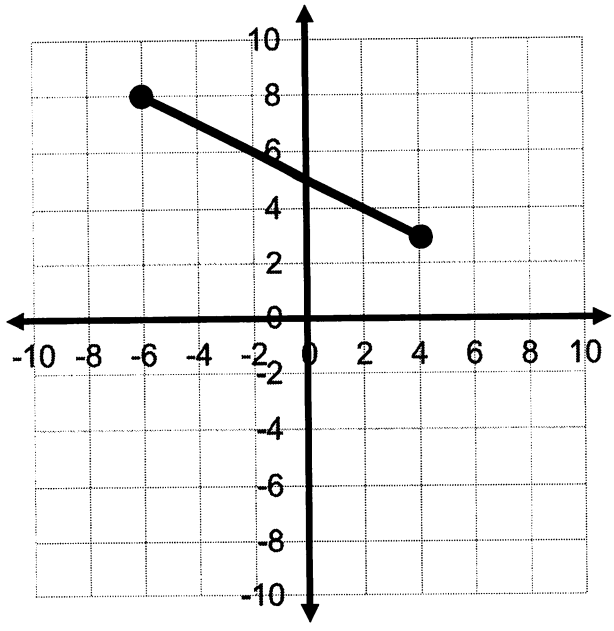
**Math 80 Test 5 Practice test 1 Fall 2015**

1) Given this is the graph of function $g(t)$.




ordered pairs

$(-6, 8)$ $(4, 3)$

$M = \frac{8-3}{-6-4} = \frac{5}{-10} = -\frac{1}{2}$

$y = mx + b$

$8 = -\frac{1}{2}(-6) + b$

$8 = 3 + b$

$5 = b$ ✓

a) What's the domain of $g(t)$ ?

$[-6, 4]$

b) What's the range of $g(t)$?

$[3, 8]$

c) Complete the description of $g(t)$.
Find both $m$ and $b$ mathematically.

$$g(t) = \begin{cases} -\frac{1}{2}t + 5, & -6 \le t \le 4 \end{cases}$$

d) Find $g(-2) \times g(4)$

$g(-2) \Rightarrow -\frac{1}{2}(-2) + 5 \Rightarrow 6$ $g(4) \Rightarrow -\frac{1}{2}(4) + 5 \Rightarrow 3$ ✓

$g(-2) \times g(4) \Rightarrow 6(3) = \boxed{18}$

e) Find $g(6) + g(1)$

Can't, $g(6)$ is outside of the domain of $g(t)$.

3) Simplify $\dfrac{k^2-7k+10}{k^3-5k^2-k+5} \div \dfrac{2k^2-3k-2}{2k^2+3k+1}$.

It's division. Find Reciprocal of denominator

$k^3-5k^2-k+5$

$k^2(k-5)-1(k-5)$

$(k^2-1)(k-5)$

$$\frac{(k-5)(k-2)}{(k-1)(k+1)(k-5)} \times \frac{(2k+1)(k+1)}{(2k+1)(k-2)} = \boxed{\frac{1}{k-1}}$$

4) Simplify $\dfrac{\frac{-7p}{p^2-4}+\frac{p+1}{p-2}}{\frac{3p-1}{p+2}-\frac{p-1}{p-2}}$.

LCD $(p-2)(p+2)$

$$\frac{-7p+(p+1)(p+2)}{(3p-1)(p-2)-(p-1)(p+2)}$$

$$\frac{-7p+(p^2+3p+2)}{3p^2-7p+2-(p^2+p-2)}$$

$$\frac{p^2-4p+2}{3p^2-7p+2-p^2-p+2}$$

$$\frac{p^2-4p+2}{2p^2-8p+4}$$

$$\frac{(p^2-4p+2)\cdot 1}{2(p^2-4p+2)}$$

$$\boxed{\frac{1}{2}}$$

5) Simplify $\frac{8}{k^2+4k-21} - \frac{4}{k^2+9k+14} + \frac{2}{k^2-k-6}$

LCD
$(k+7)(k-3)(k+2)$

$$\frac{8}{(k+7)(k-3)} - \frac{4}{(k+7)(k+2)} + \frac{2}{(k-3)(k+2)}$$

$$\frac{8(k+2)-4(k-3)+2(k+7)}{LCD}$$

$$\frac{8k+16-4k+12+2k+14}{LCD}$$

$$\frac{6k+42}{LCD}$$

$$\frac{6(k+7)}{(k+7)(k-3)(k+2)}$$

$$\boxed{\frac{6}{(k-3)(k+2)}}$$

6) Solve $\frac{1}{f_1}+1=\frac{1}{f_2}$ for $f_1$ $\quad LCD = f_1 f_2$

$$\frac{f_1 f_2}{f_1} + f_1 f_2 = \frac{f_1 f_2}{f_2}$$

$$f_2 + f_1 f_2 = f_1$$

$$f_2 = f_1 - f_1 f_2 \Rightarrow f_2 = f_1(1-f_2)$$

$$\boxed{\frac{f_2}{1-f_2} = f_1}$$

7) $S$ is related jointly to $u$ and $v$. When $u$ is 15 and $v$ is 0.05 the value of $S$ is 75. Find the value of $S$ if $u$ is 0.8 and the value of $v$ is 80.

