

Final Exam Review

Simplify. Your answer should contain only positive exponents.

$$1) \left(\frac{2x^{-4}b^0}{a^0b^3} \right)^2$$

Describe the end behavior of each function.

$$3) f(x) = -x^2 + 4x - 1$$

Evaluate each function at the given value using synthetic substitution.

$$2) f(n) = n^4 - 2n^3 - 10n^2 + 4n + 9 \text{ at } n = 4$$

$$4) f(x) = x^3 + 10x^2 + 32x + 36$$

Factor each completely by grouping.

$$5) 42a^3 + 24a^2 - 49a - 28$$

$$6) 8k^3 - 7k^2 - 32k + 28$$

Divide using polynomial long division.

$$7) (b^3 + 2b^2 - 14b + 60) \div (b + 6)$$

Divide using synthetic division.

$$8) (x^4 + 17x^3 + 54x^2 - 75x - 18) \div (x + 6)$$

Given a polynomial $f(x)$ and a factor of $f(x)$, factor $f(x)$ completely.

$$9) f(x) = 3x^3 - 13x^2 - 11x + 5; \quad x - 5$$

Write each expression in exponential form.

$$10) \frac{1}{\sqrt[3]{5v}}$$

Write each expression in radical form.

11) $(5x)^{-\frac{3}{4}}$

Solve the equation. Round your answer to two decimal places when appropriate.

12) $x^5 = -243$

13) $(x + 2)^4 + 100 = 1396$

Let $f(x) = x^2 + 5x$, $g(x) = -3x - 7$ and $h(x) = 6x - 1$. Perform the indicated operation.

14) Find $g(x) + h(x)$

15) Find $g(x) \cdot h(x)$

16) Find $g(f(-4))$

17) Find $f(g(x))$

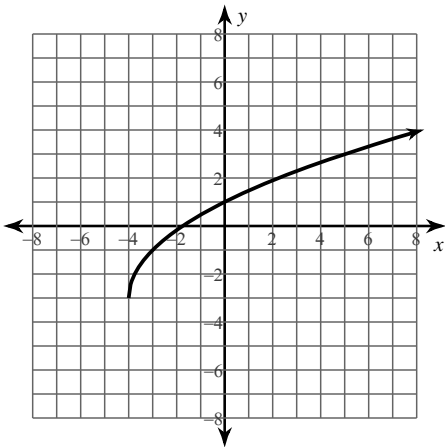
Find the inverse of the function.

18) $f(x) = \frac{2x^2 - 3}{2}$

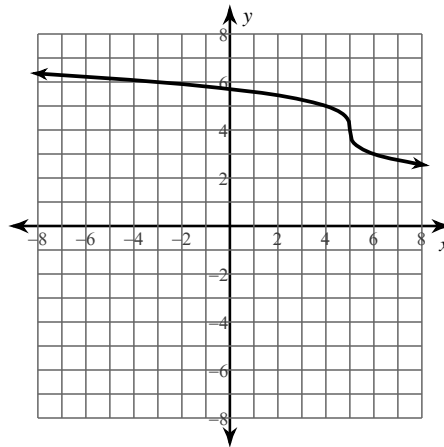
19) $f(x) = (x - 6)^2 + 9$

Find the equation of the graph.

20)



21)



Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

22) $\left(\frac{n^{-1} m^{-1}}{m^{\frac{3}{2}} n^{\frac{1}{4}} \cdot m^{\frac{2}{3}} n^0} \right)^{\frac{1}{2}}$

23) $\left(\frac{y^{\frac{3}{2}}}{xy^0 \cdot yx^0} \right)^{\frac{1}{3}}$

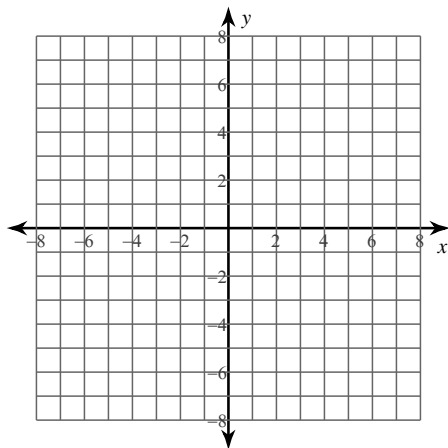
Simplify.

