Algebra 2
Review Chapter 7

Name: Key

Simplify each expression. Assume that all variables are positive.

1. $\sqrt{0.25x^7}$ $\sqrt{1/4} = 1/2$

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

2. $\sqrt[3]{54x^{12}y^{20}}$

$3x^4y^6\sqrt[3]{2y^2}$

cross off #29, #31c

3. $\sqrt{7x^5}\cdot\sqrt{42xy^9}$

$\sqrt{294x^6y^9}$ $\sqrt{294}$ $\sqrt{49}\sqrt{6}$

$7x^3y^4\sqrt{6y}$

4. $\frac{\sqrt[3]{250x^7y^3}}{\sqrt[3]{2x^2y}} = \sqrt[3]{125x^5y^2}$

$5x\sqrt[3]{x^2y^2}$

5. $\frac{\sqrt{3xy^2}}{\sqrt{5xy^3}} \cdot \frac{\sqrt{5xy}}{\sqrt{5xy}} = \frac{\sqrt{15x^2y^3}}{\sqrt{25x^2y^4}}$

$\frac{xy\sqrt{15y}}{5xy^2}$ $= \frac{\sqrt{15y}}{5y}$

6. $\sqrt{5}\left(\sqrt{10}+\sqrt{15}\right)$

$\sqrt{50} + \sqrt{75}$

$5\sqrt{2} + 5\sqrt{3}$

7. $\frac{5\sqrt{2}}{3\sqrt{7x}} \cdot \frac{\sqrt{7x}}{\sqrt{7x}} = \frac{5\sqrt{14x}}{21x}$

8. $\frac{4+\sqrt{2}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{4\sqrt{6}+\sqrt{12}}{6}$

$= \frac{4\sqrt{6}+2\sqrt{3}}{6}$

OR $\frac{2\sqrt{6}+\sqrt{3}}{3}$

9. $\frac{5+\sqrt{3}}{2-\sqrt{3}} \cdot \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{10+5\sqrt{3}+2\sqrt{3}+\sqrt{9}}{4-2\sqrt{3}+2\sqrt{3}-\sqrt{9}}$

$\frac{13+7\sqrt{3}}{1}$

10. $4\sqrt{216y^2}+3\sqrt{54y^2}$

$\sqrt{36}\sqrt{6}$ $\sqrt{9}\sqrt{6}$

$24y\sqrt{6} + 9y\sqrt{6} = 33y\sqrt{6}$

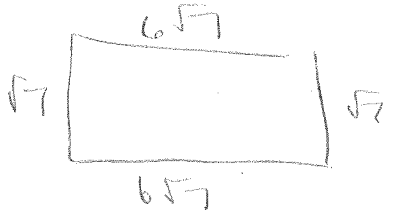
11. $\left(2\sqrt{y}-3\sqrt{2}\right)\left(4\sqrt{y}-5\sqrt{2}\right)$

$8\sqrt{y^2} - 10\sqrt{2y} - 12\sqrt{2y} + 15\sqrt{4}$

$8y - 22\sqrt{2y} + 30$

12. $\frac{3+\sqrt[3]{2}}{\sqrt[3]{2x}} \cdot \frac{\sqrt[3]{4x^2}}{\sqrt[3]{4x^2}} \cdot \frac{3\sqrt[3]{4x^2}+\sqrt[3]{8x^2}}{\sqrt[3]{8x^3}} = \frac{3\sqrt[3]{4x^2}+2\sqrt[3]{x^2}}{2x}$

13. A rectangular walk is $\sqrt{7}$ m wide and $6\sqrt{7}$ m long. What is the perimeter of the walk?



$14\sqrt{7}$

Simplify each expression. Assume that all variables are positive.

