

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
 TURN IN ALL WORKSHEETS. CALCULATORS ARE REQUIRED ON THIS TEST.

1. Factor completely

a) $8x^3 + 27y^3$

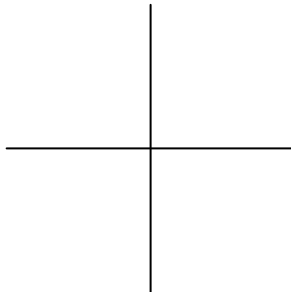
b) $(x^2 - 5x)^2 - 2(x^2 - 5x) - 24$

2. Express as a single fraction:

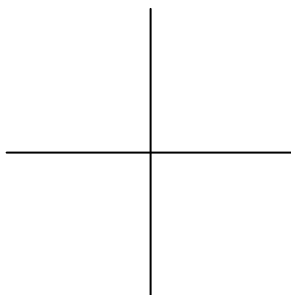
$$\frac{x}{x^2 + 4x + 4} - \frac{2}{x^2 - 4}$$

3. Find all roots and graph:

a) $y = x^3 - 12x^2$



b) $y = x^4 + 12x^3$



4. Use your calculator :

(Fractional form) (Decimal approx.)

a) $32^{-\frac{4}{5}}$

b) $\sqrt[5]{3} - \sqrt[3]{5}$

(Decimal approx.)

(Fractional form!)

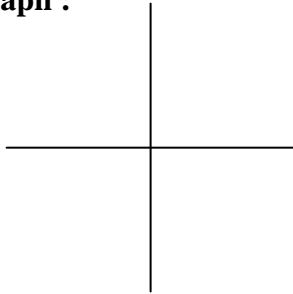
c) $\frac{\sqrt{2} + 14\sqrt{3}}{2\sqrt{3} - 3\sqrt{2}}$

d) $\frac{3 - 5i}{7 + 6i}$

5. Find the equation of the perpendicular bisector of the line segment between $(-8, 3)$ and $(2, -1)$.
 (Give answer in $y = mx + b$ form.)

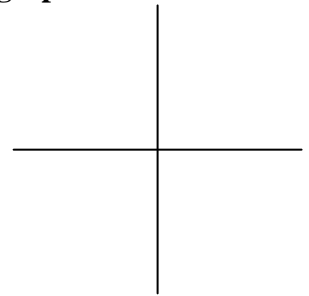
6. Find the vertex and graph :

$$x = -y^2 + 6y - 2$$



7. Find the center, radius, and graph :

$$x^2 + y^2 + 4x - 10y - 7 = 0$$



8. Use your calculator to find all roots. Verify by synthetic division.

Give irrational roots in radical form:

$$x^4 - 12x^3 + 37x^2 - 50 = 0$$

9. $f(x) = \frac{x-4}{5x}$ and $g(x) = x^2 - 3x$

a) $f[g(x)] =$

b) $g[f(x)] =$

10. Solve.

Sketch graph (give all roots!).

a) $|x + 8| \geq 5$ (Give interval notation)

b) $(x + 4)^4 (x - 2)^2 (x + 5) = 0$

11a) $\log_5 100 =$ _____ b) $\ln 0 =$ _____

c) $\log_b \frac{1}{b^2} =$ _____ d) $\ln e^{5x} =$ _____

12. Solve for x (use logarithms!): $4^{(3x-2)} = 5^x$

13. A population grows from 4,500 in 1998 to 7,500 in 2002. If $y = y_0 e^{kt}$, find “k” and estimate the population in 2008.

When will the population reach 20,000?