24) $\sqrt[3]{162k^3}$

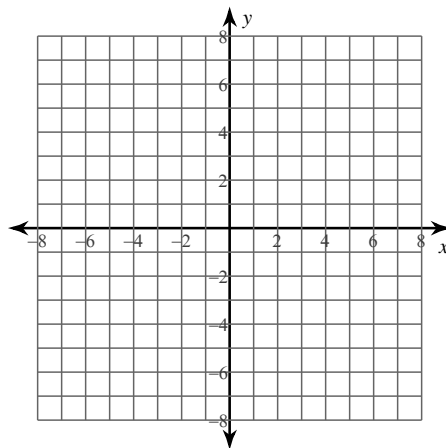
25) $\sqrt[3]{81x^4}$

Sketch the graph of each function.

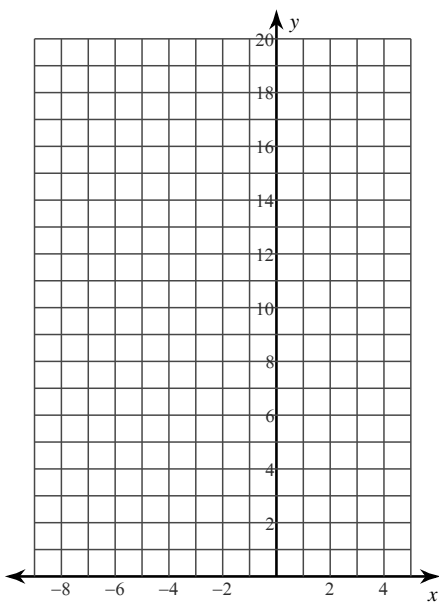
26) $y = \sqrt{x+4} - 2$



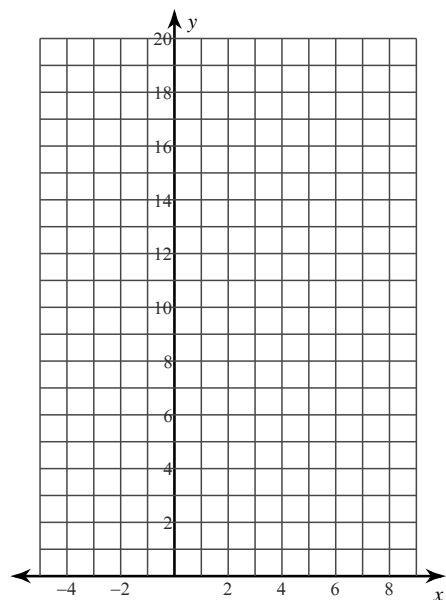
27) $y = \sqrt[3]{x+1} + 3$



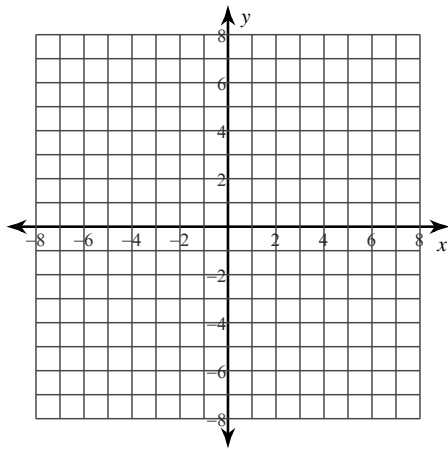
28) $y = 5 \cdot 2^{x+2} + 2$



29) $y = 4 \cdot \left(\frac{1}{2}\right)^{x-2} + 1$

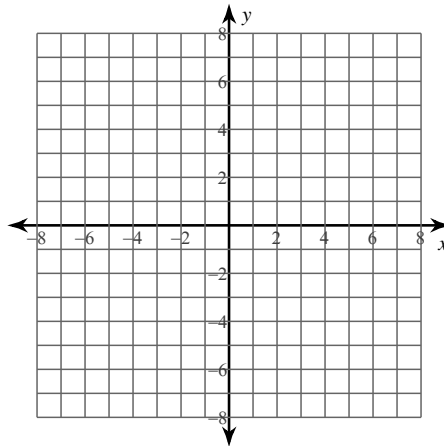


30) $y = \log_2 (x + 4) + 5$



Sketch the graph of each function by making a table of values.

