

Answers to Final Exam Review

1) $\frac{4}{x^8 b^6}$

2) -7

3) $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$
 $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$

4) $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$
 $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$

5) $(6a^2 - 7)(7a + 4)$

6) $(k - 2)(k + 2)(8k - 7)$

7) $b^2 - 4b + 10$

8) $x^3 + 11x^2 - 12x - 3$

9) Factors to: $f(x) = (x + 1)(3x - 1)(x - 5)$

Zeros: $\left\{-1, \frac{1}{3}, 5\right\}$

10) $(5v)^{-\frac{1}{3}}$

11) $\frac{1}{(\sqrt[4]{5x})^3}$

12) -3

13) 4 or -8

14) $3x - 8$

15) $-18x^2 - 39x + 7$

16) 5

17) $9x^2 + 27x + 14$

18) $\sqrt{x + \frac{3}{2}}$ and $-\sqrt{x + \frac{3}{2}}$

19) $x^2 - 12x + 45$

20) $\sqrt{x + 4} - 3$

21) $-\sqrt[3]{x - 5} + 4$

22) $\frac{m^{\frac{5}{12}} n^{\frac{3}{8}}}{m^2 n}$

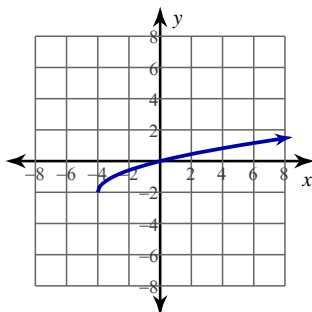
23) $\frac{y^{\frac{1}{6}} x^{\frac{2}{3}}}{x}$

24) $3k\sqrt[3]{6}$

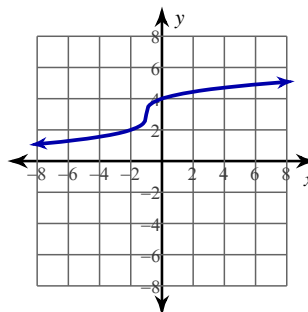
25) $3x\sqrt[3]{3x}$

26)

27)

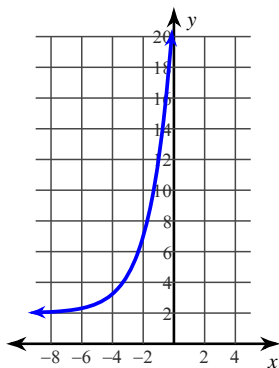


29)

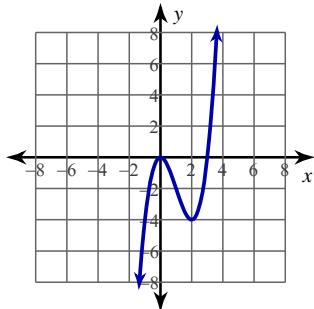


30)

28)



31)



34) $\{-4\}$

35) $\{4\}$

36) $\left\{-\frac{21}{4}\right\}$

37) $\left\{1, -\frac{9}{7}\right\}$

38) $2^4 = 16$

39) $\log_7 \frac{1}{343} = -3$

40) 6

41) -1

32) $\{8\}$

33) $\{10, 8\}$

42) $4\log_5 x + 16\log_5 y$

43) $\ln \frac{x^5}{y^4}$

44) -0.4633

45) -5.1343

46) Vertical Asym.: $x = -1$

47) X-intercepts: None

48) $\frac{n+8}{5}; \{9\}$

Horz. Asym.: $y = -\frac{1}{4}$

49) $\frac{2}{a-9}$

50) $\frac{v-10}{7}$

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

52) $\frac{-5x-7}{x^2+5x+4}$

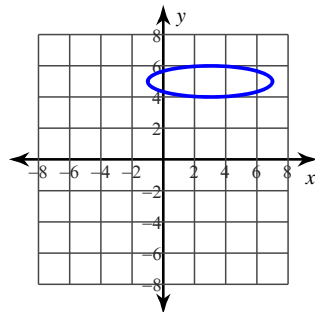
53) $\frac{9u+2u^2}{72}$

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

55) $\frac{1}{2}(x-1) = (y+10)^2$

56) $(x-1)^2 + (y-14)^2 = 4$

57)



