<u>FINAL EXAM</u>   NAME:

_____

SHOW NECESSARY WORK ON THE TEST COPY
PLACE YOUR ANSWERS IN THE BLANKS PROVIDED
THERE ARE 150 POINTS POSSIBLE   Answers   (Points)

1. Solve each of the following.

1.

a) $-6x^3 + 3x^2 + 45x = 0$ (Begin by factoring.)   a) x = _____(5)

b) $(x - 3)^2 = 25$ (Apply the Square Root Property.)   b) x = _____(5)

c) $x^2 - 2x - 3 = 7$ c) x = _____(5)

d) $\sqrt{x+6} = x$ d) x = _____(6)

e) $x^4 - x^2 - 20 = 0$ e) x = _____(6)

f) $1 - \dfrac{4}{x+6} = \dfrac{4}{x}$ f) x = _____(6)

2. Simplify the following expressions:

a) $\sqrt[3]{-80x^9y^8}$

a) _____(3)

b) $\dfrac{6\sqrt{2}}{\sqrt{7}-2}$
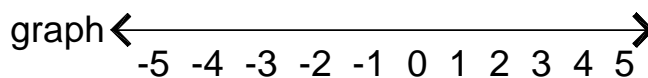
b) _____(3)

c) $\left(\dfrac{64x^{4/3}}{x^{-2/3}}\right)^{1/2}$

c) _____(3)

3. Solve the following inequality. Graph the solution set and write it in interval notation. [6 points]

$\dfrac{x-3}{x+2} \geq 0$

Interval notation _____

graph $\longleftrightarrow$
-5 -4 -3 -2 -1 0 1 2 3 4 5

4. Write answers in a + bi form.

4.

a) Multiply and simplify: (5 − 2i)(4 + 3i)

a)_____(3)

b) Divide and simplify: $\dfrac{6-9i}{3i}$

b)_____(3)

5. Given f(x) = $\dfrac{x-5}{3}$, find the inverse function, $f^{-1}(x)$

5. _____(5)

6. Find the center and radius of the circle, $x^2 + y^2 - 10x + 2y - 10 = 0$

center = _____

radius = _____

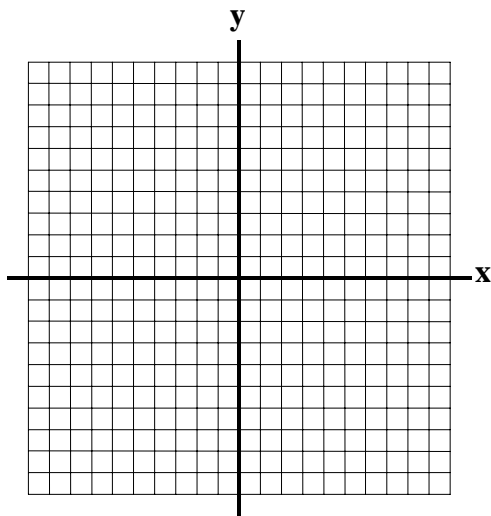7. Graph the parabola, $y = -x^2 + 4x - 3$. Also find:

a) the vertex.

b) the x-intercept(s), if any.

c) the y-intercept(s), if any.

a) vertex _____(2)

b) x-intercept(s)_____(2)

c) y-intercept(s)_____(1)

Graph. (2)

8. Identify each equation as that of either an ellipse, a parabola, a circle or a hyperbola. Then graph on the given grids.
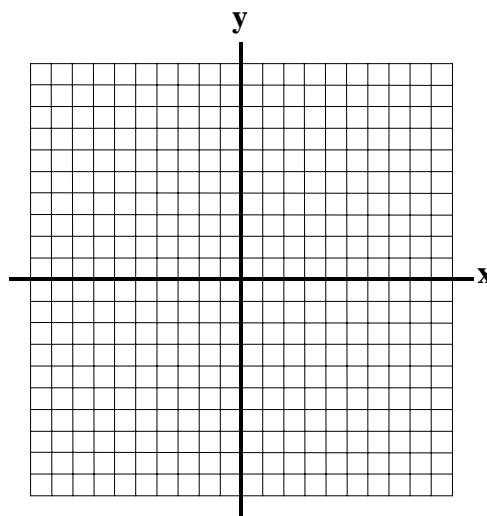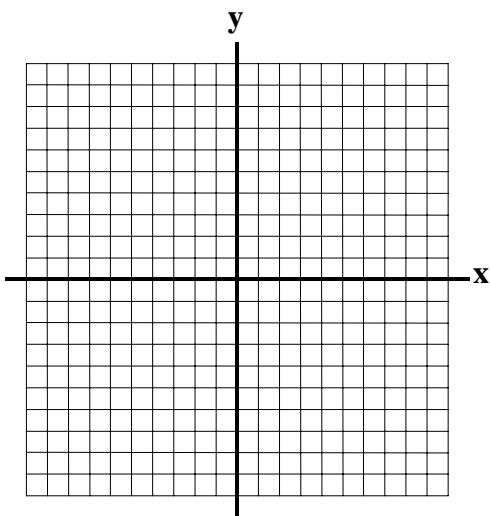
8.

a) $16x^2 + 36y^2 = 144$

a) type _____(1)

b) $x^2 - 9y^2 = 36$

b) type_____(1)

a) Graph. (4)

b) Graph. (4)

9. Solve.

9.

a) $\log_2(x + 2) + \log_2 x = 3$

a)_____(6)

b) $8^x = 90$ (Give the exact answer and an approximation accurate to three decimal places.)

b)

Exact_____(4)

Approx._____(1)

4

10. Write as an exponential equation: $\log_2 512 = 9$

11. Evaluate:

a) $8^{-2/3}$

b) $\log_5 125$

12. Simplify.

a) $\log_2 1 - \log_2 64$

b) $e^{\ln(2x+1)}$

13. Simplify:

a) $\dfrac{5}{x-3} - \dfrac{4}{x}$

b) $\dfrac{10x+20}{12y^4} \div \dfrac{x^2-4}{3xy-6y}$

c) $\dfrac{2 - \dfrac{6}{x}}{\dfrac{x}{9} - \dfrac{1}{x}}$

c)_____(5)

14. The foot of an 20-foot long ladder is placed 6 feet from the base of a vertical wall. How far up the wall will the ladder reach? Give the exact answer and an approximation accurate to one decimal place.

14.
Exact _____(4)

Approx. _____(1)

15. Suppose $4000 is invested into an account paying 2.4% interest compounded quarterly. How much will the

account be worth in 5 years? (Use $A = P(1 + \dfrac{r}{n})^{nt}$ where A = accrued amount, P = principal, r = annual interest rate, t = number of years and n = number of times compounded annually.)

15. _____(5)

16. Working together Sonya and Julia can paint a room in 4 hours. Working alone it would take Julia 12 hours to paint the room. How long would it take Sonya to paint the room alone?

16.
Equation_____(2)

Solution_____(4)

17. Solve the given system:

a) $x - 2y + 2z = 16$

    $5x + 4y - 4z = -18$

    $x - 4y + 3z = 26$

a)_____(7)

b) $x^2 + y^2 = 25$

    $2x + y = 5$

b)_____(7)