31) $f(x) = x^3 - 3x^2$



Solve each equation. Remember to check for extraneous solutions.

32) $-2 + \sqrt{k-7} = -1$

33) $\sqrt{2x-16} = x-8$

34) $-8 = -10 + \sqrt[3]{2x+9}$

35) $\frac{1}{2n} = \frac{1}{6} - \frac{1}{6n}$

36) $\frac{5k+15}{k^2-5k} + \frac{1}{k^2-5k} = \frac{1}{k}$

37) $(7m+1)^{\frac{4}{3}} = 16$

Rewrite each equation in exponential form.

38) $\log_2 16 = 4$

Rewrite each equation in logarithmic form.

39) $7^{-3} = \frac{1}{343}$

Evaluate each expression.

40) $\log_2 64$

41) $\log_3 \frac{1}{3}$

Expand each logarithm.

42) $\log_5 (xy^4)^4$

Condense each expression to a single logarithm.

43) $5 \ln x - 4 \ln y$

Solve each equation. Round your answers to the nearest ten-thousandth.

44) $12^{-4n} + 8 = 108$

45) $-10 \cdot 9^{k+6} + 10 = -57$

Identify the vertical asymptotes and horizontal asymptote of each.

46) $f(x) = \frac{x^2 + x - 2}{-4x^2 + 4}$

Identify the x-intercepts and y-intercept of each.

47) $f(x) = \frac{3x - 3}{x^2 + 3x - 4}$

Simplify each and state the excluded values.

48) $\frac{n^2 - n - 72}{5n - 45}$

Simplify each expression.

49) $\frac{2a - 8}{a^2 - 18a + 81} \cdot \frac{a^2 - 10a + 9}{a^2 - 5a + 4}$

50) $\frac{v - 3}{7v - 21} \div \frac{1}{v - 10}$

51) $\frac{2}{5x} + \frac{2x}{2x - 4}$

52) $\frac{x - 3}{x^2 + 5x + 4} - \frac{6x + 4}{x^2 + 5x + 4}$

53) $\frac{\frac{1}{2} + \frac{u}{9}}{\frac{4}{u}}$

54) $(2r^4 - 7r^2 - 5r) + (2r^2 + 5r^3 - 5r^4)$

Use the information provided to write the transformational form equation of each parabola.

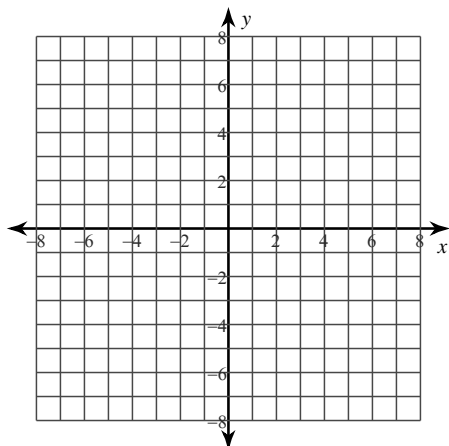
55) Vertex: $(1, -10)$, Focus: $\left(\frac{9}{8}, -10\right)$

Use the information provided to write the standard form equation of each circle.

