2-40 (a)

$$\text{Johnson Co. breakeven point in number of rides} = \frac{\text{Capacity-related costs}}{\text{Unit contribution margin}} = \frac{\$300{,}000}{\$6} = 50{,}000 \text{ rides}$$

$$\text{Smith Co. breakeven point in number of rides} = \frac{\text{Capacity-related costs}}{\text{Unit contribution margin}} = \frac{\$1{,}500{,}000}{\$15} = 100{,}000 \text{ rides}$$

(b) Let x be the number of rides.

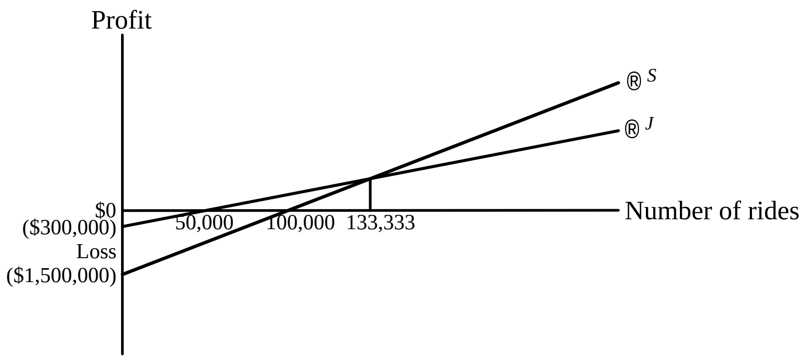
Johnson Co.'s profit function:

$$\text{®}^{J} = \$30x - 24x - 300{,}000 = \$6x - 300{,}000$$

Smith Co.'s profit function:

$$\text{®}^{S} = \$30x - 15x - 1{,}500{,}000 = \$15x - 1{,}500{,}000$$

Profit-Volume Chart



(c) We cannot say which firm's cost structure is more profitable as profits depend on sales volume. If sales drop to below 133,333 rides, Johnson Company's cost structure leads to more profits. However, if sales remain above 133,334 rides, then Smith Company's cost structure leads to more profits.

(d) The contribution margin generated must first cover the fixed costs and then the balance remaining after the fixed costs are fully covered goes toward profits. If the contribution margin is not sufficient to cover the fixed costs, then a loss occurs for the period. Once the breakeven point has been reached, profit will increase by the unit contribution margin for each additional unit sold. Here, Smith Company is more risky because it has higher fixed costs to cover and a higher unit contribution margin, which makes its profits more sensitive to decreases in the sales activity level.

2-41 (a) Contribution margin per unit:

Selling price		$250
Less variable costs:		
Variable production costs	$100	
Variable selling and distribution support	20	120
Contribution margin per unit		$130

(b) Let X = the sales volume at which the profit on sales is 10%

$$\text{Profit} = 250X - 120X - (200{,}000 + 62{,}500)$$
$$= 0.1 \times (250X)$$
$$130X - 262{,}500 = 25X$$
$$105X = 262{,}500$$
$$X = 2{,}500 \text{ units.}$$

(c) (1) Single-shift operations ($0 \leq X \leq 4{,}400$):

Selling price	$200
Variable costs	120
Contribution margin per unit	$80

Fixed costs =
$200,000 + $62,500 + $17,500 = $280,000

Breakeven point = $280,000 ÷ $80 = 3,500 units
(note: $0 \leq 3{,}500 \leq 4{,}400$)

(2) Two-shift operations ($4{,}400 \le X \le 8{,}800$):

Selling price	$200
Variable costs	120
Contribution margin per unit	$80

Fixed costs =
$310,000 + $62,500 + $17,500 = $390,000

Breakeven point = $390,000 ÷ $80 = 4,875 units
$(\text{note}: 4{,}400 \le 4{,}875 \le 8{,}800)$

(d) Profit to sales ratio in September:

$$= \frac{130 \times 3{,}000 - 262{,}500}{250 \times 3{,}000}$$

$$= \frac{390{,}000 - 262{,}500}{750{,}000}$$

$$= 0.17$$

(1) Single-shift operations ($0 \le X \le 4{,}400$)

$$200X - 120X - 280{,}000 = 0.17 \times 200X$$
$$80X - 280{,}000 = 34X$$
$$46X = 280{,}000$$
$$X = 6{,}087 \text{ units}$$

(Not acceptable because X cannot be more than 4,400 units with single-shift operations)

(2) Two-shift operations ($4{,}400 \le X \le 8{,}800$)

$$200X - 120X - 390{,}000 = 0.17 \times 200X$$
$$80X - 390{,}000 = 34X$$
$$46X = 390{,}000$$
$$X = 8{,}478 \text{ units}$$

$(\text{note}: 4{,}400 \le 8{,}478 \le 8{,}800)$