

## QUIZ 13 OVERALL QUIZ 2 FINAL PREP

- 1) In your class, you have scores of 84, 89, 84, and 79 on the first four of five tests. To get a grade of B, the average of the first five tests scores must be greater than or equal to 80 and less than 90.
- Solve an inequality to find the least score you can get on the last test and still earn a B.
  - What score do you need if the fifth test counts as two tests?

$$\begin{aligned} \text{a)} \quad & \frac{84+89+84+79+x}{5} \geq 80 \\ & \frac{336+x}{5} \geq 80 \end{aligned}$$

$$336 + x \geq 400 \qquad x = 64$$

$$\begin{aligned} \text{b)} \quad & \frac{84+89+84+79+2x}{6} \geq 80 \\ & \frac{336+2x}{6} \geq 80 \end{aligned}$$

$$336 + 2x \geq 480 \qquad x = 72$$

- 2) Find the real solutions of the following equation.

$$4x^{\frac{1}{2}} - 7x^{\frac{1}{4}} + 2 = 0$$

$$\begin{aligned} u &= x^{\frac{1}{4}} \\ 4u^2 - 7u + 2 &= 0 \end{aligned}$$

$$u = \frac{7 \pm \sqrt{17}}{8} \qquad x = \left( \frac{7 \pm \sqrt{17}}{8} \right)^4$$

Analyze the graph of the function.

3)

$$R(x) = \frac{x^2 + x - 42}{x^2 - x - 30}$$

(a) What is the domain of  $R(x)$ ?

- ☐ A.  $\{x|x \neq 0, x \neq 6 \text{ and } x \neq -5\}$   
☒ B.  $\{x|x \neq 6 \text{ and } x \neq -5\}$   
☐ C.  $\{x|x \neq 0, x \neq -7, x \neq 6 \text{ and } x \neq -5\}$   
☐ D. All real numbers

$$\frac{(x-6)(x+7)}{(x-6)(x+5)}$$

Domain:  $x = 6, -5$

(b) What is the equation of the vertical asymptote(s) of  $R(x)$ ? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A.  $x = -5$   
☐ B. There is no vertical asymptote.

*Because the  $(x-6)$  cancels*

(Use a comma to separate answers as needed. Type an integer or a fraction.)

(c) What is the equation of the horizontal or oblique asymptote of  $R(x)$ ? Select the correct choice below and fill in any answer boxes within your choice.

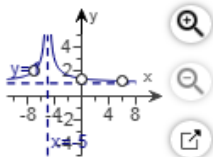
- ☒ A.  $y = 1$   
☐ B. There is no horizontal or oblique asymptote.

*matching  $x$  exponents*

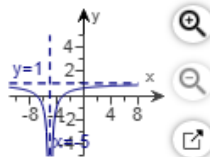
(d) Choose the correct graph for  $R(x)$  below.

*\*use the  $x=6$  is hole in the graph*

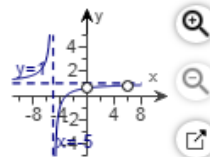
☐ A.



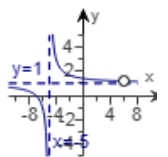
☐ B.



☐ C.



☒ D.



4) A. Graph  $f(x) = 2x^2 - 3x + 5$  by determining whether its graph opens up or down and by finding its vertex, axis of symmetry, y-intercept, and x-intercepts, if any.

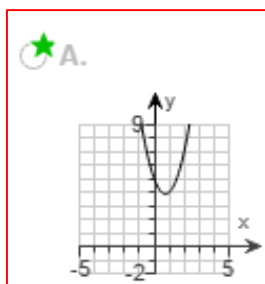
B. Determine the domain and the range of the function.

