Final Exam Practice

The Goal of this is not to just do the questions, but to laugh at how easy they are.

That means you are ready!

Section 1: Radicals and Exponents

Simplify the following Radicals

1. $\sqrt{x^2 y}$	2. $\sqrt{xy^2}$	3. $\sqrt{x^5 y}$
4. $\sqrt{x^7 y^3}$	5. $\sqrt{12x^5 y^3}$	6. $\sqrt[3]{-16x^4 y^9 z^8}$

Simplify and Perform the Following Operations – State the Domain Restrictions if necessary

7. $7\sqrt{32} + 4\sqrt{2}$	8. $7\sqrt{63} - 2\sqrt{28}$
9. $4\sqrt{50} + 3\sqrt{12} - 5\sqrt{27}$	10. $5\sqrt[4]{32} + 2\sqrt[4]{8} \cdot \sqrt[4]{4}$

11. $\sqrt{3x^2} + \sqrt{12x^2}$

12. $3y\sqrt{24x^2y^2} + 6x\sqrt{54y^3}$

13. $\sqrt{2x} \cdot \sqrt{6x^3}$

14. $2\sqrt{3}(7\sqrt{5} - 5\sqrt{3})$

15. $(\sqrt{x} + 3\sqrt{6})(\sqrt{x} - 3\sqrt{6})$

16. $(\sqrt{2x} + \sqrt{y})(\sqrt{2x} - 5\sqrt{y})$

17. $\sqrt{(2-x)^4} \div \sqrt[4]{(2-x)^3}$

18. $(\sqrt{x} \cdot \sqrt[3]{x^2}) \div \sqrt[4]{x^3}$

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Rationalize the Denominator

19. $\dfrac{1}{\sqrt{x}-2}$

20. $\dfrac{1}{\sqrt{x}-\sqrt{2}}$

21. $\dfrac{\sqrt{x}-2}{\sqrt{x}}$

22. $\dfrac{\sqrt{18}}{\sqrt{2}-\sqrt{3}}$

Solve the Rational Equations, State Domain Restrictions and Check Solutions for Extraneous Results

23. $\sqrt{2t-3}=5$

24. $2\sqrt{x-1}=x$

3

25. $\sqrt{2x+1} = x - 7$

26. $\sqrt{2x+11} + \sqrt{x+6} = 2$

Section 3: Rational Expressions and Equations

Simplify the Rational Expressions – State the Domain Restrictions

27. $\dfrac{x^3}{x^3 + x^2}$

28. $\dfrac{4x^2 + 16x}{x^2 - 16}$

4

29. $\dfrac{x^2 + 9x + 18}{x^2 + 6x}$

30. $\dfrac{3x^2 - 10x - 8}{x^2 - 16}$

31. $\dfrac{5x^2 - 32x + 12}{4x^2 - 27x + 18}$

32. $\dfrac{8x^2 - 51x + 18}{8x^2 + 29x - 12}$

5

33. $\dfrac{x^2 - 3xy + 2y^2}{x^2 - 4y^2}$

34. $\dfrac{xy - 3x + 2y - 6}{xy + 5x + 2y + 10}$

Perform the Indicated Operations – Remember Order of Operations when Necessary

35. $\dfrac{3(x^2 - 4)}{28(x - 2)} \cdot \dfrac{14x}{11(x + 2)}$

36. $\dfrac{x^2 - x - 2}{(x + 3)} \cdot \dfrac{3x + 9}{(2x + 2)}$

6

37. $\dfrac{x^2 - 9x + 18}{(4x^2 - 9)} \cdot \dfrac{2x^2 - 5x - 12}{x^2 - 10x + 24}$

38. $\dfrac{x^2 + 4x - 5}{(4x^2 - 9)} \cdot \dfrac{2x^2 - 5x - 12}{x^2 + x - 20}$

39. $\dfrac{3x^2 - x}{(6x^2 + 15x)} \div \dfrac{6x^2 + x - 1}{2x^2 - 5x - 25}$

40. $\dfrac{x^2 - y^2}{(3x^2 + 3xy)} \div \dfrac{3x^2 - 2xy - y^2}{3x^2 + 6x}$

7

41. $\dfrac{3x+9}{x^2+7x+10} + \dfrac{14}{x^2+3x-10}$

42. $\dfrac{3x+3}{x^2+5x+4} - \dfrac{(x-3)}{x^2+x-12}$

43. $\dfrac{x-1}{2x^2+3x+1} + \dfrac{(x+1)}{2x^2-x-1}$

44. $\dfrac{5}{2x^3} - \dfrac{(3x-9)}{x^2-6x+9} + \dfrac{12x}{4x^2-12x}$

8

45. $\dfrac{2}{x} + \dfrac{x^2 - y^2}{4x + 4y} \cdot \dfrac{12x^2}{3y - 3x}$

46. $\left(\dfrac{x}{x^2 - 16} - \dfrac{2}{3x + 12} \right) \left(\dfrac{x - 4}{6} \right)$

