

Student: _____	Instructor: Joe Better's
Date: _____	Course: Pre-Calculus Pre AP (Master Course) Assignment: 2.1-2.2 Classwork

1. For the given functions f and g , complete parts (a)-(h). For parts (a)-(d), also find the domain.

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

- (a) Find $(f + g)(x)$.

$$(f + g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of $f + g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is $\{x \mid \underline{\hspace{2cm}}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is $\{x \mid x \text{ is any real number}\}$.

- (b) Find $(f - g)(x)$.

$$(f - g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of $f - g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is $\{x \mid \underline{\hspace{2cm}}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is $\{x \mid x \text{ is any real number}\}$.

- (c) Find $(f \cdot g)(x)$.

$$(f \cdot g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of $f \cdot g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is $\{x \mid \underline{\hspace{2cm}}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is $\{x \mid x \text{ is any real number}\}$.

- (d) Find $\left(\frac{f}{g}\right)(x)$.

$$\left(\frac{f}{g}\right)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of $\frac{f}{g}$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A.

The domain is $\{x \mid \underline{\hspace{2cm}}\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers

B. ~~The domain~~ is $\{x \mid x \text{ is any real number}\}$.

(e) Find $(f + g)(7)$.

$$(f + g)(7) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(f) Find $(f - g)(5)$.

$$(f - g)(5) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(g) Find $(f \cdot g)(3)$.

$$(f \cdot g)(3) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(h) Find $\left(\frac{f}{g}\right)(27)$.

$$\left(\frac{f}{g}\right)(27) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

2. The function $P(y) = 0.037y^2 - 3.482y + 265.450$ represents the population P (in millions) of people in 2005 that were y years of age or older.

(a) Identify the dependent and independent variable.

- The dependent variable is y and the independent variable is P .
 The dependent variable is P and the independent variable is y .

(b) Evaluate $P(20)$.

$P(20) =$ _____ (Round to three decimal places as needed.)

Choose the answer below that explains the meaning of $P(20)$.

The value of $P(20)$ is equal to the number of people (in millions)

- A. born in 2025.
 B. who were 20 years of age in 2005.
 C. in 2025.
 D. who were 20 years of age or older in 2005.

(c) Evaluate $P(0)$.

$P(0) =$ _____ (Round to three decimal places as needed.)

Choose the answer below that explains the meaning of $P(0)$.

The value of $P(0)$ is equal to the number of people (in millions)

- A. in 2005.
 B. in 2004.
 C. born in 2005.
 D. who were 0 years of age or older in 2004.

3. An airplane crosses the Atlantic Ocean (3000 miles) with an airspeed of 550 miles per hour. The cost C (in dollars) per passenger is given by

$$C(x) = 75 + \frac{x}{15} + \frac{33,000}{x},$$

where x is the ground speed (airspeed \pm wind).

(a) What is the cost per passenger for quiescent (no wind) conditions?

\$ _____ (Round to the nearest cent as needed.)

(b) What is the cost per passenger with a head wind of 50 miles per hour?

\$ _____ (Round to the nearest cent as needed.)

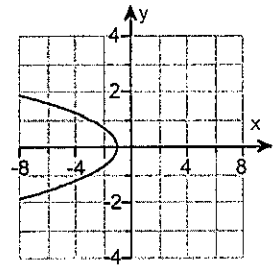
(c) What is the cost per passenger with a tail wind of 100 miles per hour?

\$ _____ (Round to the nearest cent as needed.)

(d) What is the cost per passenger with a head wind of 100 miles per hour?

\$ _____ (Round to the nearest cent as needed.)

4. Determine whether the graph is that of a function by using the vertical-line test. If it is, use the graph to find
- its domain and range.
 - the intercepts, if any.
 - any symmetry with respect to the x-axis, y-axis, or the origin.



Is the graph that of a function?

- No
 Yes

What are the domain and range of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is _____. The range is _____.
 (Type your answers in interval notation.)
 B. The graph is not that of a function.

What are the intercepts of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The intercept(s) is/are _____.
 (Type an ordered pair. Use a comma to separate answers as needed.)
 B. The graph is not that of a function.

If the graph is that of a function, determine what kinds of symmetry it has. Select all that apply.

- A. The graph is a function and is symmetrical with respect to the y-axis.
 B. The graph is a function and is symmetrical with respect to the x-axis.
 C. The graph is a function and is symmetrical with respect to the origin.
 D. The graph is a function and is not symmetrical.
 E. The graph is not that of a function.
-

5. Answer the questions about the following function.

$$f(x) = \frac{8x^2}{x^4 + 16}$$

- (a) Is the point $(-2, 1)$ on the graph of f ?
 (b) If $x = 1$, what is $f(x)$? What point is on the graph of f ?
 (c) If $f(x) = 1$, what is x ? What point(s) are on the graph of f ?
 (d) What is the domain of f ?
 (e) List the x -intercept(s), if any, of the graph of f .
 (f) List the y -intercept, if any, of the graph of f .

