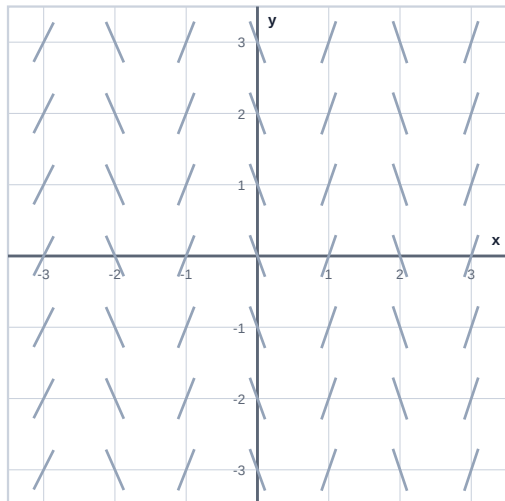


Graphing Solutions on Slope Fields

Sketch one valid solution curve that follows each supplied slope field on one connected interval.
Infinitely many vertical translations are valid; constants may differ across separate domain intervals.

1.

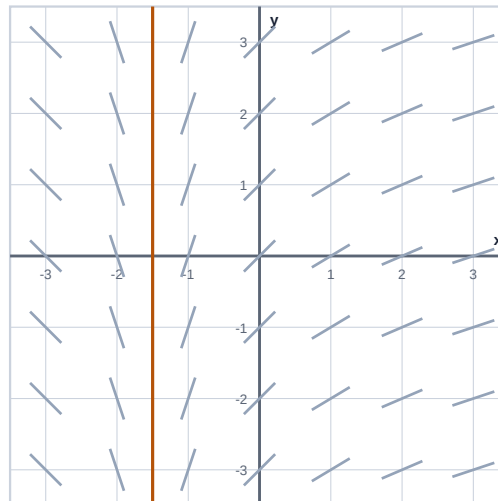
$$\frac{dy}{dx} = 3 \cdot \sin(-2 - 3 \cdot x)$$



Domain: all real x.

2.

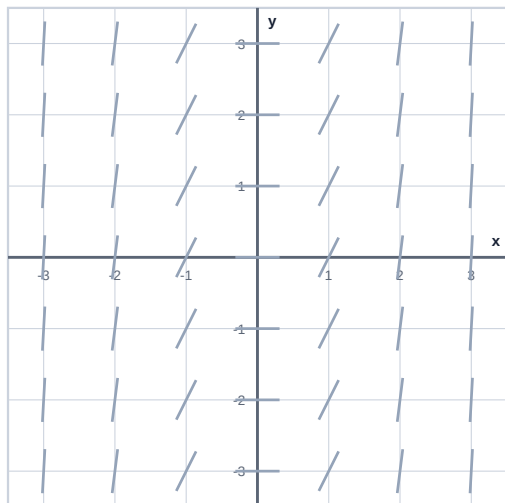
$$\frac{dy}{dx} = \frac{-3}{-2 \cdot x - 3}$$



Domain: x is not -3/2; solve on one connected side of the pole.
Orange lines mark excluded x-values.

3.

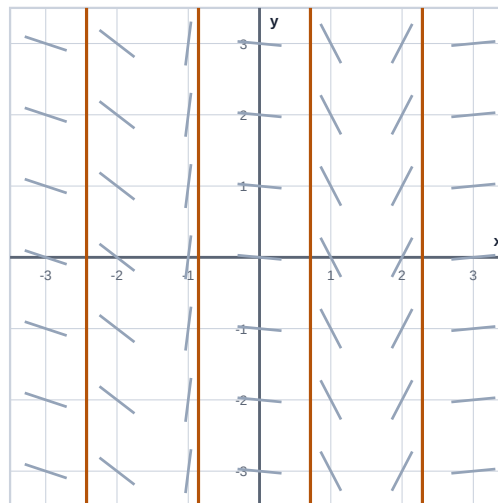
$$\frac{dy}{dx} = 2 \cdot x^2$$



Domain: all real x.