58) $\frac{x^2}{25} - \frac{(y+1)^2}{9} = 1$

59) Circle

$(x+1)^2 + (y-1)^2 = 25$

60) Hyperbola

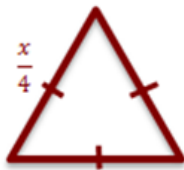
$\frac{(y+1)^2}{4} - \frac{x^2}{25} = 1$

Semester 2 Final Exam Review

UNIT 7

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

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

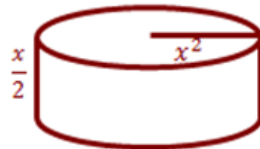


$$A = \frac{\sqrt{3}}{4} \left(\frac{x}{4}\right)^2$$

$$A = \frac{\sqrt{3}}{4} \left(\frac{x^2}{16}\right)$$

$$A = \frac{\sqrt{3}}{64} x^2$$

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

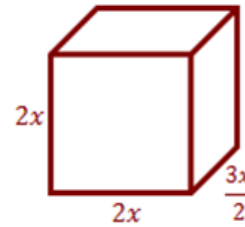


$$V = \pi (x^2)^2 \left(\frac{x}{2}\right)$$

$$V = \pi x^4 \frac{x}{2}$$

$$V = \pi \frac{x^5}{2}$$

c. $V = lwh$



$$V = (2x)(2x)\left(\frac{3x}{2}\right)$$

$$V = 6x^3$$

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? (2 points)

$$f(6) = 6 + 120$$

$$f(6) = 126 \text{ students}$$

b) How many students will Bean have after 6 months? (2 points)

$$g(6) = \sqrt{4(6) - 24} + 125$$

$$g(6) = \sqrt{0} + 125$$

$$g(6) = 125 \text{ students}$$

c) When will the two teachers have the same amount of students? (4 points)

$$m + 120 = \sqrt{4m - 24} + 125$$

$$m - 5 = \sqrt{4m - 24}$$

$$(m - 5)^2 = 4m - 24$$

$$m^2 - 10m + 25 = 4m - 24$$

$$m^2 - 14m + 49 = 0$$

$$(m - 7)^2 = 0$$

$$m - 7 = 0$$

$$m = 7 \text{ months}$$

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.

a) 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).

$$M = 150(1.2)^d$$

b) Use your model to determine how long it will take for there to be 1000 mosquitos.

$$1000 = 150(1.2)^d$$

$$\frac{20}{3} = 1.2^d$$

$$\log_{1.2}\left(\frac{20}{3}\right) = \log_{1.2} 1.2^d$$

$$\frac{\log\left(\frac{20}{3}\right)}{\log 1.2} = d$$

10.4 days

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:

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

a) Graph on your calculator with a friendly window. Fill in the window.

b) Find $\bar{C}(12,000)$. What does this mean?

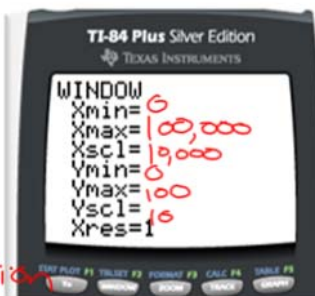
\$13.70 is the average cost to produce 12,000 books.

c) What does $\bar{C}(x) = 12$ mean? Find it.

When is the average cost \$12. It does not happen. Graph $\frac{1}{2} = 12$. No intersection.

d) How many books should they publish to minimize their cost?

17,320 books



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?

$$x^2 = 4py$$

$$(3.5)^2 = 4(1)y$$

$$12.25 = 4y$$

3.06 cm deep