14. $(-343)^{\frac{1}{3}}$

$\sqrt[3]{-343} = -7$

17. $32^{\frac{6}{5}}$

$(\sqrt[5]{32})^6 = 64$

18. $\left(x^{\frac{2}{3}}y^{-\frac{1}{6}}\right)^{-12}$

$x^{-\frac{24}{3}}\ y^{\frac{12}{6}}$

$x^{-8}\ y^2 \rightarrow \frac{y^2}{x^8}$

19. $10{,}000^{0.75}$

$10{,}000^{\frac{3}{4}}$ $\quad \sqrt[4]{10{,}000^3}$

$10^3 = 1{,}000$

20. $y^{\frac{1}{2}} \cdot y^{\frac{3}{10}}$

$y^{\frac{5}{10}} \cdot y^{\frac{3}{10}}$

$y^{8/10} = \sqrt[10]{y^8}$

21. $\left(\frac{16x^{14}}{81y^{18}}\right)^{\frac{1}{2}}$

$\frac{16^{1/2}\ x^7}{81^{1/2}\ y^9} = \frac{4x^7}{9y^9}$

22. $\left(x^{\frac{3}{4}} \div x^{\frac{7}{8}}\right)$

23. $\sqrt[3]{(3xy)^6}$

$(3xy)^2 = 9x^2y^2$

24. $4^{\frac{3}{2}} \cdot 16^{\frac{5}{2}}$

$(\sqrt{4})^3 \cdot (\sqrt{16})^5$

$8 \cdot 1024$

$= 8192$

25. $\frac{x^5}{x^4} = x$

Solve.

26. $\sqrt{2x-1}-3=0$

$2x-1=9$

$2x=10$

$\boxed{x=5}$

27. $3(x+3)^{\frac{3}{4}}-81=0$

$(x+3)^{3/4}=(27)^{4/3}$

$x+3=\left(\sqrt[3]{27}\right)^4$

$x+3=3^4$

$x+3=81$

$\boxed{x=78}$

28. $\sqrt{4x-10}=3\sqrt{x-5}$

$4x-10=9(x-5)$

$4x-10=9x-45$

$35=5x$

$\boxed{x=7}$

29. $x^{\frac{1}{2}}-(x+3)^{\frac{1}{2}}=1$

30. $(3x+1)^{\frac{1}{6}}=(x-2)^{\frac{1}{3}}$

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

$3x+1=x^2-4x+4$

$x^2-7x+3=0$

QF $\frac{7\pm\sqrt{(-7)^2-4(1)(3)}}{2(1)}=\frac{7\pm\sqrt{37}}{2}$

$x=6.54$ or $.46$

31. A car dealer offers a 20% discount off the list price x of any car. At the same time, the manufacturer offers a $1000 rebate for each purchase of a car.

a) Write a function f(x) to represent the price after the discount.

$f(x)=.8x$

b) Write a function g(x) to represent the price after the rebate.

$g(x)=x-1000$

c) Use a composition function to find the price of the car if the discount is applied after the rebate.

$30,000$ car

$f(g(30,000))$

$g(30,000)=29,000$

$f(29,000)=\$23,200$

Let $f(x) = x - 1$ and $g(x) = x^2 - 1$ g(x) is factorable!