4.

$$\frac{dy}{dx} = \frac{2}{3} \cdot \sec(-3 + 2 \cdot x) \cdot \tan(-3 + 2 \cdot x)$$



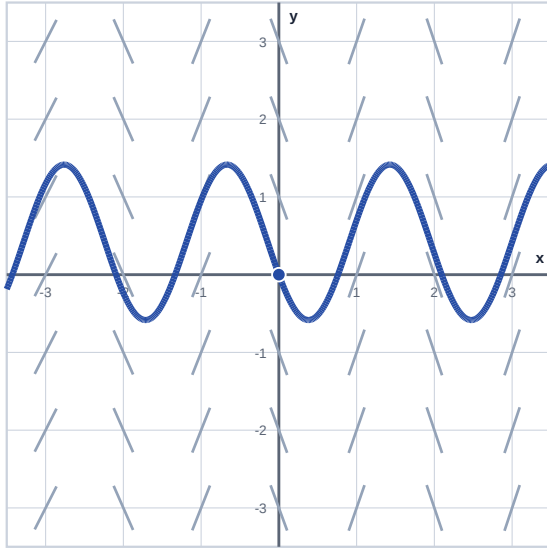
Domain: $\cos(2x-3)$ is not 0; use one connected interval between poles.
Orange lines mark excluded x-values.

Graphing Solutions on Slope Fields

Worked Answer Key

Sketch one valid solution curve that follows each supplied slope field on one connected interval.
Infinitely many vertical translations are valid; constants may differ across separate domain intervals.

1. One valid example solution



$$\frac{dy}{dx} = 3 \cdot \sin(-2 - 3 \cdot x)$$

$$y = \cos(-2 - 3 \cdot x) + C$$

The shown key curve is one example through (0,0), so exactly $C = -G(0)$; numerically, C is approximately 0.41614684. Every vertical translate is also valid on a connected domain interval.

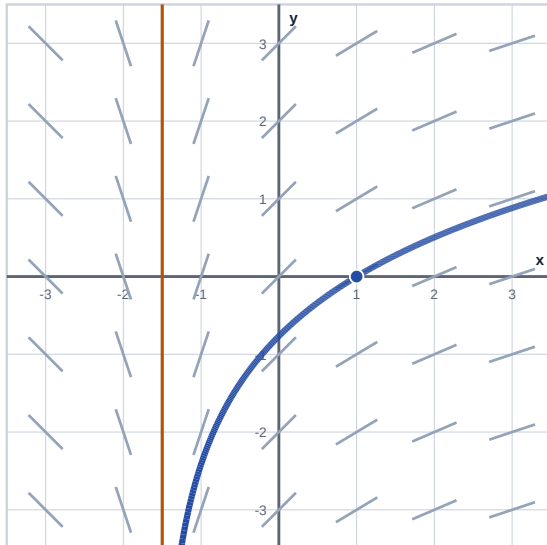
Domain: all real x .

$$G(x) = \cos(-2 - 3 \cdot x)$$

$$G'(x) = 3 \cdot \sin(-2 - 3 \cdot x)$$

Multiply the primitive adjustment by the certified derivative factor $3/1$; the recovered coefficient is $3/1$.

2. One valid example solution



$$\frac{dy}{dx} = \frac{-3}{-2 \cdot x - 3}$$

$$y = \frac{3}{2} \cdot \ln(|-2 \cdot x - 3|) + C$$

The shown key curve is one example through (1,0), so exactly $C = -G(1)$; numerically, C is approximately -2.4141569. Every vertical translate is also valid on a connected domain interval.

