplify $\left(4+\sqrt{5}\right)\left(6-\sqrt{5}\right)$ _____

15. Simplify $\sqrt{98}-\sqrt{72}+\sqrt{32}$ _____

16. Simplify $\sqrt[3]{216x^{12}}$ _____

17. Write the expression $x^{\frac{3}{7}}$ in radical form. _____

18. Evaluate $125^{\frac{1}{3}}$ _____

19. Solve $\sqrt{4x+1}=3$ _____

20 Solve $\sqrt{x+7}+8=3$ _____

21. Simplify $\sqrt{-25}$

$5i$

$\sqrt{-1} \cdot \sqrt{25}$

$5i$

22. Simplify $(-8+7i)+(22-11i)$

$14-4i$

23. What is the equation of the axis of symmetry of $y = x^2 + 16x + 20$? $x = -8$

$a = 1, b = 16, c = 20$

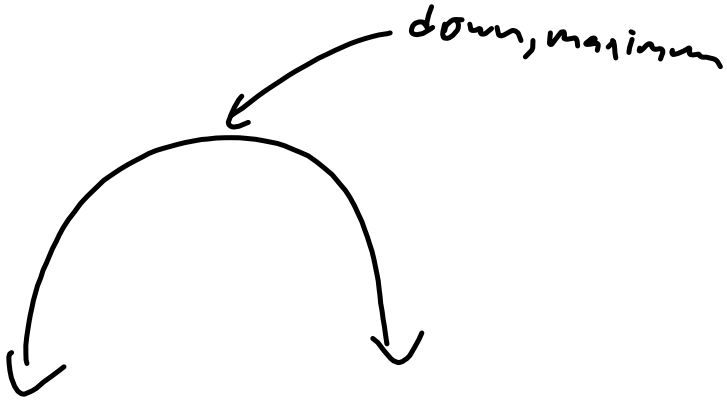
$$x = \frac{-b}{2a}$$

$$= \frac{-16}{2(1)} = -8$$

$x = -8$

24. The graph of $f(x) = -5x^2 + x$ opens _____ and has a _____ value.

down, maximum



25. Solve $x^2 - 9x - 22 = 0$

$\{11, -2\}$

$(x-11)(x+2)=0$

$x-11=0$ $\quad$ $x+2=0$

$+11 \quad +11$ $\quad$ $-2 \quad -2$

$x=11$ $\quad$ $x=-2$

{0, 2}

26. Solve $3x^2 - 6x = 0$

$3x(x-2)=0$

$3x=0$ $\quad$ $x-2=0$

$\div 3 \quad \div 3$ $\quad$ $+2 \quad +2$

$x=0$ $\quad$ $x=2$

27. Which quadratic has roots $-\frac{1}{3}, -3$?

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

$3x^2+9x+1x+3=0$

$3x^2+10x+3=0$

$3x^2+10x+3=0$

28. Find the value of c that makes $x^2 + 12x + c$ a perfect square. 36

1) $\frac{12}{2} = 6$

2) $6^2 = 36$

29. Find the exact solutions to $x^2+3x+-3=0$ by using the quadratic formula.

$\frac{-3\pm\sqrt{21}}{2}$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $a=1, b=3, c=-3$

$=\frac{-3\pm\sqrt{3^2-4(1)(-3)}}{2(1)}$

$=\frac{-3\pm\sqrt{21}}{2}$

30. Use the value of the discriminant to determine the number and type of roots for $x^2 - 16x + 4 = 0$.

2 irrational roots

$b^2 - 4ac$

$(-16)^2 - 4(1)(4)$

240

$a = 1$
$b = -16$
$c = 4$

31. Use the value of the discriminant to determine the number and type of roots for $x^2 - x + 6 = 0$.

2 complex roots

$a=1, b=-1, c=6$

$b^2 - 4ac$

$(-1)^2 - 4(1)(6)$

$1 - 24 = -23$

32. Factor x^3+8 completely

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

Sum of cubes (a^3+b^3)

$(a+b)(a^2-ab+b^2)$

Difference of cubes (a^3-b^3)

$(a-b)(a^2+ab+b^2)$

$a=x$

$b=2$

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

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

33. Simplify $\frac{18}{6-\sqrt{2}}$ $\cdot \frac{6+\sqrt{2}}{6+\sqrt{2}}$ $\frac{54+9\sqrt{2}}{17}$

$\frac{108+18\sqrt{2}}{36-\sqrt{4}}$ $= \frac{108+18\sqrt{2}}{34}$

$= \frac{54+9\sqrt{2}}{17}$

34. Multiply (x+5)(x-7)

$x^2-2x-35$

$x^2-7x+5x-35$

$x^2-2x-35$

35. Simplify $(3x+8)^2$

$(3x+8)(3x+8)$

$9x^2+24x+24x+64$

$9x^2+48x+64$

$9x^2+48x+64$

Answer Key

1. $\frac{24x^6}{y}$
2. $\frac{z^2}{3y^5}$
3. 7×10^7
4. $-3a^3-3a^2+a+8$
5. $28x^3-21xy$
6. x+7
7. $(m+8)(m+2)$
8. $(x^2+3)(x-4)$
9. $(x-5)(x+5)$
10. $(2x-1)(x+7)$
11. 14
12. 18.466
13. $4\sqrt{5}$
14. $19+2\sqrt{5}$
15. $5\sqrt{2}$
16. $6x^4$
17. $\sqrt[7]{x^3}$
18. 5
19. 2

20. No Solution

21. 5i

22. 14 – 4i

23. x = -8

24. down, maximum

25. 11, -2

26. 0, 2

27. $3x^2+10x+3=0$

28. 36

29. $\frac{-3\pm\sqrt{21}}{2}$

30. 2 real irrational roots

31. 2 complex roots

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

33. $\frac{54+9\sqrt{2}}{17}$

34. $x^2-2x-35$

35. $9x^2+48x+64$