Solve the Rational Equations, State Domain Restrictions

47. $\dfrac{2x + 3}{x - 1} - \dfrac{2}{x + 3} = \dfrac{5 - 6x}{x^2 + 2x - 3}$

48. $\dfrac{x}{x^2 + x - 2} + \dfrac{x}{x^2 - 1} = \dfrac{x}{x^2 + 3x + 2}$

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49. $\dfrac{x^2}{x^2 - x - 2} = \dfrac{2x}{x^2 + x - 6}$

50. $\dfrac{3 - 2x}{x + 1} - \dfrac{10}{x^2 - 1} = \dfrac{2x + 3}{1 - x}$

Section 4: Everything Quadratics

Graph the Following: Identify Vertex, Axis of Symmetry, Domain, Range, and Max/Min Value

51. $f(x) = 2(x - 1)^2 - 3$
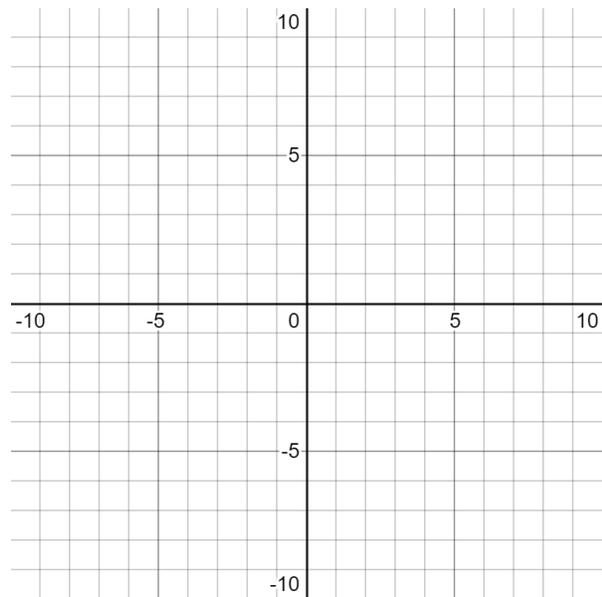
52. $f(x) = -2(x+1)^2 + 3$
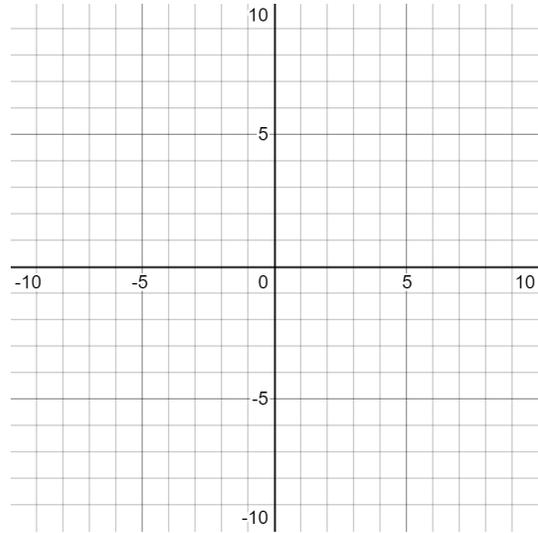
53. $f(x) = \frac{1}{4}(x-5)^2 - 6$
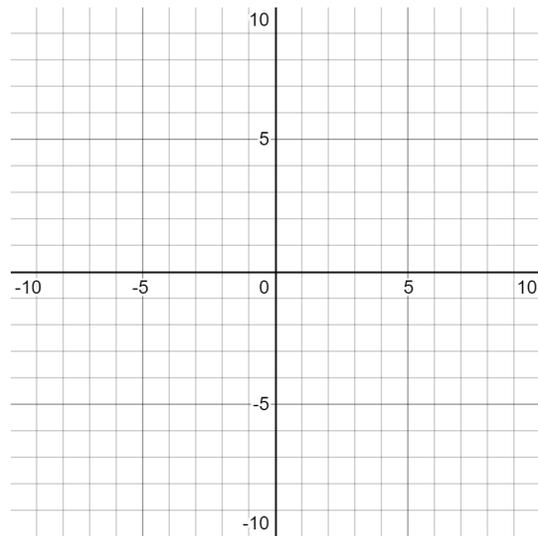
Complete the Square – Identify the Vertex