56) Center: $(1, 14)$
Radius: 2

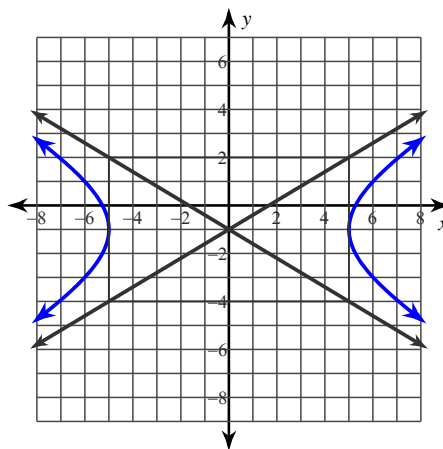
Graph each equation.

$$57) \frac{(x-3)^2}{16} + (y-5)^2 = 1$$



Use the information provided to write the standard form equation of each hyperbola.

58)



Classify each conic section and write its equation in standard form.

$$59) x^2 + y^2 + 2x - 2y - 23 = 0$$

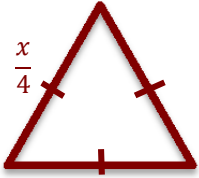
$$60) -4x^2 + 25y^2 + 50y - 75 = 0$$

Semester 2 Final Exam Review

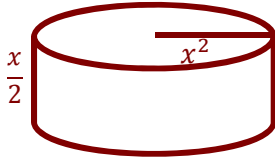
UNIT 7

1) Write an expression for the figure's area or volume in terms of x .

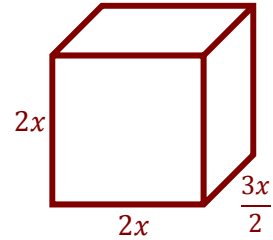
a. $A = \frac{\sqrt{3}}{4}s^2$



b. $V = \pi r^2 h$



c. $V = lwh$



UNIT 8

2) Brust and Bean are battling for superiority at RHS. They want to see who will have more students in their class by the end of the year. Brust models his function with $f(m) = m + 120$, where $f(m)$ the number of students after m , months. Bean (who's a bit more exact) models his function with $g(m) = \sqrt{4m - 24} + 125$.

a) How many students will Brust have after 6 months?

b) How many students will Bean have after 6 months?

c) When will the two teachers have the same amount of students?

UNIT 9

3) During the summer, Sullivan left his 2-foot bathing pool out over the weekend and it attracted a swarm of mosquitos. On Monday morning, there were 150 mosquitos. The mosquito population increases by 20% every day.

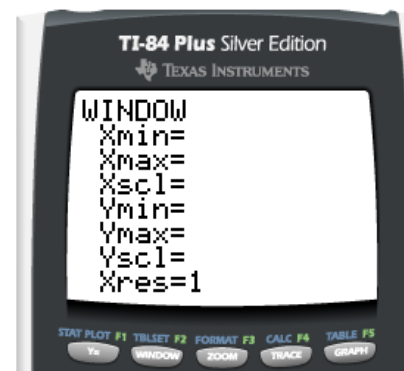
- Write an exponential growth model that represents the mosquito population in Sully's backyard. Let the dependent variable be M (for number of mosquitos) and the independent variable be d (for number of days since Monday).
- Use your model to determine how long it will take for there to be 1000 mosquitos.

UNIT 10

4) Mr. Kelly writes a best-selling autobiography titled "Algebroments: Simplifying Life's Greatest Problems". The cost in dollars of publishing x copies of the book is modeled by the function $C(x) = 30,000 + 10x + 0.0001x^2$. The publishing company creates a function to determine the average cost for each book produced which is given by:

$$\bar{C}(x) = \frac{30,000 + 10x + 0.0001x^2}{x}$$

- Graph on your calculator with a friendly window. Fill in in the window.
- Find $\bar{C}(12,000)$. What does this mean?
- What does $\bar{C}(x) = 12$ mean? Find it.
- How many books should they publish to minimize their cost?



UNIT 11

5) While on a camping trip, Brust goes on a "Snipe Hunt" at night. While running through the woods, he drops and breaks his flashlight. While putting it back together, he sees the light is 1 cm from the base of the parabolic mirror. If the mirror is 7 cm wide, how deep is the flashlight's mirror?