

Exam 2 Practice Show-Your-Work Problems

SHOW YOUR WORK

For this portion of the exam you will be graded on the work that you show to solve the problem. If you do not show any work, you will not be given any credit. If you use your calculator for any part of a problem, you must write down your steps/graphs and how you arrived at your answer based on this information.

Here are several problems that may be similar to what will appear on the handwritten, show-your-work portion of the first exam. You should attempt to write out complete solutions to these problems a separate piece of paper.

Factor completely.

1.) $4x^3 - 26x^2$

3.) $x^2 + 16x + 64$

5.) $x^3 - 4x$

2.) $x^2 + x - 12$

4.) $9x^2 - 6x + 1$

6.) $9x^4 - 18x^3 + 27x^2$

Factor by grouping

7.) $x^3 - 2x^2 + 5x - 10$

8.) $3x^3 - 2x^2 - 6x + 4$

Add, subtract, multiply, or divide the following complex numbers. Be sure to write your answers in the standard form $a + bi$.

9.) $(7 + 2i) + (1 - 4i)$

13.) $(7 - \sqrt{-10})^2$

15.) $\frac{2+3i}{4-5i}$

10.) $(-2 + 6i) - (3 - 7i)$

11.) $-3i(7i - 5)$

14.) $\frac{8i}{4-3i}$

12.) $(-5 + 4i)(3 + i)$

Solve each equation by factoring.

16.) $x^2 - 3x - 10 = 0$

17.) $3x^2 + 12x = 0$

Solve each equation by completing the square.

18.) $x^2 - 2x + 2 = 0$

19.) $x^2 + 6x = 5$

Solve each equation by using the quadratic formula.

20.) $x^2 - 6x + 10 = 0$

21.) $3x^2 = 6x - 1$

Solve each radical equation.

22.) $1 + \sqrt{6x + 1} = x$

23.) $\sqrt{x - 4} + \sqrt{x + 1} = 5$

Solve each equation with rational exponents.

24.) $3x^{4/3} - 24 = 0$

25.) $(x - 7)^{2/3} = 25$

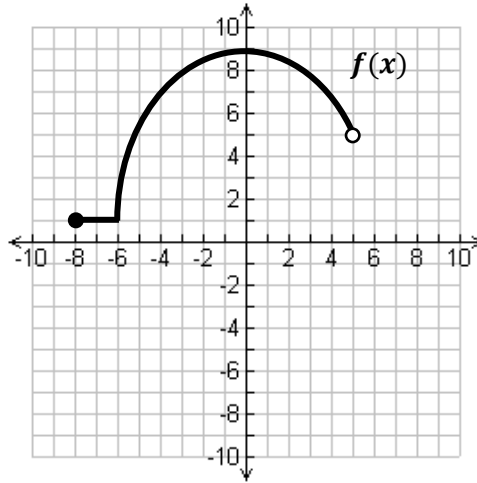
Use the graph of $f(x)$ to answer the following questions:

26.) What is the domain of $f(x)$?

27.) What is the range of $f(x)$?

28.) Find $f(-6)$.

29.) Find $f(0)$.



Use the function $f(x) = \frac{-x^2+1}{5x}$ to evaluate at the given values of x .

30.) Find $f(3)$.

31.) Find $f(-4)$

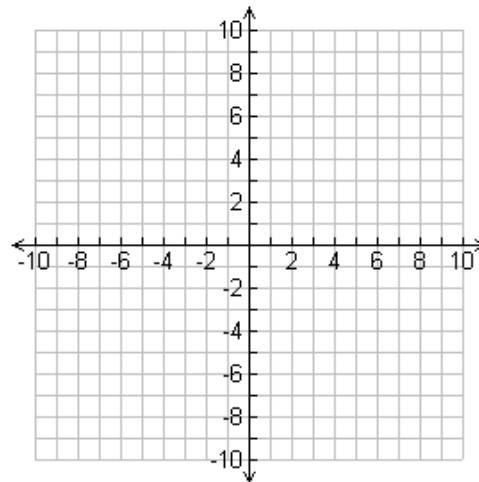
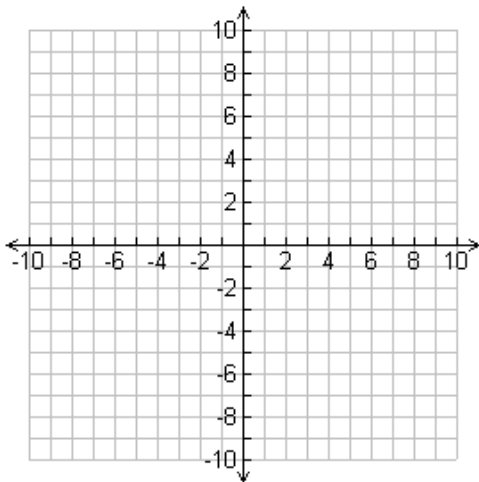
32.) Find $f(-x)$

33.) Find $f(x + 2)$

Graph the following quadratic functions. Be sure to label the vertex, any x -intercepts and y -intercepts, and the axis of symmetry.

34.) $f(x) = 4 - (x - 1)^2$

35.) $f(x) = x^2 - 2x - 3$



Find the distance and the midpoint of the line segment with the following pairs of endpoints:

36.) $(6, 8)$ and $(2, 4)$

37.) $(-\frac{7}{2}, \frac{3}{2})$ and $(-\frac{5}{2}, -\frac{11}{2})$

38.) Write the standard form of a circle with a center $(-2, 0)$ and a radius of $\sqrt{3}$

Write the equation of the circle in standard form. Then identify the center and the radius of the circle.

39.) $x^2 + y^2 - 10x - 6y - 30 = 0$

40.) $x^2 + y^2 - 5y - 4 = 0$

Solve the following story problems.

- 41.) You are choosing between two cellphone plans. Data Plan A has a monthly fee of \$52 with a charge of \$18 per gigabyte (GB). Data Plan B has a monthly fee of \$32 with a charge of \$22 per GB. For how many GB of data will the costs for the two data plans be the same?
- 42.) After a 20% price reduction, a cordless phone sold for \$48. What was the phone's price before the reduction?
- 43.) A sales person earns \$300 per week plus 5% commission of sales. How much must be sold to earn \$800 in a week?
- 44.) One possible reason for the explosion of college tuition involves the decrease in government aid per student. In 2001, higher-education revenues per student averaged \$8,500. The bar graph shows government aid per U.S. college student from 2005 through 2012. (All figures are adjusted for inflation and expressed in 2012 dollars.)

The mathematical model

$$G = -82x^2 + 410x + 7100$$

Describes government aid per college student, G , x years after 2005.

- a) Does the model underestimate or overestimate aid per student in 2011? By how much?
- b) If we project the model past 2012, determine in which year government aid per student decreased to \$4100.

