Section 3-8

Name:

1. **Given the formula for the perimeter of a rectangle is:**

$$2l + 2w = P$$

rewrite the formula so that it has been solved for the variable 'w'.

$$\cancel{2l} + 2w = P$$
$$\cancel{-2l} \qquad -2l$$
$$\frac{2w}{2} = \frac{P-2l}{2}$$
$$\boxed{w = \frac{P-2l}{2} \text{ or } \frac{P}{2} - \frac{2l}{2} \text{ or } \frac{P}{2} - l}$$

: SUBTRACT $2l$ FROM BOTH SIDES

: DIVIDE BOTH SIDES BY 2

2. **Given the formula for Power in Watts of an electrical circuit is:**

$$P = I \cdot V$$

where *I* is the resistance in Ohms and V is the voltage in volts, rewrite the formula so that it has been solved for '*V*'.

$$\frac{P}{I} = \frac{\cancel{I} \cdot V}{\cancel{I}}$$
$$\boxed{\frac{P}{I} = V}$$

: DIVIDE BOTH SIDES BY I.

3. **Given the formula for Centripetal Acceleration can be described by the formula:**

$$a = \frac{v^2}{r}$$

where '*v*' is the velocity in meters per second (m/s) and '*r*'´ is the length of the radius in meters. Assuming all variables represent positive values, rewrite the formula so that it has been solved for '*v*'.

DON'T HAVE TO WRITE ±

$$r \cdot a = \frac{v^2}{\cancel{r}} \cdot \cancel{r}$$
$$\sqrt{ar} = \sqrt{v^2}$$
$$\boxed{\sqrt{ar} = v}$$

: MULTIPLY BOTH SIDES BY r

: TAKE THE SQUARE ROOT OF BOTH SIDES. WE DON'T NEED TO WRITE ± BECAUSE ALL VALUES ARE POSITIVE

4. **Given the formula for the area of a trapezoid is:**

$$\frac{h}{2}(b_1 + b_2) = P$$

rewrite the formula so that it has been solved for the variable 'b_1'.

METHOD #1

$$\frac{\cancel{2}}{\cancel{h}} \cdot \frac{\cancel{h}}{\cancel{2}} \cdot (b_1 + b_2) = \frac{P}{1} \cdot \frac{2}{h}$$
$$b_1 + b_2 = \frac{2P}{h}$$
$$-b_2 \qquad -b_2$$
$$b_1 = \frac{2P}{h} - b_2$$
$$\boxed{b_1 = \frac{2P}{h} - b_2} = \frac{2P}{h} - \frac{b_2 h}{h} = \frac{2P - b_2 h}{h}$$

: MULTIPLY BOTH SIDES BY $\frac{2}{h}$

: SUBTRACT b_2 FROM BOTH SIDES

ALTERNATE CORRECT FORMS

METHOD #2

$$\frac{h}{2}\left(\frac{b_1}{1} + \frac{b_2}{1}\right) = P$$
$$\frac{b_1 h}{2} + \cancel{\frac{b_2 h}{2}} = P$$
$$\cancel{-\frac{b_2 h}{2}} \qquad -\frac{b_2 h}{2}$$
$$\frac{b_1 \cancel{h}}{\cancel{2}} \cdot \frac{\cancel{2}}{\cancel{h}} = \left(P - \frac{b_2 h}{2}\right) \cdot \frac{2}{h}$$
$$b_1 = \frac{2P}{h} - \frac{\cancel{2}b_2 \cancel{h}}{\cancel{2h}} = \boxed{\frac{2P}{h} - b_2}$$

: DISTRIBUTE $\frac{h}{2}$

: SUBTRACT $\frac{b_2 h}{2}$ FROM BOTH SIDES

: MULTIPLY BOTH SIDES BY $\frac{2}{h}$ AND DISTRIBUTE

: SIMPLIFY

5. **Given the function, $f(x) = x^2 + 2x$, determine the average rate of change from x = 1 to x = 2.**

SLOPE

$M = \frac{Y_2 - Y_1}{X_2 - X_1}$

$(\overset{x_1}{1}, \overset{y_1}{3})$ $(\overset{x_2}{2}, \overset{y_2}{8})$

$f(1) = (1)^2 + 2(1)$
$= 1 + 2$
$= 3$

$f(2) = (2)^2 + 2(2)$
$= 4 + 4$
$= 8$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{8-3}{2-1} = \frac{5}{1} = \boxed{5}$

6. **Given the function, $p(x) = 2^x + 1$, determine the average rate of change from x = 0 to x = 2.**

$(\overset{x_1}{0}, \overset{y_1}{2})$ $(\overset{x_2}{2}, \overset{y_2}{5})$

$P(0) = 2^{(0)} + 1$
$= 1 + 1$
$= 2$

$P(2) = 2^{(2)} + 1$
$= 4 + 1$
$= 5$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{5-2}{2-0} = \frac{3}{2} = \boxed{\frac{3}{2}}$

7. **Given the table of values for $h(x)$,**

x	– 2	0	2	4	6
h(x)	3	– 1	3	15	35

what is the average rate of change from x = 2 to x = 6?

