

General Algebraic Concepts

1. $f(x) = -\frac{6}{5}x - \frac{13}{5}$

2. $y = -\frac{1}{2}x + \frac{7}{2}$

3. $\frac{\Delta x}{\Delta t} = -\frac{5}{3}$

4. \$0.05 per message

5. $ROC_B < ROC_C < ROC_A$

6. 13

7. $\frac{1}{\sqrt{4+h}+2}$.

8. $\frac{317}{24}$

9. $g^{-1}(x) = \frac{3x}{1-x}$

10. One possibility: $f(x) = 8 + \sqrt{x}$ and $g(x) = 4 - 3x$

11. $(-1, -2)$ and $(5, 4)$

12. $3x^3 + 192 \Rightarrow 3(x+4)(x^2 - 4x + 16)$

$$2x^3 - 11x^2 + 12x + 9 \Rightarrow (x-3)^2(2x+1)$$

$$2x^{5/4} + x^{3/4} - 15x^{1/4} \Rightarrow x^{1/4}(2x^{1/2} - 5)(x^{1/2} + 3)$$

$$x(1-2x)^{-3/2} + (1-2x)^{-1/2} \Rightarrow (1-2x)^{-3/2}(1-x) \Rightarrow \frac{1-x}{(1-2x)^{3/2}}$$

$$12. \left(\frac{2}{x}-3\right) \div \left(1-\frac{1}{x-1}\right) \Rightarrow \frac{(2-3x)(x-1)}{x(x-2)}$$

$$13. \ln \frac{(x+2)\sqrt{x-3}}{x^6}$$

$$14. e^{(\ln 4)x}$$

$$15. 2 \sin(x) \cos(x)$$

$$16. 1$$

$$17. \frac{1}{2} + \frac{1}{2} \cos 2x$$

$$18. 13$$

$$19. \frac{128}{3}$$

$$20. \sin\left(\frac{7\pi}{6}\right) = -\frac{1}{2}$$

$$\cos(120^\circ) = -\frac{1}{2}$$

$$\tan\left(\frac{\pi}{2}\right) \text{ is undefined}$$

$$\csc(60^\circ) = \frac{2}{\sqrt{3}}$$

$$\sec\left(-\frac{2\pi}{3}\right) = -2$$

$$\cot(-135^\circ) = 1$$

Equations and Inequalities

$$21. \quad \frac{3}{7}(x+5) - 2x = 13 - \frac{4x}{3} \Rightarrow x = -\frac{228}{5}$$

$$3x^2 + 2x = 6 \Rightarrow x = -\frac{1}{3} \pm \frac{\sqrt{19}}{3}$$

$$x^3 - x^2 - 8x + 12 = 0 \Rightarrow x = -3, 2$$

$$4e^{2x} = 5 \Rightarrow x = \frac{1}{2} \ln\left(\frac{5}{4}\right)$$

$$\ln(3x)^2 = 16 \Rightarrow x = \pm \frac{1}{3} e^8$$

$$3\sqrt{x-2} - 8 = 8 \Rightarrow x = \frac{274}{9}$$

$$(x-4) - 5(x-4)^{1/2} = 6 \Rightarrow x = 40$$

$$\cos(3x) = 0 \Rightarrow x = \frac{\pi}{6}(1+2k)$$

$$2\sin^2 x = \sin x + 1 \Rightarrow x = \frac{\pi}{2} + 2\pi k, \frac{7\pi}{6} + 2\pi k, \frac{11\pi}{6} + 2\pi k$$

$$\frac{3}{x-1} - \frac{8}{9} = \frac{1}{x+5} \Rightarrow x = -\frac{23}{4}, 4$$

$$|6-7x| = x+4 \Rightarrow x = \frac{1}{4}, \frac{5}{3}$$

22. $x^2 > 2x + 8 \Rightarrow (-\infty, -2) \cup (4, \infty)$

$$\left| 2 - \frac{x}{3} \right| < 5 \Rightarrow (-9, 21)$$

$$\frac{x-5}{3-x} \geq 0 \Rightarrow (3, 5]$$

$$\sin x < \cos x \text{ on the interval } [0, 2\pi] \Rightarrow \left[0, \frac{\pi}{4} \right) \cup \left(\frac{5\pi}{4}, 2\pi \right]$$