31. $f(x) + g(x) =$

$x^2 + x - 2$

33. $-2f(x) - g(x) =$

$-2(x-1) - (x^2-1)$

$-x^2 - 2x + 3$

34. $g(f(2)) =$

$f(2) = 1$

$g(1) = 0$

35. $\frac{g(x)}{f(x)} =$ $\frac{x^2-1}{x-1} = \frac{(x+1)(x-1)}{x-1}$

$= x+1$

36. $(g \circ f)(x) =$

$g(f(x)) =$

$(x-1)^2 - 1$

$x^2 - 2x$

37. $f(g(c)) =$

$g(c) = c^2 - 1$

$f(c^2-1) = c^2 - 1 - 1$

$c^2 - 2$

39. Find the inverse of the function $y = 3x + 1$.

$x = 3y + 1$

$x - 1 = 3y$

$\frac{x-1}{3} = y$ or $\frac{1}{3}x - \frac{1}{3} = y$

40. Find the inverse of the function $f(x) = (1 - 2x)^2 + 5$.

$x = (1-2y)^2 + 5$

$x - 5 = (1-2y)^2$

$\sqrt{x-5} = 1 - 2y$

$\sqrt{x-5} - 1 = -2y$

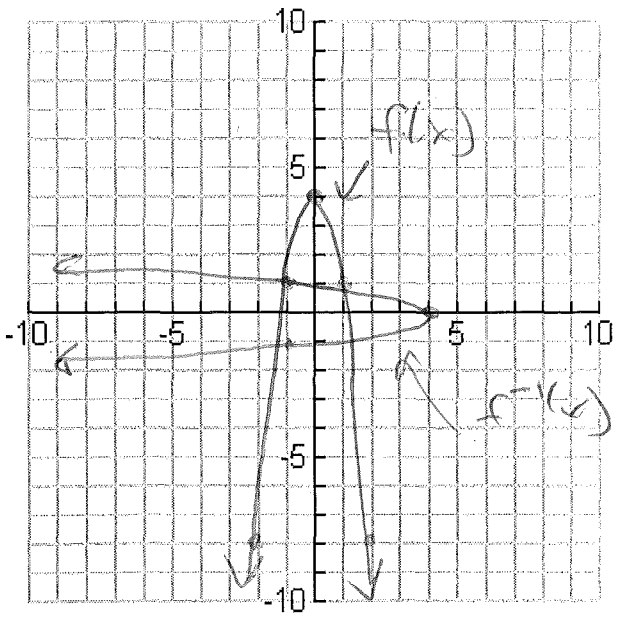
$\frac{\sqrt{x-5} - 1}{-2} = y$ or $-\frac{\sqrt{x-5}}{2} + \frac{1}{2} = y$

41. Consider the function $f(x) = -3x^2 + 4$.

a) Find the inverse of the function.

$x = -3y^2 + 4$

$\frac{x-4}{-3} = y^2$ $\quad \pm\sqrt{\frac{x-4}{-3}} = y$



b) Graph the function. (label as f(x))

c) Graph the inverse of the function. (label as $f^{-1}(x)$)

d) State the domain and range of the function.

D: $\mathbb{R}$

R: $(-\infty, 4]$

e) State the domain and range of the inverse.

D: $(-\infty, 4]$

R: $\mathbb{R}$

f) Is the inverse a function?

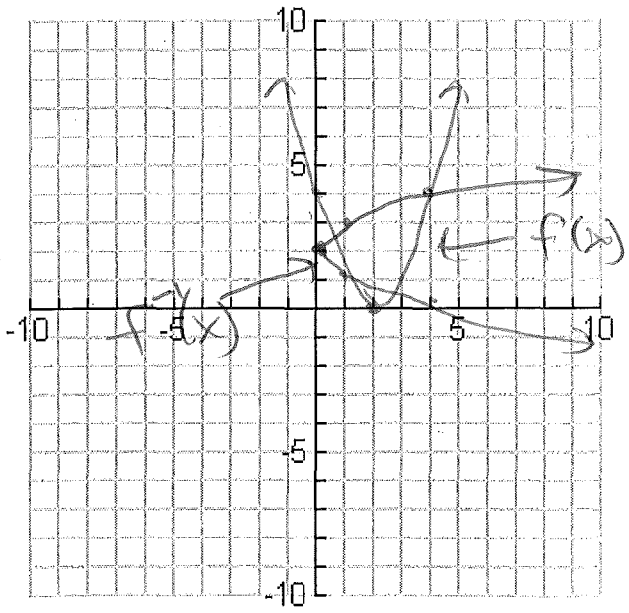
NO

42. Consider the function $y = (x-2)^2$.

a) Find the inverse of the function.

$x = (y-2)^2$

$\sqrt{x} = y - 2$ $\quad \pm\sqrt{x} + 2 = y$



b) Graph the function.

c) Graph the inverse of the function.

d) State the domain and range of the function.

D: $\mathbb{R}$

R: $[0, \infty)$

e) State the domain and range of the inverse.

D: $[0, \infty)$

R: $\mathbb{R}$

f) Is the inverse a function?

