

SEC 2.1 - SLOPE

① WRITE THE SLOPE FORMULA: $m = \frac{y_2 - y_1}{x_2 - x_1}$

② FOR EACH OF THE FOLLOWING, COMPUTE SLOPE:

(A) (8, 10) (-7, 14)

$$\frac{14 - 10}{-7 - 8} = \frac{4}{-15}$$

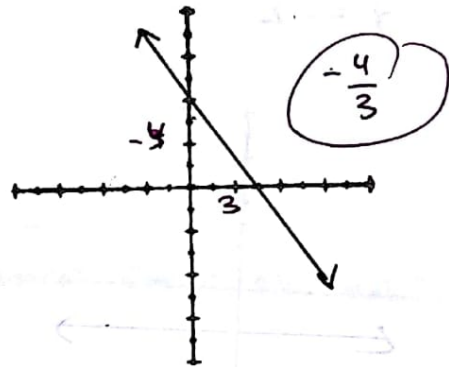
(B) (-18, 13) (-18, 20)

$$\frac{20 - 13}{-18 - (-18)} = \frac{7}{0} \text{ (UNDEF)}$$

(C) (12, 5) (21, 5)

$$\frac{5 - 5}{21 - 12} = \frac{0}{9} = 0$$

(D)



③ FIND THE SLOPE OF THE LINE PARALLEL TO THE LINE THAT PASSES THROUGH (3, 4) AND (-5, 0).

$$\frac{4 - 0}{3 - (-5)} = \frac{4}{8} = \frac{1}{2}$$

④ FIND THE SLOPE OF THE LINE PERPENDICULAR TO THE LINE THAT PASSES THROUGH (3, 4) AND (-5, 0).

$$m_{\perp} = -2$$

SEC 2.2 - EQUATIONS OF LINES

⑤ WHAT IS THE SLOPE OF A HORIZONTAL LINE?

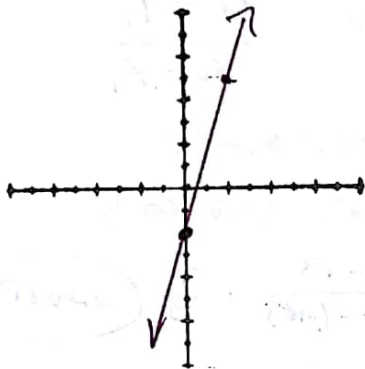
$$m = 0$$

⑥ WHAT IS THE SLOPE OF A VERTICAL LINE?

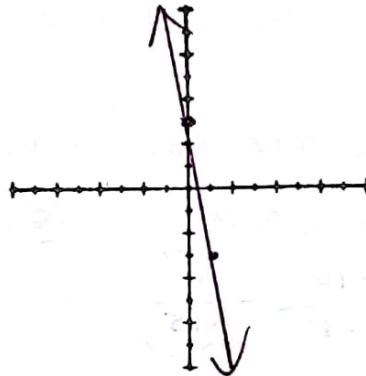
UNDEFINED

(7) GRAPH EACH OF THE FOLLOWING LINES:

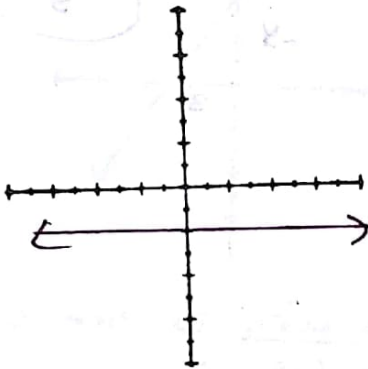
(A) $y = \frac{7}{2}x - 2$



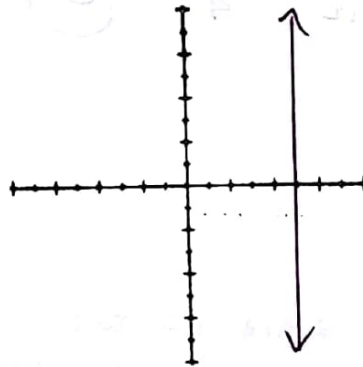
(B) $y = -6x + 3$



(C) $y = -2$



(D) $x = 5$



(8) WRITE $2x + 4y = 8$ IN SLOPE-INTERCEPT FORM.

$$\begin{array}{r} 2x + 4y = 8 \\ -2x \quad -2x \\ \hline 4y = -2x + 8 \end{array} \quad \rightarrow \quad \frac{4y}{4} = \frac{-2x}{4} + \frac{8}{4}$$
$$\boxed{y = -\frac{1}{2}x + 2}$$

(9) WRITE $y = 3x + 2$ IN STANDARD FORM.

$$\begin{array}{r} y = 3x + 2 \\ -3x \quad -3x \\ \hline -3x + y = 2 \end{array} \quad \rightarrow \quad \boxed{3x - y = -2}$$

(10) WHAT IS THE SLOPE OF $2x + 3y = 10$?

