

Answers

1. (a) $\frac{x^2 + 3x}{x - 4}$ (b) $\frac{x - 4}{x^2 - x}$ (c) $\frac{5x}{x + 5}$ (d) $\frac{3x - 1}{x}$

2. (a) $2(\sqrt{3} - \sqrt{2})$ (b) $-1 - \sqrt{5}$ (c) $\frac{7 + 3\sqrt{3} + \sqrt{5} + 2\sqrt{15}}{11}$

3. (a) $8a^6 b^{-1}$ (b) $3a^{\frac{1}{2}} b^{\frac{3}{2}}$ (c) $\frac{2}{3}a^2 b^{-1}$ (d) ab^{-1} (e) $a^{-\frac{3}{2}} b$ (f) $a^{\frac{5}{8}} b^{\frac{1}{2}}$

4. (a) 1 (b) $-\frac{3}{2}$ (c) 8 (d) $\pm\frac{4}{25}$

5. (a) $\log_2(5(x+1))$ (b) $\log_2 3$ (c) 25

6. (a) $1/2$ (b) $-x$ (c) $2\log_{10} x$

7. (a) $\frac{bcx}{bc - cy - bz}$ (b) $\frac{V - 2bc}{2(b + c)}$ (c) $\frac{-\pi h + \sqrt{\pi^2 h^2 + 2\pi A}}{2\pi}$ (d) $\frac{A}{1 + nr}$ (e) $\frac{2x - y}{x + 2y}$ (f) $\frac{\pi}{\pi - 1}$

8. (a) $y - (-1) = (x - (-2))^2$ (b) $y - \frac{3}{8} = -\frac{3}{2}(x - (-\frac{1}{2}))^2$ (c) $x - (-10) = 9(y - \frac{1}{3})^2$

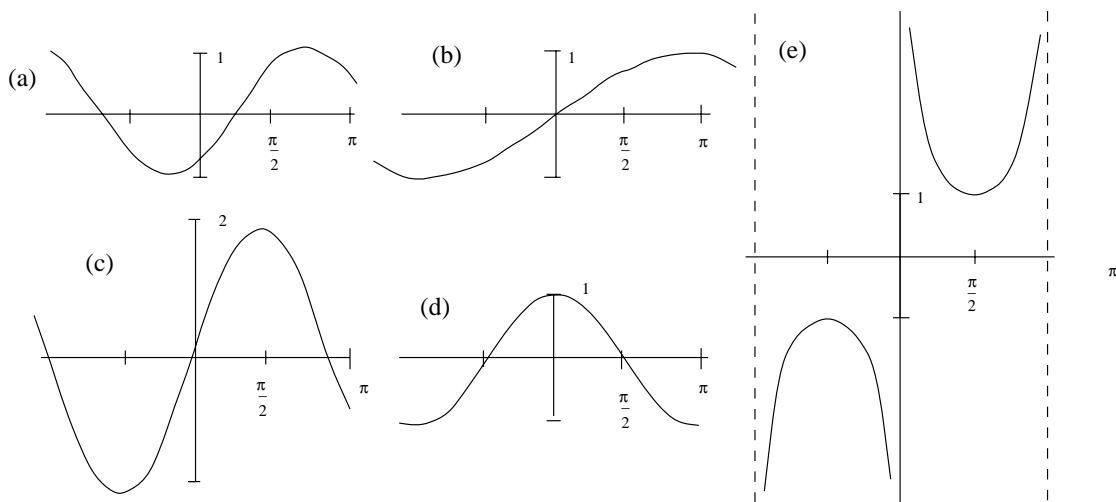
9. (a) $x^4(x - 4)(x + 4)$ (b) $(x - 2)(2x - 5)(2x + 5)$ (c) $(2x + 3)(4x^2 - 6x + 9)$ (d) $(x - 1)(x + 1)(x^2 + 1)$

10. (a) $0, \pm 4$ (b) $2, \pm\frac{5}{2}$ (c) $-\frac{3}{2}$

11. (a) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}$, or $\frac{11\pi}{6}$ (b) $-\frac{\pi}{2}, \frac{\pi}{6}$, or $\frac{5\pi}{6}$ (c) $\frac{\pi}{6} + 2k\pi$, or $\frac{5\pi}{6} + 2k\pi$, where k is any integer

12. (a) $-\frac{\sqrt{3}}{2}$ (b) $-\frac{\sqrt{2}}{2}$ (c) $-\frac{\pi}{4}$ (d) $-\frac{\pi}{2}$ (e) $\frac{\sqrt{2}}{2}$ (f) $\frac{\pi}{3}$ (g) $\frac{\sqrt{3}}{3}$ (h) π

13.