NO

43. For f(x) = 8x + 3, find $(f^{-1} \circ f)(-4)$.

$= -4$

44. Find the inverse of f(x) = $\sqrt[3]{x-5}$

$x = \sqrt[3]{y-5}$

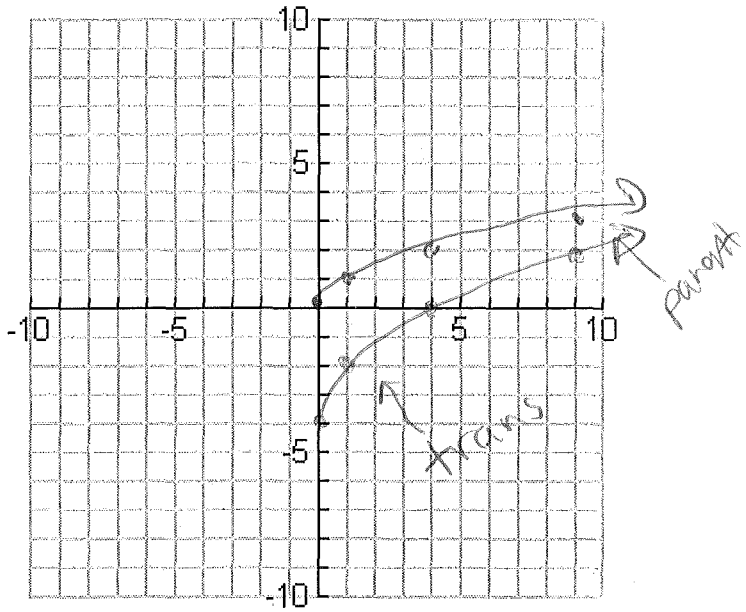
$x^3 = y-5$

$x^3+5 = y^{-1}$

← By hand

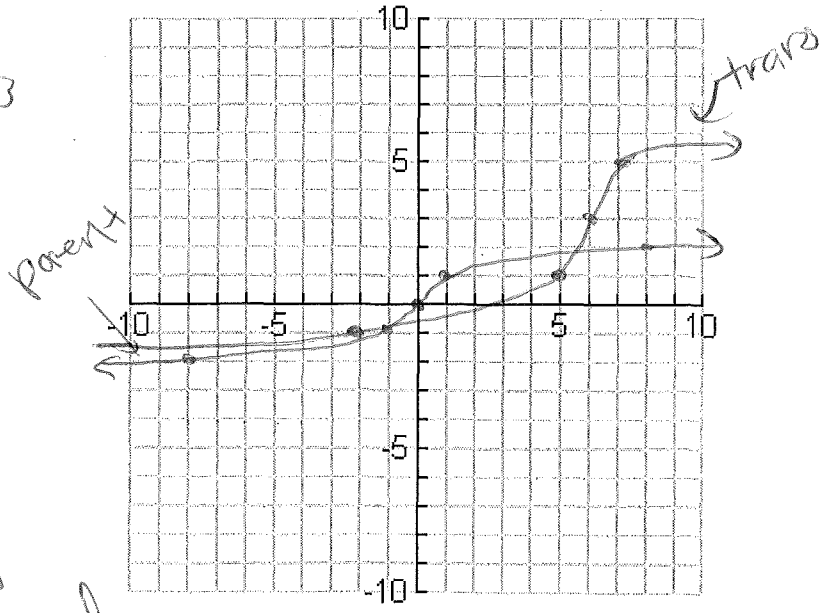
45. Graph the function y = $2\sqrt{x}-4$

↓ 4, stretched by 2



46. Graph the function y = $2\sqrt[3]{x-6}+3$

Stretch 2, right 6, up 3

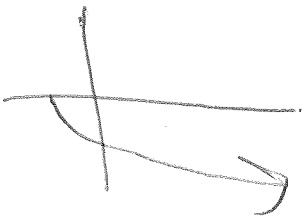


↑ By hand

47. Find the domain and range of y = $-\sqrt{x+2}$

D: $[-2, \infty)$

R: $(-\infty, 0]$

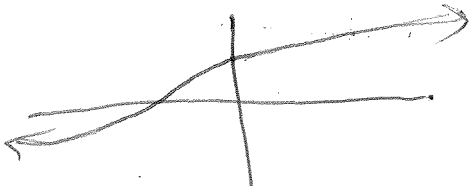


48. Find the domain and range of y = $\sqrt[3]{8x}+5$

$y = 2\sqrt[3]{x} + 5$

D: $\mathbb{R}$

R: $\mathbb{R}$



49. The graph of y = $\sqrt{x}$ is translated three units to the left and 6 units down. Write an equation of the translated function.

$y = \sqrt{x+3} - 6$

50. Graph the function y = $\sqrt{36x+108}+4$.
**hint: simplify to make it easier to transformations

$y = \sqrt{36(x+3)} + 4$

$y = 6\sqrt{x+3} + 4$