Domain: x is not $-3/2$; solve on one connected side of the pole. Orange lines are poles; the curve never crosses them.

$$G(x) = \frac{3}{2} \cdot \ln(|-2 \cdot x - 3|)$$

$$G'(x) = \frac{-3}{-2 \cdot x - 3}$$

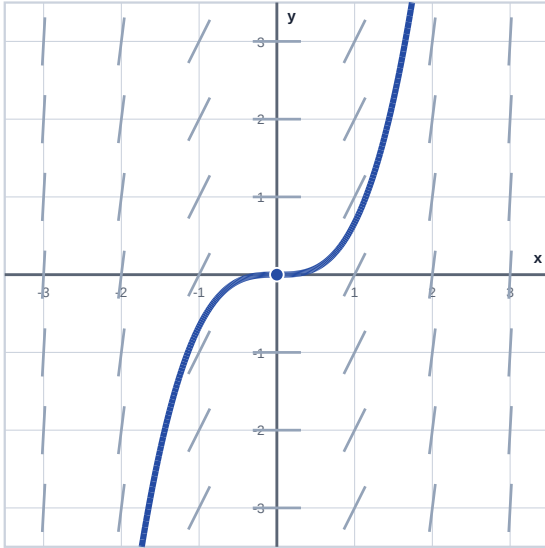
Multiply the primitive coefficient by the inner slope -2 ; this recovers $-3/1$ over the affine denominator.

Graphing Solutions on Slope Fields

Worked Answer Key

Sketch one valid solution curve that follows each supplied slope field on one connected interval.
Infinitely many vertical translations are valid; constants may differ across separate domain intervals.

3. One valid example solution



$$\frac{dy}{dx} = 2 \cdot x^2$$

$$y = \frac{2}{3} \cdot x^3 + C$$

The shown key curve is one example through (0,0), so exactly $C = -G(0)$; numerically, C is approximately 0. Every vertical translate is also valid on a connected domain interval.

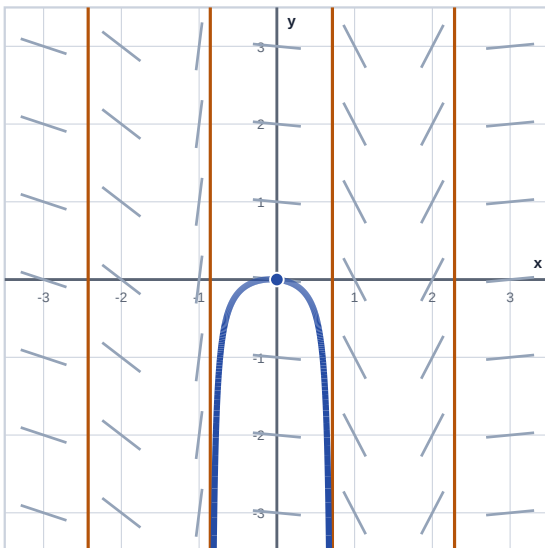
Domain: all real x .

$$G(x) = \frac{2}{3} \cdot x^3$$

$$G'(x) = 2 \cdot x^2$$

Differentiate each primitive term: multiply by its power, then lower that power by 1.

4. One valid example solution



$$\frac{dy}{dx} = \frac{2}{3} \cdot \sec(-3 + 2 \cdot x) \cdot \tan(-3 + 2 \cdot x)$$

$$y = \frac{1}{3} \cdot \sec(-3 + 2 \cdot x) + C$$

The shown key curve is one example through (0,0), so exactly $C = -G(0)$; numerically, C is approximately 0.33670289. Every vertical translate is also valid on a connected domain interval.

Domain: $\cos(2x-3)$ is not 0; use one connected interval between poles. Orange lines are poles; the curve never crosses them.

$$G(x) = \frac{1}{3} \cdot \sec(-3 + 2 \cdot x)$$

$$G'(x) = \frac{2}{3} \cdot \sec(-3 + 2 \cdot x) \cdot \tan(-3 + 2 \cdot x)$$

Multiply the primitive adjustment by the certified derivative factor 2/3; the recovered coefficient is 2/3.