Graph open UP

C. Determine where the function is increasing and where it is decreasing.

a) vertex  $x = \frac{-b}{2a}$   $x = \frac{3}{2(2)} = \frac{3}{4}$   $y = 2\left(\frac{3}{4}\right)^2 - 3\left(\frac{3}{4}\right) + 5 = \frac{31}{8}$  vertex  $\left(\frac{3}{4}, \frac{31}{8}\right)$

axis of symmetry  $x = \frac{3}{4}$  intercepts  $(0, 5)$



B. The domain of the function is  $(-\infty, \infty)$

The range of the function is  $\left[\frac{31}{8}, \infty\right)$

C. The function is increasing on the interval  $\left[\frac{3}{4}, \infty\right)$

The function is decreasing on the interval  $\left(-\infty, \frac{3}{4}\right)$

5) Find the inverse of  $f(x) = \frac{2x+5}{x+2}$

*Switch x and y then solve for y.*  $x = \frac{2y+5}{y+2} \quad x(y+2) = 2y+5$

$$xy + 2x = 2y + 5 \rightarrow xy - 2y = 5 - 2x \rightarrow y(x - 2) = 5 - 2x$$

$$f^{-1} = \frac{-2x + 5}{x - 2}$$

*Domain of f is  $\{x|x \neq -2\}$       Range of f is  $\{y|y \neq 2\}$*

*Domain and Range of function and its inverse are opposite, THEREFORE...*

*Domain of  $f^{-1}$  is  $\{x|x \neq 2\}$       Range of  $f^{-1}$  is  $\{y|y \neq -2\}$*

6) Write the expression as a sum and/or difference of logarithms. Express powers as factors.

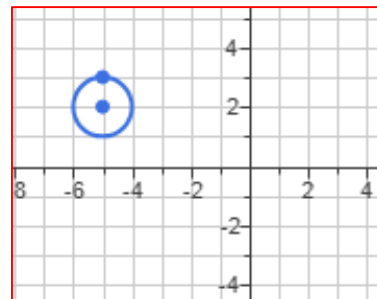
$$\log_7 \left( \frac{x^4}{x-2} \right), x > 2$$

$$4\log_7 x - \log_7 (x-2)$$

7) Graph.

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

*Plot center (-5,2) with radius 1*



8) Find the real solutions of the equation.

$$x + \sqrt{x} = 2$$

$$u = \sqrt{x}$$

$$u^2 + u - 2 = 0$$

$$(u+2)(u-1) = 0 \quad u = -2, 1$$

*\*square the positive u*

$$\sqrt{x} = 1 \quad x = 1$$

- 9) The half-life of carbon-14 is 5600 years. If a piece of charcoal made from the wood of a tree shows only 79% of the carbon-14 expected in living matter, when did the tree die?

Find rate (k) first:  $\ln 0.5 = e^{5600k}$        $.79 = e^{\left(\frac{\ln 0.5}{5600}\right)t}$

$$k = \frac{\ln 0.5}{5600}$$

$$\ln .79 = \frac{\ln 0.5}{5600} t$$

*\*multiply by reciprocal*

$$\frac{(5600 \cdot \ln 0.79)}{\ln 0.5} = t \approx \mathbf{1904}$$

- 10) Determine whether the equation defines y as a function of x.

$$x^2 + 3y^2 = 1$$

---

Does the equation define y as a function of x?

☐ Yes

☒ No

*\*can't have  $y^2$*

11)  $3x^3 + 16 = x^2 + 48x$

*\*move all to the left*

$$3x^3 - x^2 - 48x + 16 = 0$$

*factor by grouping*

$$x^2(3x-1) - 16(3x-1) = 0$$

$$(x^2 - 16)(3x-1) = 0$$

$$x = -4, 4, \frac{1}{3}$$

12)  $x - 2x\sqrt{x} = 0$

$$x = 2x\sqrt{x}$$

*square both sides*

$$x^2 = 4x^2(x)$$

$$x^2 - 4x^3 = 0$$

$$x^2(1-4x) = 0$$

$$x = 0, \frac{1}{4}$$