Math 1021 Review for Test 2 (5.5, 5.6 and 6.1-6.7 inclusive)

NOTE THIS IS NOT ALL ENCOMPASSING. THERE MIGHT BE TYPES OF PROBLEMS ON THE TEST THAT ARE NOT ON THIS REVIEW. You must know how to do any of the types of homework problems that were assigned. **Any problem similar to a sample problem or a homework problem may appear on the test. You are also responsible for the examples worked out in each assigned section in the textbook even though they are not done in class.**

In 1-9 Solve the equations:

1. $\frac{10}{x-5}-\frac{10}{x}=\frac{-25}{x+1}$ **2.** $\frac{2}{x^2-9}-\frac{3}{x-3}=\frac{1}{x+3}$ **3.** $\frac{3x+5}{x^2+3x+2}=\frac{1}{x+2}+\frac{2}{x+1}$

4. $\frac{x}{x-2}-\frac{4}{x(x-2)}=\frac{5}{x}$ **5.** $\sqrt{3x-2}=5$ **6.** $\sqrt{4x+8}-\sqrt{4x+3}=1$

7. $x-3=\sqrt{3x-11}$ **8.** $\sqrt{2x+1}-\sqrt{x+4}=1$ **9.** $\sqrt{4x+11}-\sqrt{1-x}=0$

10. For the given functions, find the indicated function values.

a.

$f(x)=\sqrt{5-3x}$; $f(1)$ and $f(2)$

b. $g(x)=\frac{1}{\sqrt{x}}$; g(4) and g(1)

11. Find the domain of the functions f and g in Exercise 10, express in interval notation.

12. Simplify. Assume that letters represent any real number.

a. $\sqrt{(-5t)^2}$

b. $\sqrt{x^2+2x+1}$

c. $\sqrt[3]{-\frac{1}{27}}$

d. $-\sqrt[4]{625}$

e. $\sqrt[4]{-625}$

f. $\sqrt[3]{-625}$

13. Write each in simplest radical form where appropriate. Variables represent positive values.

a. $\sqrt{12x^3y^5z^2}$ b. $\sqrt[3]{\frac{8a^7}{27b^3}}$ c. $\sqrt[3]{2}\ \sqrt[4]{3}$ d. $\frac{\sqrt[4]{w^3}}{\sqrt[3]{w^2}}$

e. $\sqrt[4]{\frac{81x^{21}}{16x^{13}}}$

14. Rationalize the denominator in each of the following.

(a) $\frac{5}{\sqrt{5x}}$ (b) $\frac{x}{\sqrt[3]{x}}$ (c) $\frac{1}{\sqrt{x}-1}$ (d) $\frac{\sqrt[3]{2y^4}}{\sqrt[3]{6x^4}}$ (e) $\frac{\sqrt{a}-\sqrt{b}}{\sqrt{b}-\sqrt{a}}$

15. Express the following in terms of rational exponents.

(a) $\left(\sqrt{(x+1)^3}\right)^5$ (b) $\left(\sqrt{(x-1)(x-2)}\right)^3$ (c) $\sqrt{\sqrt[3]{x}}$

16. Simplify the following, Express in terms of positive exponents.

(a) $\left(27x^3\right)^{2/3}$ (b) $\left(16x^8y^{-4}\right)^{1/4}$ (c) $\left(\frac{x^{-1/3}y^{1/2}}{x^{-1/4}y^{1/3}}\right)^6$

(d) $3^{-5/2}a^{4/5}b^{-7/3}$ (e) $\sqrt[6]{(-4x)^2}$

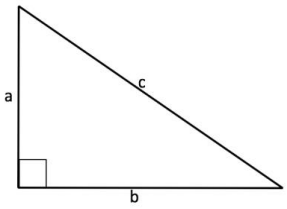
17. Perform the indicated operations and simplify if possible.

(a) $3\sqrt{a^4}+4\sqrt[3]{8a^6}$ (b) $\sqrt{6b}-\sqrt{24b^3}$ (c) $\left(3-\sqrt{x}\right)\left(3+\sqrt{x}\right)$

(d) $\left(2\sqrt{a}-3\sqrt{b}\right)^2$ (e) $2\sqrt[3]{y}\left(4\sqrt[3]{y}-2\sqrt[3]{y^2}\right)$ (f) $\sqrt[3]{18y^3}\ \sqrt[3]{4x^2}$

(g) $5\sqrt[3]{16y^4}+7\sqrt[3]{2y}$ (h) $\frac{\sqrt[4]{(x-1)^3}}{\sqrt{x-1}}$

18. For the triangle below, find the length of the side not given. Leave answers in exact form.



(a) a = 8, b = 10 (b) a = $\sqrt{11}$, c = 5 (c) c = 1, b = x

19. A 16- foot tree casts a shadow that is 8 feet long. What is the distance from the top of the tree to the end of the shadow? Leave answers in exact form.

20. David can paint the outside of a house in 12 hr. Bill can paint the same house in 9 hr. How long would it take them working together?

21. The current of the Gold River is 6 mph. A boat travels 50 mi downstream in the same time that it takes to travel 30 mi upstream. What is the speed of the boat in still water?

22. Logan and Noah run a summer painting company to defray their college expenses. They need 4 gal of paint to paint 1700 ft^2 of clapboard. How much paint would they need for a building with 6000 ft^2 of clapboard?

23. The force needed to compress a spring varies directly as the change in the length of the spring. A force of 18 lb will compress a spring 3 in. How many pounds of force will be needed to compress the same spring 5 in.?