

### PreCalculus Readiness Test

Please do the following problems. If necessary, use your notes or sample problems found on the internet to help answer them.

This is due the first week of PreCalculus Honors and it is expected you will make a valiant effort at solving these problems

Do not use a calculator

1.  $\left(\frac{8x^{-4}y^2}{-2x^2y^{-5}}\right)^{-3}$

2.  $\frac{x^{-3}y^4}{-2^{-2}x^5y} \cdot \left(\frac{3y^{-2}}{x^4}\right)^{-2}$

3.  $2 \cdot 9^{-\frac{3}{2}}$

4.  $(2^{\frac{1}{2}}x^{\frac{1}{4}}y^{\frac{2}{3}})^2 \cdot \left(4^{-2}x^{\frac{-4}{3}}y^2\right)^{\frac{1}{4}}$

5.  $\frac{\left(-8x^{\frac{3}{2}}\right)^{-\frac{1}{3}}}{\left(16x^{-\frac{1}{2}}\right)^{\frac{3}{2}}}$

**Factor Completely**

6.  $2x^3 + 8x^2 + 5x + 20$

7.  $a^4b^5 - a^2b^9$

8.  $25x^2 - 100y^2$

9.  $x^2 + 2xy - 8y^2$

10.  $6x^2 + 25x + 14$

11.  $27x^3 + 125y^9$

**Simplify. Assume all variables are positive**

$$12. \frac{3\sqrt{60x^6y^9}}{\sqrt{5xy^3}}$$

$$13. \frac{\sqrt[3]{12a^5b^2}}{\sqrt[3]{16a^3b^4}}$$

$$14. \frac{3\sqrt{2} + \sqrt{2}}{4 - \sqrt{6}}$$

**Perform the indicated operation**

$$15. \frac{3}{x+6} - \frac{4x}{x^2-36} - \frac{2}{6-x}$$

$$16. \frac{16x^4 - y^4}{8x^3 + 64} \div \frac{4x^2 - y^2}{8x^3 - 16x^2 + 32x}$$

$$17. \frac{1 - \frac{y^2}{x^2}}{1 + \frac{y}{x}}$$

$$18. -4i(3 + 4i)^2$$

$$19. (-6i^4)(2i^3)(-3i^4)$$

$$20. \frac{3 + \sqrt{-27}}{6}$$

$$21. \frac{2 + 3i}{1 - 4i}$$

**Solve the following quadratic equations by factoring:**

$$22. 4x^2 + 4x - 15 = 0$$

$$23. 2x^2 - 8x = 0$$

$$24. 16x^2 - 49 = 0$$

**25. Solve the quadratic equation by taking square roots:**

$$-4x^2 - 80 = 0$$

**Solve the following quadratic equations using the quadratic formula:**

**26.**  $x^2 - 6x = 20$

**27.**  $2x^2 + 8x - 8 = 0$

**For the following equations, find the discriminant and the number and types of solutions.**

**28.**  $3x^2 - 3x + 9 = 0$

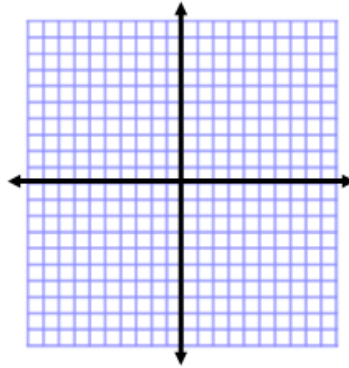
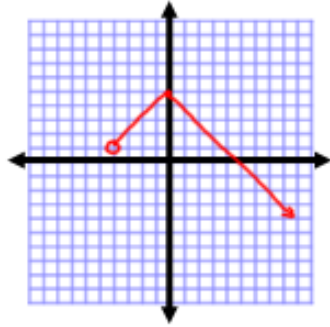
**29.**  $5x^2 - 10x = 6$

**30. Solve the following quadratic equation by COMPLETING THE SQUARE:**

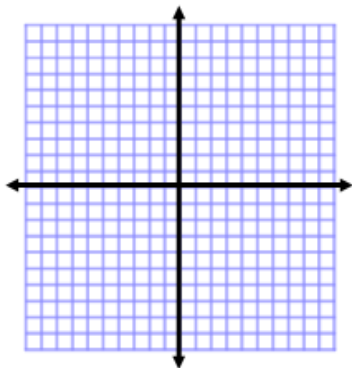
$$2x^2 + 12x - 14 = 0$$

State the domain and range  
31.

32.

