(only basic calculator permitted))

To obtain any credit, you must show your work! Place a box around each answer.

1. *[12 pts]*   Consider the straight line with equation $y = 15 - 3(4 - 5x)$.

    (a)   What is the slope of this line?

Solution: Distributing the 3 yields $y = 15 - (12 - 15x)$

Distributing the $-$ in front of the parentheses: $y = 15x + 3$

Hence the slope is **15.**

    (b)   What is the y-intercept of this line?

Using (a) the y-intercept is **3.**

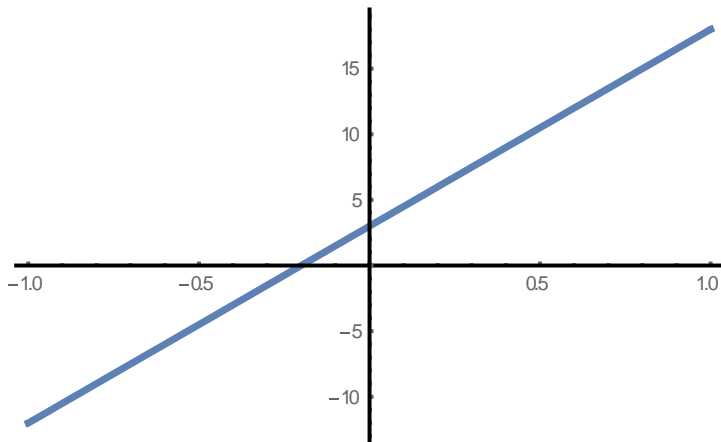   (c)   Write the line in slope-intercept form.

Using (a) $y = 15x + 3$

    (d)   What is the x-intercept of this line?

Solution:

Setting $y = 0$, we have $0 = 15x + 3$; So $15x = -3$; $\boldsymbol{x = -\dfrac{1}{5}}$

    (e)   Sketch a graph of this line.

2. *[6 pts]*   The cost, in dollars, of hiring a repair person for h hours is given by $C = 50 + 25h$.

(a) What does the repair person charge to walk in the door?

Solution:

Setting h = 0, we find that the cost of walking in the door is **$ 50**.

(b) What is the hourly rate of the repair person?

Solution:

The hourly rate is the slope of the given line, namely, **$ 25/hour**.

3. *[12 pts]*   A passenger tram ride to go up Pike's Peak begins at an elevation of 1113 meters. One minute after starting, the passenger is at 1451 meters.

(a) Find a linear function for the passenger's elevation, h, in meters, t minutes after starting the ride.

Solution: Let E(t) denote the elevation of the tram at time t, where t denotes the number of minutes since the tram began its ascent.

Since the tram increases elevation by 1451 – 113 = 1338 meters/min, the slope of our line must be 1138.

Since at time t = 0, the tram's elevation is 1113, it follows that E(t) = 1338 t + 1113

(b) Give the units of t and h.

Units of t are: **minutes**

Units of h are: **meters**

(c)   What is the practical interpretation of the vertical intercept?

Solution: The vertical intercept represents the position of the tram at time t = 0.

(d)   What is the practical interpretation of the slope?

Solution: The slope represents the speed of the tram in meters/mile.

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