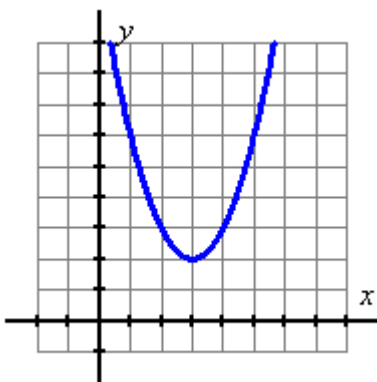
Coordinate Geometry

23.

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

D: $(-\infty, \infty)$

R: $[2, \infty)$

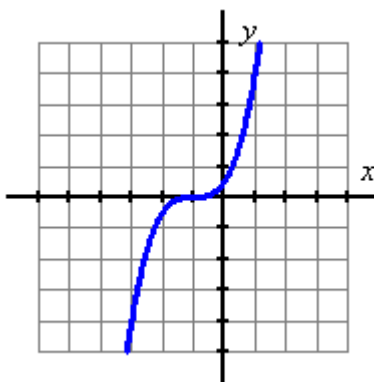


$$[-2, 8] \times [-1, 9]$$

$$f(x) = \frac{1}{2}(x+1)^3$$

D: $(-\infty, \infty)$

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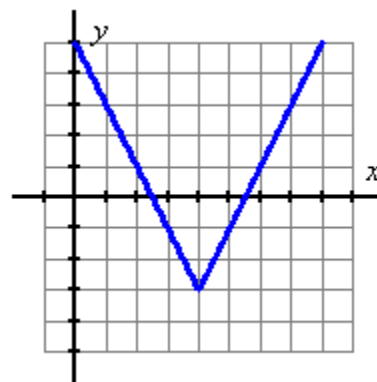