$$m = \frac{-A}{B} = \boxed{\frac{-2}{3}}$$

11) FIND THE X-INTERCEPT AND Y-INTERCEPT FOR
 $3x + 2y = 6$ $(0, 3)$ $2y = 6$ $y = 3$
 $(2, 0)$ $3x = 6$ $x = 2$

12) GIVEN $(9, 3)$ AND $m = 5$, WRITE AN EQUATION IN POINT-SLOPE FORM.

$$y - 3 = 5(x - 9)$$

13) WRITE $y - 4 = \frac{3}{4}(x - 4)$ IN SLOPE-INTERCEPT FORM.

$$y - 4 = \frac{3}{4}x - 3$$

$$y = \frac{3}{4}x + 1$$

SEC 2.3 - AVERAGE RATE OF CHANGE

14) GIVE THE FORMULA FOR AVERAGE RATE OF CHANGE.

$$\text{AVG RATE OF } \Delta = \frac{f(b) - f(a)}{b - a}$$

15) FOR EACH OF THE FOLLOWING FUNCTIONS, FIND THE AVERAGE RATE OF CHANGE FROM $x=0$ TO $x=3$.

(A) $h(x) = 3(2)^x$
 $f(3) = 3(2)^3 = 24$
 $f(0) = 3(2)^0 = 3$
 $\frac{24 - 3}{3 - 0} = \frac{21}{3} = \boxed{7}$

(B) $k(x) = 3x^2 + x - 1$
 $k(3) = 3(3)^2 + 3 - 1 = 29$
 $k(0) = -1$
 $\frac{29 - (-1)}{3 - 0} = \frac{30}{3} = \boxed{10}$

(C) $f(x) = 3x - 2$
 $m = \boxed{3}$ OR
 $f(3) = 3(3) - 2 = 4 - 2 = 7$
 $f(0) = -2$
 $\frac{7 - (-2)}{3 - 0} = \frac{9}{3} = \boxed{3}$

16) $h(x)$ IS DEPICTED IN THE TABLE BELOW.

x	0	1	2	3	4	5	6
$h(x)$	31	28	25	20	22	25	30

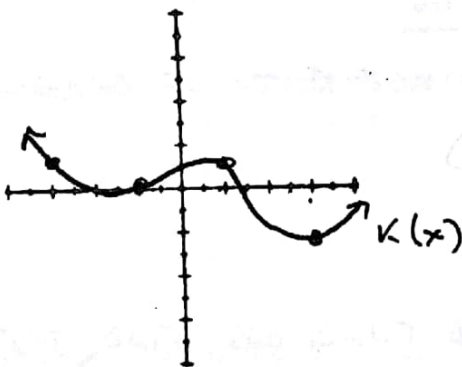
(A) FIND THE AVERAGE RATE OF CHANGE OF $h(x)$ FROM $x=0$ TO $x=4$.

$$\left. \begin{array}{l} h(4) = 22 \\ h(0) = 31 \end{array} \right\} \frac{h(4) - h(0)}{4 - 0} = \frac{22 - 31}{4 - 0} = \frac{-9}{4}$$

(B) FIND THE AVERAGE RATE OF CHANGE OF $h(x)$ FROM $x=4$ TO $x=6$

$$\left. \begin{array}{l} h(4) = 22 \\ h(6) = 30 \end{array} \right\} \frac{h(6) - h(4)}{6 - 4} = \frac{30 - 22}{6 - 4} = \frac{8}{2} = 4$$

17) THE GRAPH OF $k(x)$ IS SHOWN BELOW.



(A) FIND THE AVERAGE RATE OF CHANGE OF $k(x)$ FROM $x=-2$ TO $x=2$.

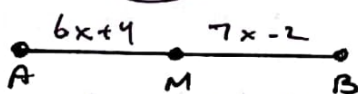
$$\left. \begin{array}{l} k(-2) = 0 \\ k(2) = 1 \end{array} \right\} \frac{1 - 0}{2 - (-2)} = \frac{1}{4}$$

(B) FIND THE AVERAGE RATE OF CHANGE OF $k(x)$ FROM $x=2$ TO $x=6$.

$$\left. \begin{array}{l} k(2) = 1 \\ k(6) = -2 \end{array} \right\} \frac{-2 - 1}{6 - 2} = \frac{-3}{4}$$

SEC 2.5 - GEOMETRY APPLICATIONS

18) FIND AM IF M IS THE MIDPOINT OF \overline{AB} , AND $AM = 6x + 4$

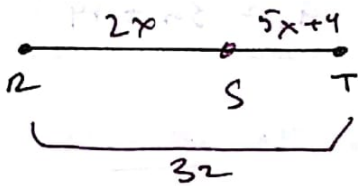


AND $MB = 7x - 2$.

$$\begin{aligned} 6x + 4 &= 7x - 2 \\ 6 &= x \end{aligned}$$

$$AM = 6(6) + 4 = 40$$

- 19) IF R AND T ARE END POINTS OF \overline{RT} AND S IS A POINT BETWEEN THEM, FIND \overline{RS} IF $RS = 2x$, $ST = 5x + 4$, AND $RT = 32$.