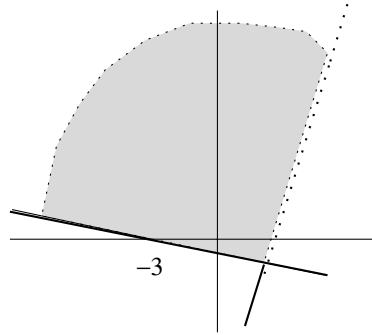
14. (a) $\frac{-3 \pm \sqrt{6}}{2}$ (b) $\frac{1}{2}$ or -3 (c) $-\frac{1}{2}$

15. (a) -89 (b) $x^2 + 3$

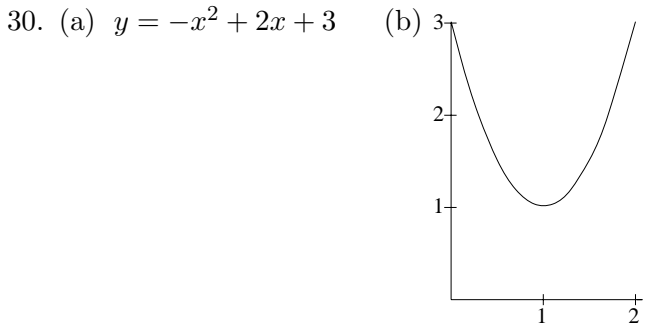
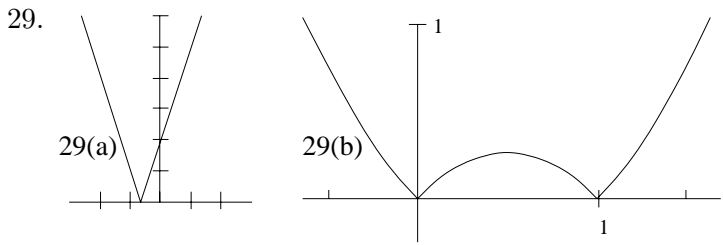
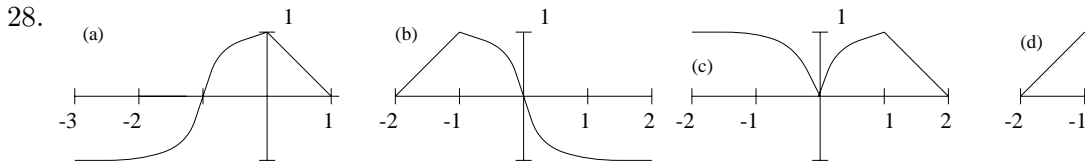
16. (a) $-\frac{1}{3}$ or $\frac{1}{4}$ (b) $-\frac{1}{2}, -\frac{1}{2}$, or $\frac{1}{3}$

17. (a) $-3 \leq x \leq 1$ (b) $x < \frac{2}{3}$ or $x \geq 1$ (c) all x

18. (a) $3 \leq x \leq 5$ (b) 2 or $-\frac{6}{5}$ (c) $-\frac{4}{3}$ or 2
 19. (a) $7x + 3y = 2$ (b) $3x + 2y = 1$ (c) $y = 3$
 20. (a) $(2, -1)$ (b)



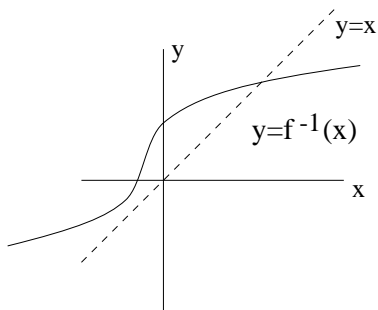
21. (a) $(x - 1)^2 + (y - 2)^2 = 18$ (b) $(x - \frac{1}{2})^2 + (y - 1)^2 = \frac{5}{4}$
 22. (a) centre = $(-3, 2)$ radius = $\sqrt{10}$ (b) $x + 3y = 13$.
 23. (a) 9 (b) $(x - 5)^2 + (y - 3)^2 = 25$
 24. $8x^2 - 38x + 8y^2 + 20y + 43 = 0$ (a circle).
 25. (a) $x < -2$ or $x > 1$ (b) i. D: all numbers, R: $\{7\}$ ii. D: all numbers except $-\frac{1}{2}$, R: all numbers except $\frac{5}{2}$
 26. D: all numbers except 0; Range: $\{1, -1\}$
 27. (a) 2 (b) $\frac{-1}{(x+1)(x+h+1)}$ (c) $2x + h$



31. (a) $y = x^2 - 3x + 2$ (b) $y = x(x^2 + 3x + 3)(x + 1)^3$ (c) $x^2 + y^2 = 1$

32. (a) $f^{-1}(x) = \frac{x-3}{2}$ (b) $f^{-1}(x) = \frac{x+2}{5x-1}$ (c) $-1 + \sqrt{x+2}$, $x > -1$

33.



34. (a) $x = t \left(\frac{r-h}{h} \right)$ (b) $x = \frac{rt}{\sqrt{r^2 - h^2}}$

35. (a) $1 - \frac{\pi}{4}$ (b) $4r + \pi r$ (c) $\frac{9\pi}{4}$ (d) $100\sqrt{5}$ km (e) $\frac{\pi}{6}$ or 30°

36. (a) Use B, $y = x$, A and $\cos 0 = 1$ (b) Use D. (c) Use C. (d) Use (c) then (a).
 (e) Use (d) then (a). (f) Replace x by $\frac{x}{2}$ in (d). (g) Replace x by $\frac{x}{2}$ in (e).