$$[-6, 4] \times [-5, 5]$$

$$f(x) = 2|x-4| - 3$$

D: $(-\infty, \infty)$

R: $[-3, \infty)$

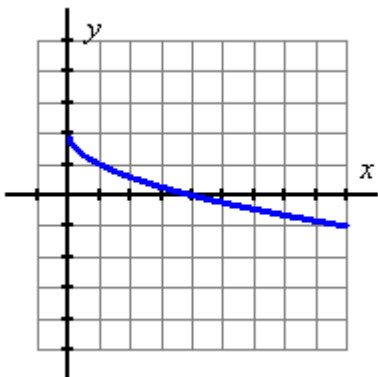


$$[-1, 9] \times [-5, 5]$$

$$f(x) = 2 - \sqrt{x}$$

$$D: [0, \infty)$$

$$R: (-\infty, 2]$$

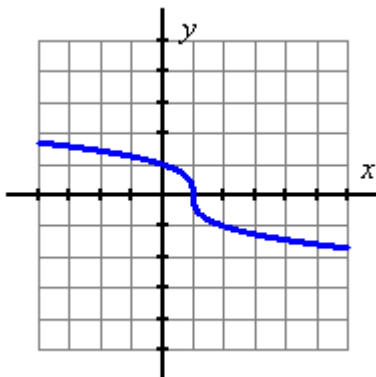


$$[-1, 9] \times [-5, 5]$$

$$f(x) = \sqrt[3]{1-x}$$

$$D: (-\infty, \infty)$$

$$D: (-\infty, \infty)$$

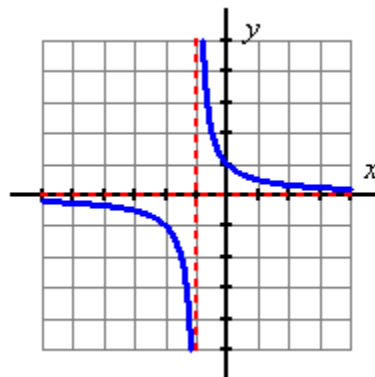


$$[-4, 6] \times [-5, 5]$$

$$f(x) = \frac{1}{x+1}$$

$$D: (-\infty, -1) \cup (-1, \infty)$$

$$R: (-\infty, 0) \cup (0, \infty)$$

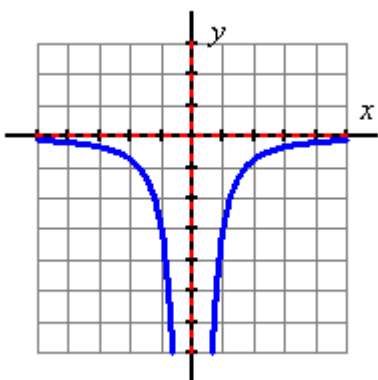


$$[-6, 4] \times [-5, 5]$$

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

$$D: (-\infty, 0) \cup (0, \infty)$$

$$R: (-\infty, 0)$$

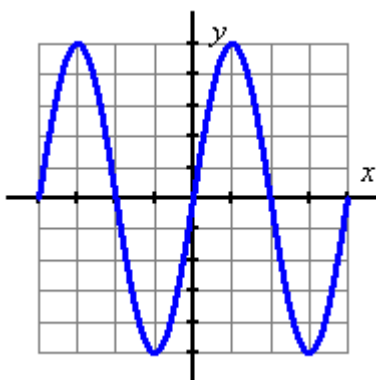


$$[-5, 5] \times [-7, 3]$$

$$f(x) = 5 \sin x$$

$$D: (-\infty, \infty)$$

$$D: [-5, 5]$$

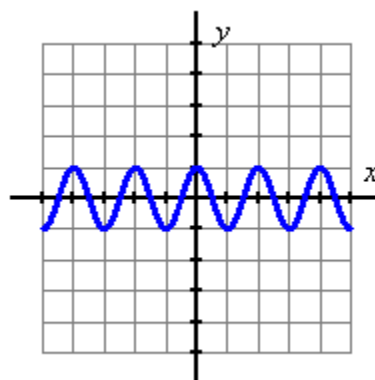


$$[-2\pi, 2\pi] \times [-5, 5]$$

$$f(x) = \cos(\pi x)$$

$$D: (-\infty, \infty)$$

$$R: [-1, 1]$$

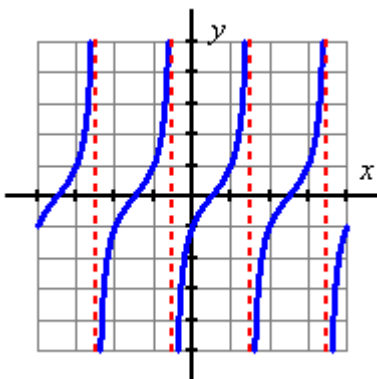


$$[-5, 5] \times [-5, 5]$$

$$f(x) = \tan\left(x - \frac{\pi}{4}\right)$$

$$D: x \neq \frac{3\pi}{4} + \pi k$$

$$R: (-\infty, \infty)$$