(a) Is the point $(-2, 1)$ on the graph of f ?

- Yes
 No

(b) If $x = 1$, what is $f(x)$?

$f(1) =$ _____

(Type an integer or a simplified fraction.)

Use this information to list a point on the graph of f .

(Simplify your answer. Type an ordered pair, using integers or fractions.)

(c) If $f(x) = 1$, what is x ?

$x =$ _____

(Simplify your answer. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Use this information to list two points on the graph of f .

(Simplify your answer. Type an ordered pair. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

(d) What is the domain of f ?

The domain is _____.

(Type the answer in interval notation.)

(e) List the x -intercept(s), if any, of the graph of f . Select the correct choice below and fill in any answer boxes within your choice.

A. The x -intercept(s) is/are _____.
 (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There are no x -intercepts.

(f) List the y -intercept, if any, of the graph of f . Select the correct choice below and fill in any answer boxes within your choice.

A. The y -intercept(s) is/are _____.
 (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There are no y -intercepts.

6. A golf ball is hit with an initial velocity of 160 feet per second at an inclination of 45° to the horizontal. In physics, it is established that the height h of the golf ball is given by the function

$$h(x) = \frac{-32x^2}{160^2} + x,$$

where x is the horizontal distance that the golf ball has traveled.

- (a) Determine the height of the golf ball after it has traveled 100 feet.

$h =$ _____ feet (Round to one decimal place.)

- (b) What is the height after it has traveled 300 feet?

$h =$ _____ feet (Round to one decimal place.)

- (c) What is the height after it has traveled 400 feet?

$h =$ _____ feet (Round to one decimal place.)

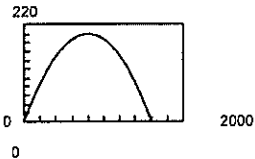
- (d) How far does the golf ball travel before it lands?

$x =$ _____ feet (Round to one decimal place.)

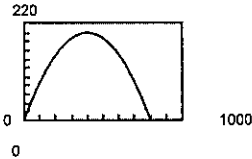
- (e) Graph the function $h = h(x)$.

Which of the following is the graph?

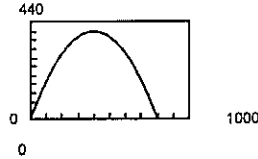
A.



B.



C.



- (f) Use a graphing utility to determine the distance that the ball has traveled when the height of the ball is 100 feet.

- A. The ball has traveled _____ feet.
(Use a comma to separate answers as needed. Round to one decimal place.)
- B. The ball has not traveled.

- (g) Create a TABLE with $TblStart = 0$ and $\Delta Tbl = 25$. To the nearest 25 feet, how far does the ball travel before it reaches a maximum height? What is the maximum height?

To the nearest 25 feet, the ball travels _____ feet.

The maximum height is _____ feet.
(Round to the nearest whole number.)

- (h) Adjust the value of ΔTbl until you determine the distance, to within 1 foot, that the ball travels before it reaches a maximum height.

_____ ft

1. $\sqrt{3x} + 5x - 2$

A. The domain is $\{x \mid \underline{x \geq 0}\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

A. The domain is $\{x \mid \underline{x \geq 0}\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$5x\sqrt{3x} - 2\sqrt{3x}$

A. The domain is $\{x \mid \underline{x \geq 0}\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$$\frac{\sqrt{3x}}{5x - 2}$$

A. The domain is $\{x \mid \underline{x \geq 0, x \neq \frac{2}{5}}\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$\sqrt{21} + 33$

$\sqrt{15} - 23$

39

$$\frac{9}{133}$$

2. The dependent variable is P and the independent variable is y.

210.610

D. who were 20 years of age or older in 2005.

265.450

A. in 2005.

3. 171.67

174.33

169.10

178.33

4. No

B. The graph is not that of a function.

B. The graph is not that of a function.

E. The graph is not that of a function.

5. Yes

$$\frac{8}{17}$$

$$\left(1, \frac{8}{17}\right)$$

$$2, -2$$

$$(2, 1), (-2, 1)$$

$$(-\infty, \infty)$$

A. The x-intercept(s) is/are 0.

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

A. The y-intercept(s) is/are 0.

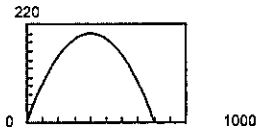
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

6. 87.5

187.5

200

800

B. 0A. The ball has traveled 117.2, 682.8 feet.

(Use a comma to separate answers as needed. Round to one decimal place.)

