Slope Intercept Form $y = mx + b$
Standard Form $Ax + By = C$

Point Slope Form

Deriving Point Slope Form:

Point Slope Form:
$$y - y_1 = m(x - x_1)$$
(x_1, y_1) is a point we know
m is the slope

Write an equation in point-slope form for the line with the given slope that contains the given point.

a. **slope** $= \dfrac{1}{6}; (5, 1)$

$$y - 1 = \frac{1}{6}(x - 5)$$

b. **slope** $= 1; (-1, -4)$

$$y + 4 = 1(x + 1)$$

c. slope $= 2; \left(\dfrac{1}{2}, 1\right)$

$$y - 1 = 2\left(x - \tfrac{1}{2}\right)$$

d. slope $= 0; (3, -4)$

$$y + 4 = 0(x - 3)$$

What is the point we know?   What is the slope?

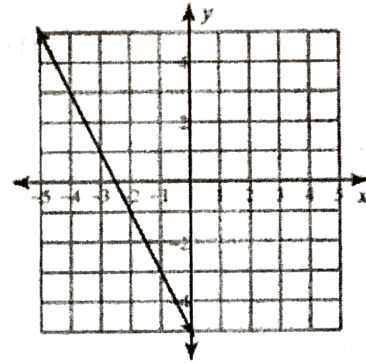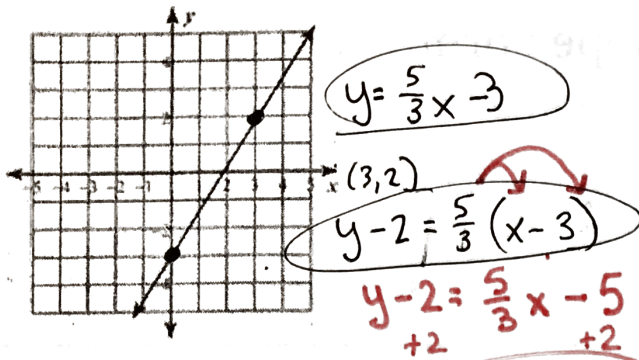A. $y + 2 = 6(x - 1)$

point: $(1, -2)$
Slope: 6

B. $y - 2 = 6(x + 1)$

point: $(-1, *2)$
slope: 6

What does point-slope form highlight?

Write the equation of each line in point slope form AND slope intercept form:

$y = \frac{5}{3}x - 3$

$(3, 2)$

$y - 2 = \frac{5}{3}(x - 3)$

$y - 2 = \frac{5}{3}x - 5$

$+2 \qquad\qquad +2$

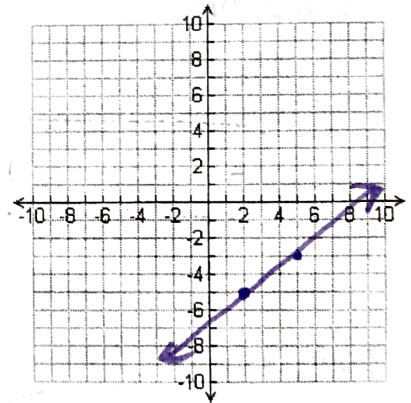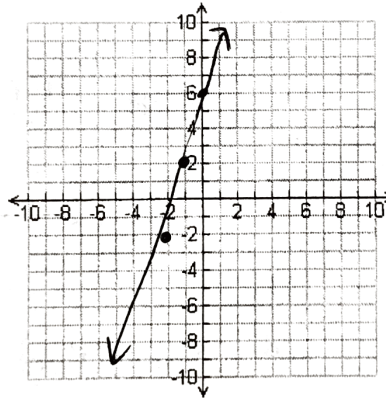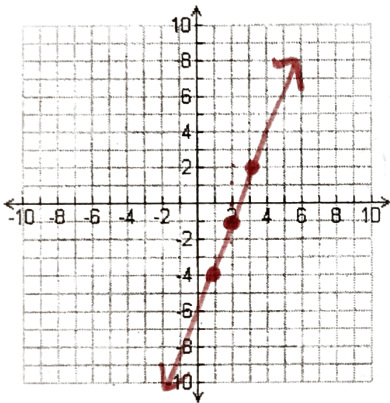Graph from point-slope form: $y = \frac{5}{3}x - 3$

a. $y + 1 = 3(x - 2)$

Point: $(2, -1)$
Slope: 3

b. $y - 2 = 4(x + 1)$

c. $y + 5 = \frac{2}{3}(x - 2)$

A gas station has a customer loyalty program. The graph shows the amount of dollars that two members paid for gas.

a. Why should we use point-slope form for this situation?
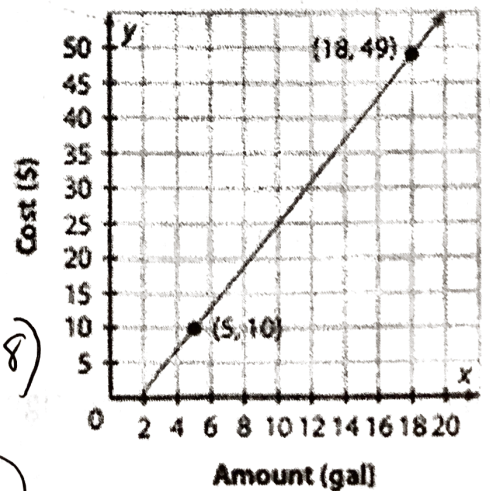
We can't see the y-intercept

b. Write a ~~function~~ that relates the number of gallons with the cost.   equation in point slope form