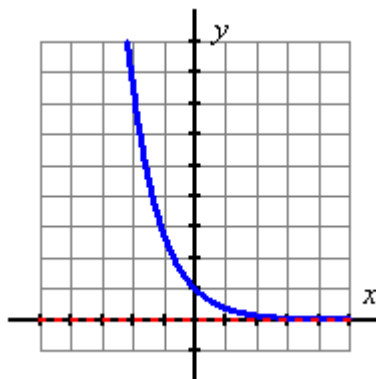


$$[-2\pi, 2\pi] \times [-5, 5]$$

$$f(x) = e^{-x}$$

$$D: (-\infty, \infty)$$

$$R: (0, \infty)$$

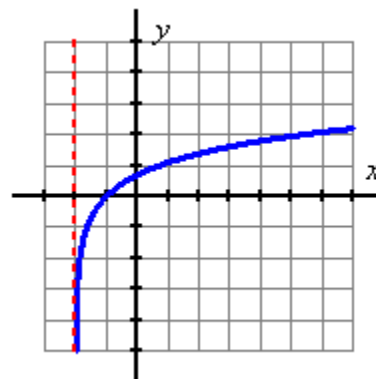


$$[-5, 5] \times [-1, 9]$$

$$f(x) = \ln(x + 2)$$

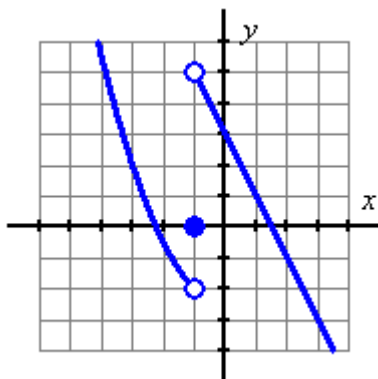
$$D: (-2, \infty)$$

$$R: (-\infty, \infty)$$



$$[-3, 7] \times [-5, 5]$$

24.



$$[-3, 7] \times [-5, 5]$$

25. VA: $x = -2, 2$

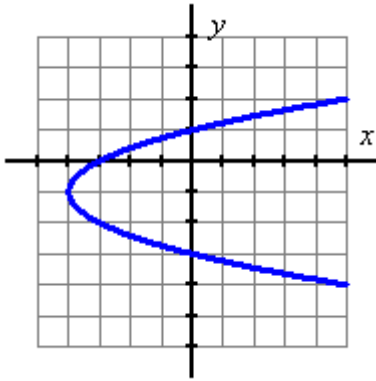
HA: $y = -3$

25. $x \rightarrow -\infty, f(x) \rightarrow 0$

$x \rightarrow \infty, f(x) \rightarrow -\infty$

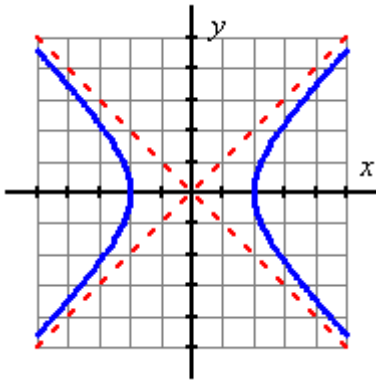
26. $f(x) = \sqrt{16 - x^2}$

27.



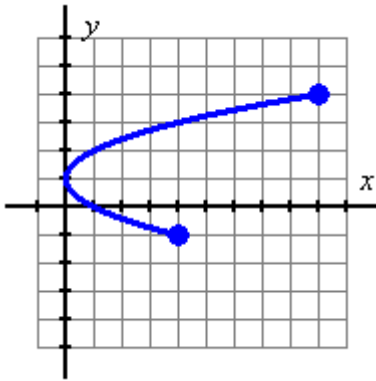
$$[-5, 5] \times [-6, 4]$$

28.



$$[-5, 5] \times [-5, 5]$$

29.



$$[-1, 10] \times [-5, 6]$$

30. $(\sqrt{2}, \sqrt{2})$

Planar and Spatial Geometry

31. $A = 36\pi \text{ ft}^2$

$$C = 12\pi \text{ ft}$$

$$s = \frac{10\pi}{3} \text{ ft}$$

32. $x = \sqrt{30}$

33. $A = \frac{51\sqrt{2}}{2} \text{ cm}^2$

34. $c = \sqrt{225 - 108\sqrt{3}} \approx 6.159 \text{ m}$

$$A = 27 \text{ m}^2$$

35. $C = 8\pi \text{ in}$

$$V = \frac{256\pi}{3} \text{ in}^3$$

$$A = 64\pi \text{ in}^2$$

36. $297\pi \text{ ft}^3$