400

200

400

2.1-2.2 classwork

$$\textcircled{1} f(x) = \sqrt{3x} \quad g(x) = 5x - 2$$

$$\text{a) } (f+g)(x) = \sqrt{3x} + 5x - 2 \quad \text{Domain } x \geq 0$$

$$\text{b) } (f-g)(x) = \sqrt{3x} - 5x + 2 \quad \text{Domain } x \geq 0$$

$$\text{c) } (f \cdot g)(x) = 5x\sqrt{3x} - 2\sqrt{3x} \quad \text{Domain } x \geq 0$$

$$\text{d) } \left(\frac{f}{g}\right)(x) = \frac{\sqrt{3x}}{5x-2} \quad \begin{array}{l} \text{Domain } x \geq 0 \\ x \neq \frac{2}{5} \end{array}$$

$$\text{e) } (f+g)(7) = \sqrt{3x} + 5x - 2 \\ \sqrt{3(7)} + 5(7) - 2 = \boxed{\sqrt{21} + 33}$$

$$\text{f) } (f-g)(5) = \sqrt{3x} - 5x + 2 \\ = \sqrt{3(5)} - 5(5) + 2 = \boxed{\sqrt{15} - 23}$$

$$\text{g) } (f \cdot g)(3) = 5x\sqrt{3x} - 2\sqrt{3x} \\ 5(3)\sqrt{3(3)} - 2\sqrt{3(3)} = \boxed{39}$$

$$\text{h) } \left(\frac{f}{g}\right)(27) = \frac{\sqrt{3x}}{5x-2} \\ = \frac{\sqrt{3(27)}}{5(27)-2} = \frac{\sqrt{81}}{133} = \boxed{\frac{9}{133}}$$

2.1-2.2 classwork continued

$$\textcircled{2} P(y) = .037y^2 - 3.482y + 265.450$$

a) The dependent variable is P
and the independent variable
is y .

b) $P(20) = \boxed{210.610}$ plug into
equation

~~_____~~ \boxed{D} who were 20 years
of age ~~_____~~ ~~_____~~ in 2005

c) $P(0) = \boxed{265.450}$ plug into
equation

\boxed{A} in 2005

2.1-2.2 classwork continued

$$\textcircled{3} \quad C(x) = 75 + \frac{x}{15} + \frac{33000}{x}$$

Airspeed of 550 mph

a) no wind plug 550 into equation
 $= \boxed{171.67}$

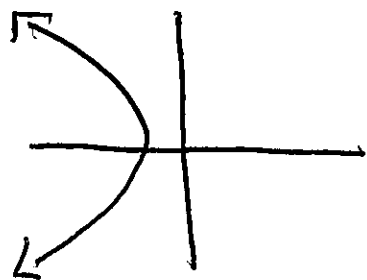
b) head wind of 50 mph plug in 500
into equation
 $= \boxed{174.33}$

c) tail wind of 100 mph plug in 650
into equation
 $= \boxed{169.10}$

d) head wind of 100 mph plug in 450
into equation
 $= \boxed{178.33}$

2.1-2.2 classwork continued

④



not a function

B }
B } not a function
E }

⑤ $f(x) = \frac{8x^2}{x^4 + 16}$

a) $(-2, 1)$ $1 = \frac{8(-2)^2}{(-2)^4 + 16}$ $1 = 1$
yes

b) $f(1) = \frac{8(1)^2}{(1)^4 + 16} = \frac{8}{17}$ $(1, 8/17)$

c) $1 = \frac{8x^2}{x^4 + 16} \rightarrow x^4 - 8x^2 + 16 = 0$
 $(x^2 - 4)(x^2 - 4) = 0$
 $x = \pm 2$ $(2, 1), (-2, 1)$

d) Domain $(-\infty, \infty)$

e) x-int $0 = \frac{8x^2}{x^4 + 16}$ $x = 0$ $(0, 0)$

f) y-int $y = \frac{8(0)}{(0)^4 + 16}$ $y = 0$ $(0, 0)$

2.1-2.2 classwork continued

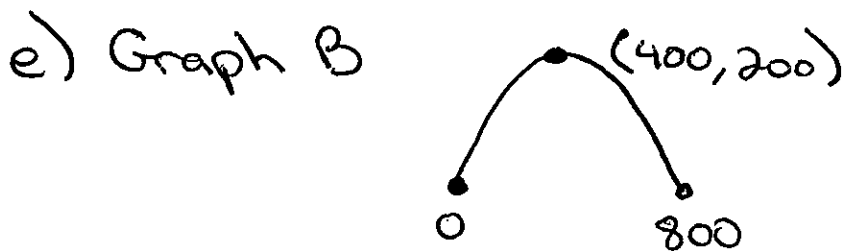
⑥ $h(x) = \frac{-32x^2}{160^2} + x$

a) $x=100 \quad \frac{-32(100)^2}{160^2} + 100 = \boxed{87.5}$

b) $x=300 \quad \frac{-32(300)^2}{160^2} + 300 = \boxed{187.5}$

c) $x=400 \quad \frac{-32(400)^2}{160^2} + 400 = \boxed{200}$

d) $h=0 \quad 0 = \frac{-32x^2}{160^2} + x$
 $0 = -32x^2 + 160^2x$
 $x=0, \boxed{x=800}$



f) calculator

$100 = \frac{-32x^2}{160^2} + x \rightarrow \begin{matrix} \boxed{117.2} \\ \boxed{682.8} \end{matrix}$

g) calculator

max $\boxed{400, 200}$

h) calculator

$\boxed{400}$