$(\overset{x_1}{2}, \overset{y_1}{3})$ $(\overset{x_2}{6}, \overset{y_2}{35})$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{35-3}{6-2} = \frac{32}{4} = \boxed{8}$

8. **Given the table of values for $g(x)$,**

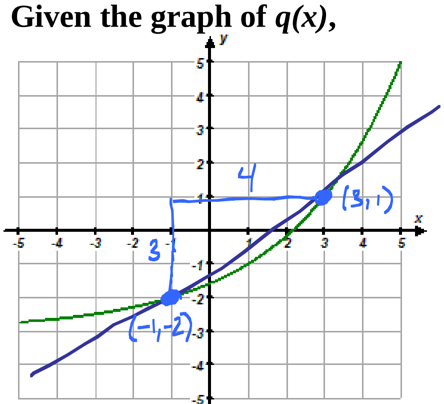
x	– 2	0	2	4	6
g(x)	3	– 1	3	15	35

what is the average rate of change from x = -2 to x = 4?

$(\overset{x_1}{-2}, \overset{y_1}{3})$ $(\overset{x_2}{4}, \overset{y_2}{15})$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{15-3}{4--2} = \frac{12}{6} = \boxed{2}$

9. **Given the graph of *q(x)*,**



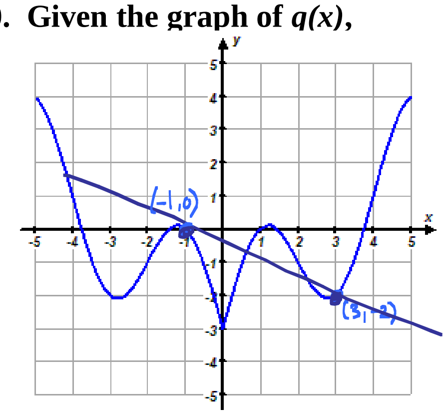
what is the average rate of change from x = – 1 and x = 3.

$(\overset{x_1}{-1}, \overset{y_1}{-2})$ $(\overset{x_2}{3}, \overset{y_2}{1})$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{1--2}{3--1} = \frac{3}{4} = \boxed{\frac{3}{4}}$

$\frac{RISE}{RUN} = \frac{3}{4}$

10. **Given the graph of *q(x)*,**

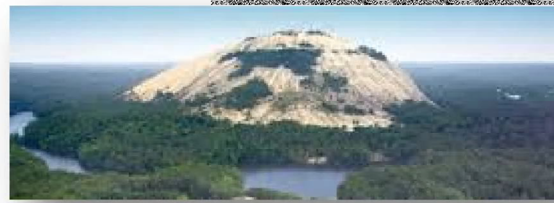


what is the average rate of change from x = – 1 ~~and~~ to x = 3.

$(\overset{x_1}{-1}, \overset{y_1}{0})$ $(\overset{x_2}{3}, \overset{y_2}{-2})$

$M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{-2-0}{3--1} = \frac{-2}{4} = \boxed{\frac{-1}{2}}$

11. A group of students visited Stone Mountain. They decided to walk up to the top of the mountain. At 3:00 pm they started walking and according to their GPS when they were at the bottom of the mountain their elevation was 861 feet above sea level. At 3:45 pm they were at the top of the mountain which was 1686 feet above sea level. What is the students' average rate of change in feet per minute?

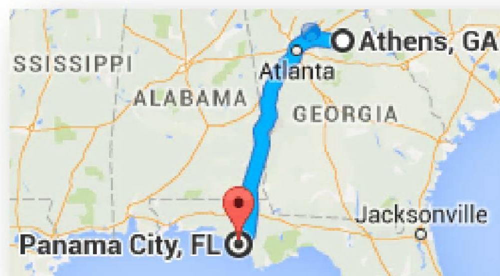


AVG RATE OF CHANGE : $\dfrac{\text{CHANGE IN FEET}}{\text{CHANGE IN MINUTES}} = \dfrac{1686 - 861}{45 - 0} = \dfrac{825 \text{ ft}}{45 \text{ MIN}}$

$= 18.\overline{3}$ ft/Min

```
825/45
       18.3333333
```

12. A college student is driving from Athens to Panama City Beach for a vacation. The student left Athens at 12:00pm and arrived at the beach at 5:15pm but gained an hour due to the Standard Time Zone change. The trip was exactly 350miles. What was the student's average rate of speed in miles per hour?



AVERAGE RATE OF CHANGE : $\dfrac{\text{CHANGE IN MILES}}{\text{CHANGE IN HOURS}}$: $\dfrac{350 \text{ MILES}}{6.25 \text{ HRS}}$ AVERAGE $= 56$ MILES ~~PER~~ HOUR

```
350/6.25
              56
```

HOW MANY HOURS ARE THERE FROM 12:00 PM TO 5:15 PM?

$5 + \frac{15}{60} = 5.25$ hrs (15 MINUTES IS A QUARTER OF AN HOUR)

& ADD AN HOUR FOR THE TIME CHANGE 6.25 HOURS

Do you think the student ever traveled more than 58 miles per hour?

THE STUDENT PROBABLY STOPPED ALONG THE WAY AT SOME POINT WHICH WOULD BE 0 MPH. SO TO GET THE AVERAGE BACK UP TO 56 MPH, THE STUDENT HAD TO GO FASTER THAN 56MPH AT SOME POINT SO IT COULD AVERAGE TO 56 MPH.