54. $f(x) = x^2 + 4x + 3$

55. $f(x) = -x^2 - 3x + 5$

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56. $f(x) = 3x^2 - 18x + 25$

57. $f(x) = -3x^2 + 5x - 3$

Factor using Basic and AC Method Techniques

58. $(x + 5)(x + 3) = 5x + 25$

59. $x(3x - 20) = -12$

60. $(4x - 5)(x - 5) = -45x$

61. $6x^2 - 5x - 4 = 0$

12

Factor Using the Square Root Method

62. $(x-2)^2 = -2$

63. $(x + \frac{2}{3})^2 = \frac{2}{9}$

Factor Using the Quadratic Equations $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

64. $x^2 = -4x - 1$

65. $(x-2)(x+4) = 2x(x-3)$

Graph the Following: Identify all Parameters including the x-intercepts and y-intercepts

66. $f(x) = x^2 - 4x + 5$

67. $f(x) = -2x^2 - 8x - 6$

14
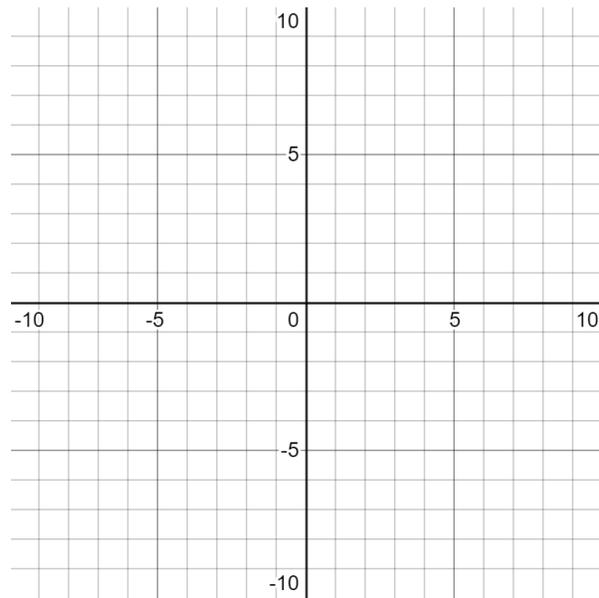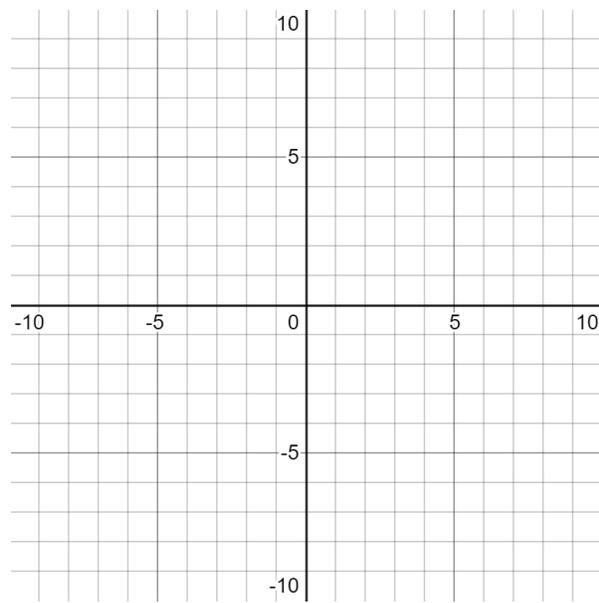
Section 7: Trigonometry