$S = k u v \Rightarrow 75 = k(15)(0.05) \Rightarrow k = 100$

$S = 100 u v \Rightarrow S = 100(0.8)(80) \Rightarrow S = 6{,}400$

8) The profit made from selling an item is inversely related to the square of the price of a barrel of oil and directly related to the dollars spent on advertising. If oil is selling for \$45 a barrel and \$70,000 is spent on advertising, then the profit from the sale of one item is \$345. Estimate the profit made from selling one item if the price of a barrel of oil rises to \$60 and the amount spent on advertising drops to \$50,000. You can round the value of $k$ to the nearest whole number.

P ↗, A ↘, B ↗

$$P = \frac{kA}{B^2} \Rightarrow 345 = \frac{k(70{,}000)}{45^2} \Rightarrow \boxed{k \cong 10}$$

$$P = \frac{10A}{B^2} \Rightarrow P = \frac{10(50{,}000)}{60^2} \Rightarrow P \cong 139$$

The Profit will be about \$139.

9) Find the following values.

a) $\log_7 49 = 2$ since $7^2 = 49$

b) $\log_3\left(\frac{1}{27}\right) = -3$ since $3^{-3} = \frac{1}{3^3} = \frac{1}{27}$

c) $\log 81 \approx 1.9085$ since $10^{1.9085} \approx 81.0028$

d) $\ln 81 \approx 4.3944$ since $e^{4.3944} \approx 80.9960$

10) Use the present value formula, $P = Ae^{-rt}$ to find the amount you need to save today to have \$500,000 in 100 years at an annual rate of 6%.

A t r

$$P = 500{,}000\, e^{-0.06(100)} \Rightarrow \boxed{P = \$1{,}240}$$

Check $A = 1{,}240\, e^{.06(100)} \approx 500{,}252$ ✓

11) Use properties of rational exponents to simplify each expression. Assume that all variables represent positive numbers.

a. $\dfrac{y^{2/3}}{y^{1/4}} = y^{2/3-1/4} = y^{8/12-3/12} = y^{5/12}$

b. $x^{1/6}x^{-4/9} = x^{1/6-4/9} = x^{3/18-8/18} = x^{-5/18} = \dfrac{1}{x^{5/18}}$

12) Use rational exponents to simplify each expression. If rational exponents appear after simplifying, write the answer in radical notation. Assume that all variables represent positive numbers.

a. $\dfrac{\sqrt[4]{x}}{\sqrt[5]{x}} = \dfrac{x^{1/4}}{x^{1/5}} = x^{\frac{1}{4}-\frac{1}{5}} = x^{5/20-4/20} = x^{\frac{1}{20}} = \sqrt[20]{x}$

b. $\sqrt[6]{a^3b^9}$

$(a^3b^9)^{1/6} = a^{3/6}b^{9/6} = a^{1/2}b^{3/2} = \sqrt{a}\sqrt{b^3} =$

$\sqrt{a}(b)\sqrt{b} = \boxed{b\sqrt{ab}}$

13) Simplify $\sqrt[4]{12a^3b}\sqrt[4]{8a^3b^2}$

$\sqrt[4]{2\cdot2\cdot3\cdot2\cdot2\cdot2a^6b^3} = \sqrt[4]{16\cdot6a^6b^3} = 2a\sqrt[4]{6a^2b^3}$

14) Simplify $5a\sqrt{24a} + \sqrt{6a^3}$

$5a\sqrt{4\cdot6a} + a\sqrt{6a}$

$10a\sqrt{6a} + a\sqrt{6a}$

$11a\sqrt{6a}$

14) Simplify $\sqrt[3]{\frac{16k^7}{27k^{-4}}} = \sqrt[3]{\frac{16k^{11}}{27}} = \frac{\sqrt[3]{16k^{11}}}{\sqrt[3]{27}} = \frac{2k^3\sqrt[3]{2k^2}}{3}$

15) Simplify $\frac{\sqrt{54a^7b^{11}}}{\sqrt{3a^4b^{-2}}} = \sqrt{18a^3b^{13}} = 3ab^6\sqrt{2ab}$

**16)** I brought a jar with a total of 206 dimes and quarters to the bank and poured them into a machine that counts your change and then allows you to have the total value deposited into your savings account. If I deposited $38.15 into my account how many dimes and how many quarters were in the jar? **You must use a system of equations to answer the question.**

Let D = # of Dimes Q = # of quarters

I have 89 dimes.

" " 117 quarters.

Rates Dimes $\frac{\$0.10}{1 \text{ dime}}$

Quarters $\frac{\$0.25}{1 \text{ quarter}}$

Then $D+Q = 206$

$0.1D + 0.25Q = 38.15$

$Q = 206 - D$

$0.1D + 0.25(206-D) = 38.15$

$0.1D + 51.5 - .25D = 38.15$

$-0.15D = -13.35$

$D = 89$

$Q = 206 - 89 = 117$

Check

$.1(89) + .25(117) =$

$\$38.15$ ✓