$y - 10 = 3(x - 5)$ $y - 49 = 3(x - 18)$

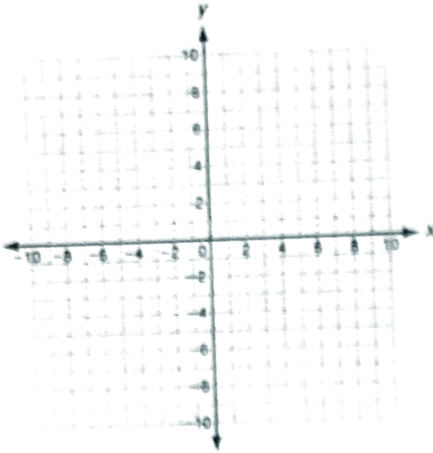c. How much will a customer pay for 25 gallons of gas?

$y - 10 = 3(20)$
$y - 10 = 60$ → $y = 70$ ($70)

(18, 49)
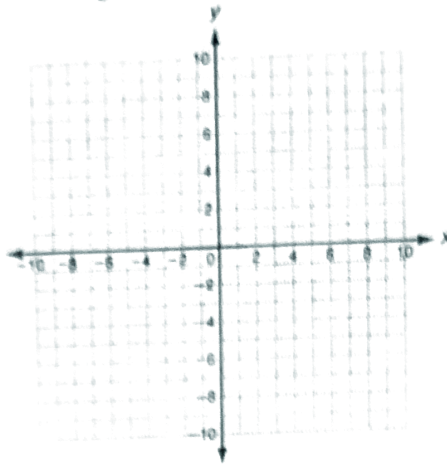
(5, 10)

Cost ($)

Amount (gal)

Point- Slope Form Homework

Graph from Standard Form

1. $5x - 2y = 10$

2. $\frac{2}{3}x + 2y = 6$

Write an equation in point-slope form for the line with the given slope that contains the given point.

3. slope $= 3$; $(-4, 2)$

4. slope $= -1$; $(6, -1)$

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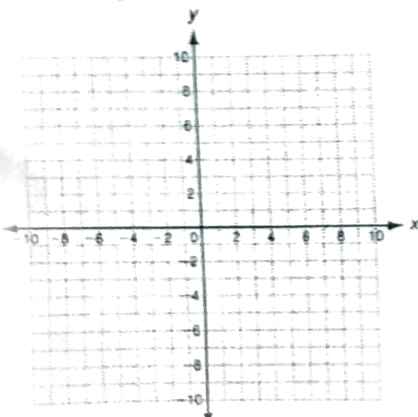5. slope $= -4$; $(1, -3)$ is on the line

6. slope $= \frac{1}{2}$ $(-8, -5)$ is on the line

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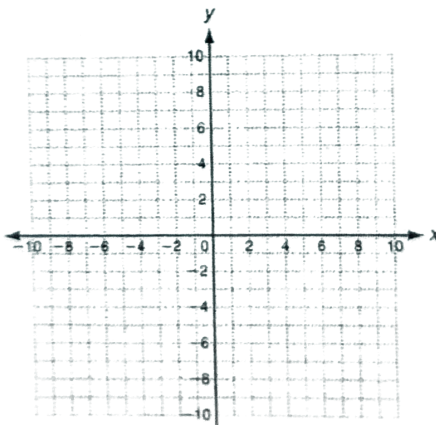7. $(2, 1)$ and $(0, -7)$ are on the line

8. $(-6, -6)$ and $(2, -2)$ are on the line

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Graph the line described by each equation in point-slope form.
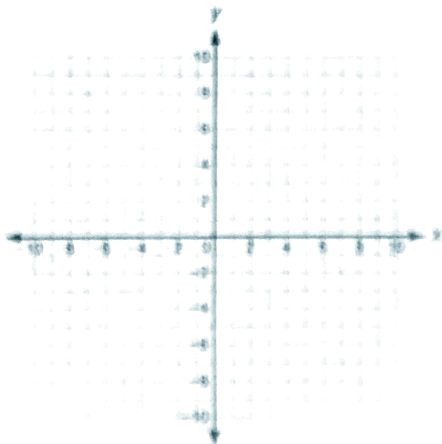
9. $y + 2 = -\frac{2}{3}(x - 6)$
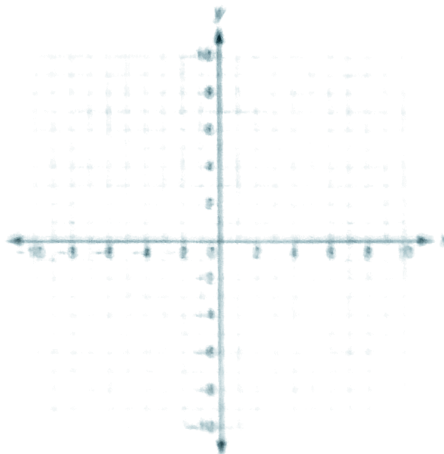
10. $y + 3 = -2(x - 4)$

THERE IS A BACK!

Graph the line described by each equation in point-slope form.

11. $y + 1 = -5(x + 1)$

12. $y + 2 = -(x - 1)$

Review:

Solve for y (Get y alone):

a. $2x - 4y = 10$

b. $y + 1 = -5(x + 1)$ Distribute the -5 first!