**What are the reference angles of the following degrees? Draw the Terminal Arm in Standard Position**

68. $113°$
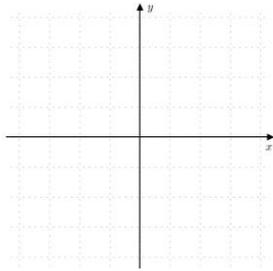
69. $304°$
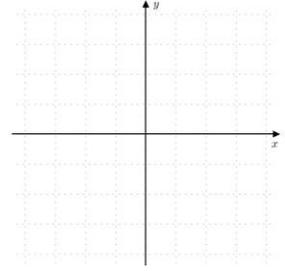
70. $832°$
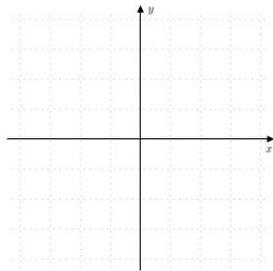
71. $-218°$
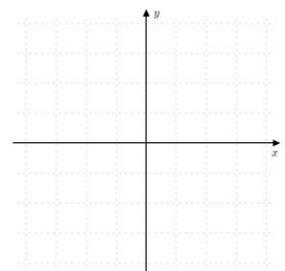
Determine the values of all three trigonometric ratios (sin, cos, tan) given the point provided is on the terminal arm at angle θ (Drawings can Help)

72. $(3, -4)$
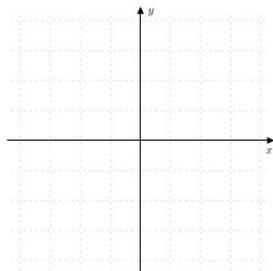
73. $(8, 15)$
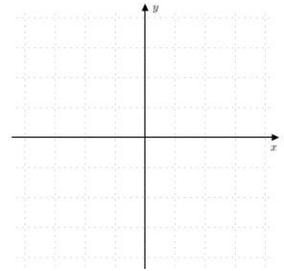
74. $\left(-2\sqrt{3}, 2\right)$

75. $(-7, -24)$

76. $(9, -40)$

77. $(-5, 5)$

16
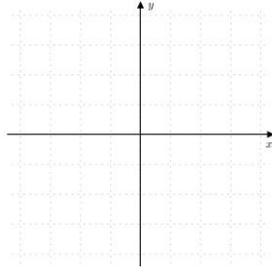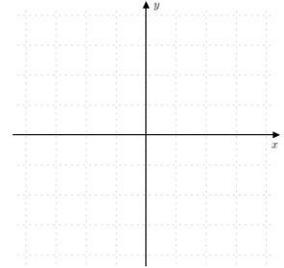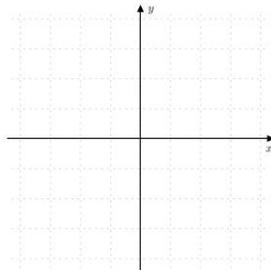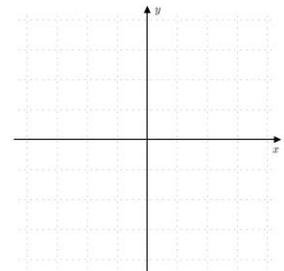
Find all θ, $0° \leq \theta \leq 360°$, that satisfy the following equations

78. $\sin \theta = 0$

79. $\sin \theta = -1$

80. $\cos \theta = 0$

81. $\tan \theta = 0$

82. $\sin \theta = \dfrac{\sqrt{3}}{2}$

83. $\cos \theta = -\dfrac{\sqrt{3}}{2}$

84. $\tan \theta = -\dfrac{1}{\sqrt{3}}$

85. $\cos \theta = -\dfrac{1}{\sqrt{2}}$

86. $\sin\theta = -\dfrac{1}{2}$

87. $\tan\theta = \sqrt{3}$

Solve using the Sine Law $(\#88-91)$**, Solve for all measures of the triangle** $(\#92-95)$

88. $\dfrac{\sin A}{10} = \dfrac{\sin 40°}{30}$

89. $\dfrac{\sin A}{200} = \dfrac{\sin 70°}{100}$

90. $\dfrac{\sin A}{10} = \dfrac{\sin 30°}{5}$

91. $\dfrac{40}{\sin A} = \dfrac{53}{\sin 57°}$

92. $\angle C = 27°, \angle B = 46°, a = 120$

93. $\angle C = 41°, c = 9, a = 9$

94. $\angle A = 74°, a = 7, b = 8.1$

95. $\angle B = 40°, b = 55, c = 80$

Solve the requested information Using the Cosine Law: $a^2 = b^2 + c^2 - 2bc(\cos A)$; (One of the forms)

96. $\angle A = 50°, b = 10, c = 15; Solve\ for\ a$

97. $a = 2, b = 3, c = 4; Solve\ for\ \angle C$

98. $a = 9, b = 14, c = 11; Solve\ for\ \angle B$

99. $x = 6, y = 7, z = 13\ Solve\ for\ \angle Z$

100. $\angle C = 60°, b = 4, a = 8; Solve\ for\ c$