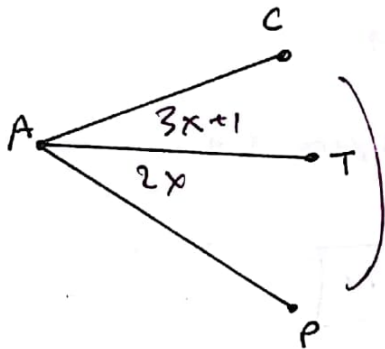
$$2x + 5x + 4 = 32$$

$$7x = 28$$

$$x = 4$$

$$RS = 2(4) = \boxed{8}$$

20)



IF $m\angle CAT = 3x + 1$, $m\angle TAP = 2x$, AND $m\angle CAP = 21$, FIND $m\angle CAT$.

$$3x + 1 + 2x = 21$$

$$5x + 1 = 21$$

$$5x = 20$$

$$x = 4$$

$$m\angle CAT = 3(4) + 1 = \boxed{13}$$

SEC 2.6 - ARITHMETIC SEQUENCES

- 21) DETERMINE IF EACH SEQUENCE IS ARITHMETIC.

(A) $3, 5, 9, 15, \dots$ NO. NO COMMON DIFFERENCE.
 $\underbrace{3 \rightarrow 5}_{+2}, \underbrace{5 \rightarrow 9}_{+4}, \underbrace{9 \rightarrow 15}_{+6}$

(B) $4.5, 7.1, 9.7, 12.3, \dots$ YES, $d = 2.6$
 $\underbrace{4.5 \rightarrow 7.1}_{+2.6}, \underbrace{7.1 \rightarrow 9.7}_{+2.6}, \underbrace{9.7 \rightarrow 12.3}_{+2.6}$

- 22) FIND THE NEXT 3 TERMS OF EACH SEQUENCE:

(A) $5, 11, 17, \dots$ $\boxed{23, 29, 35}$
 $\underbrace{5 \rightarrow 11}_{+6}, \underbrace{11 \rightarrow 17}_{+6}$

(B) $\frac{1}{12}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \dots$

$\frac{1}{12}, \frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \boxed{\frac{5}{12}, \frac{6}{12}, \frac{7}{12}}$

(COMMON DENOMINATOR)

23) WRITE AN EQUATION FOR THE n th TERM, a_n , OF THE SEQUENCE: 17, 20, 23, ...

$a_1 = 17$

$d = 3$

$a_n = 17 + (n-1)(3)$ OR $a_n = 3n + 14$

24) USE YOUR ANSWER IN #23 TO FIND THE 50th TERM.

$a_{50} = 17 + (49)(3) = 164$ OR

$a_{50} = 3(50) + 14 = 164$

25) WHICH TERM OF THE SEQUENCE IN #23, IS 314?

$314 = 3n + 14$

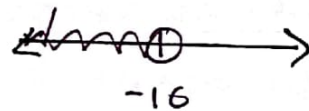
$300 = 3n \quad n = 100 \quad a_{100} = 314$

OLD STUFF:

26) SOLVE AND GRAPH

$\frac{32 > -2y}{-2} \quad \frac{-2}{-2}$

$-16 < y$

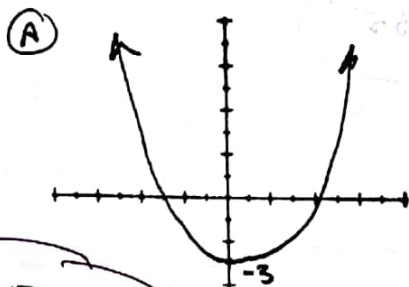


27) SOLVE $2x + b = w$ FOR x .

$\frac{2x + b = w}{-b \quad -b} \rightarrow \frac{2x = w - b}{2}$

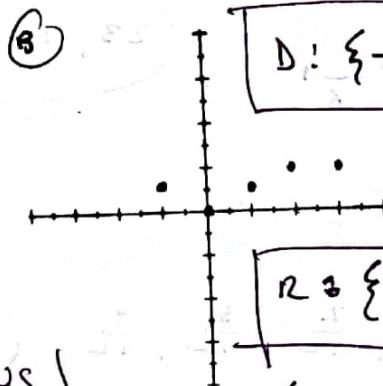
$x = \frac{w-b}{2}$ OR $x = \frac{w}{2} - \frac{b}{2}$

28) FOR EACH OF THE FOLLOWING GRAPHS, GIVE DOMAIN AND RANGE!



D: \mathbb{R}
R: $y \geq -3$

(CONTINUOUS)



D: $\{ -2, 0, 2, 4, 6 \}$

R: $\{ 1, 0, 2 \}$

(DISCRETE)

FORMULAS :

SLOPE : $m = \frac{y_2 - y_1}{x_2 - x_1}$

SLOPE - INTERCEPT : $y = mx + b$

STANDARD FORM : $Ax + By = c$ $m = -\frac{A}{B}$ $b = \frac{c}{B}$

POINT SLOPE FORM : $y - y_1 = m(x - x_1)$

AVERAGE RATE OF CHANGE : $\frac{f(b) - f(a)}{b - a}$

nth TERM OF ARITHMETIC SEQUENCE :

$$a_n = a_1 + (n - 1)d$$