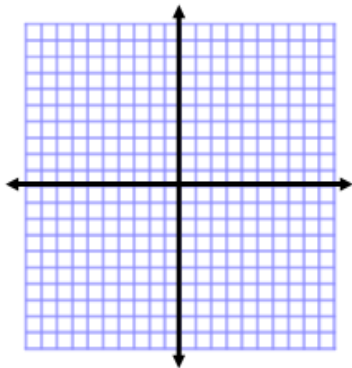


33. Put the following in vertex/transformation form then state the vertex, axis, x and y -intercepts, domain, range and graph:  $y = -x^2 + 6x - 5$

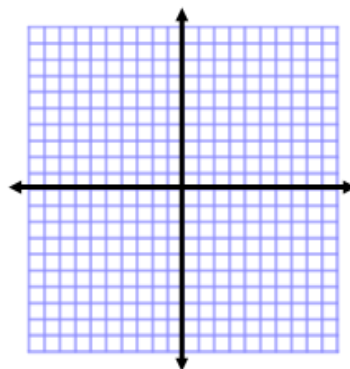


For each of the following, list your transformations, dot in the parent function and sketch the graph.

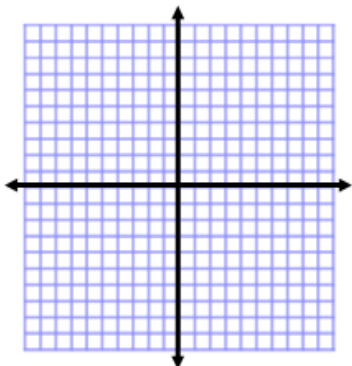
34.  $y = -\frac{1}{2}\sqrt{x-4}$



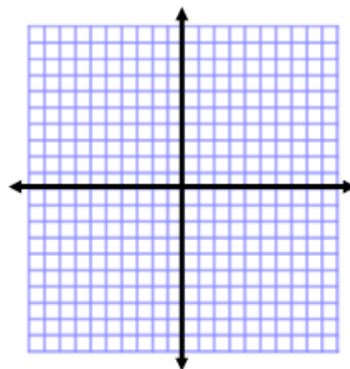
35.  $y = 3\sqrt[3]{x} + 4$



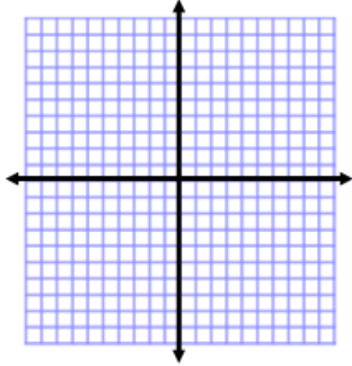
36.  $y = \frac{1}{x+2} + 3$



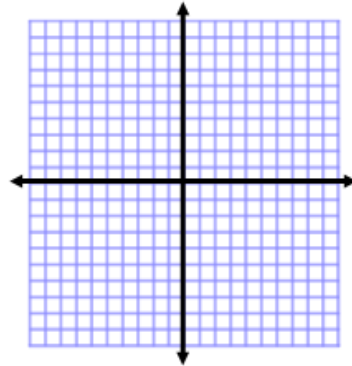
37.  $f(x) = -2(x+3)^2 + 5$



38.  $f(x) = -|x-4|-6$



39.  $f(x) = \frac{1}{3}(x+4)^3$



40.  $\frac{x}{x-1} - \frac{2}{1-x^2} = \frac{8}{x+1}$

41. An object is launched directly upward at 110 feet per second (ft/s) from a platform 75 feet high.

a. When will the object be 120 feet high?

b. What is its maximum height?

c. When will it reach the ground?



42. You have a patch of grass that is 20 feet by 26 feet in your backyard. The landscaper builds a sidewalk of uniform width around the garden. If he used enough cement to cover 371 sq. ft, how wide is the sidewalk?

Use the two functions below to answer questions 43 – 47 and find the domains for numbers 43, 45 & 46.

$$f(x) = -2x + 3 \text{ and } g(x) = \sqrt{x+2}$$

43.  $(f \circ g)(x)$

44.  $(g \circ f)(7)$

45.  $(f - g)(x)$

46.  $\left(\frac{f}{g}\right)(x)$

47.  $(fg)(2)$

48.  $(f + g)(-1)$

**Simplify**

49.  $\frac{3}{x-1} + \frac{x-2}{x+4}$

**Solve**

50.  $2x + y = 10 \quad 2y = 4x - y$