Situation 3: Price = $1.55, TFC = $1,000

Applying RORB II
- The range of production in which MC is declining is not a range in which a firm, if it produces, will stop. If it is worth to produce when an MC - $3.00, it will be even more worth it to produce when MC = $1.25 and $0.75.
- The range of production in which MC is increasing is the relevant production range. A firm, if it decides to produce, will stop somewhere in this range. Therefore, we start our application of RORB II when MC = $0.75.
- So … If one is to produce, stop when MR = MC, i.e. about at 800 units.

Applying RORB III: The short-run shut-down rule
- At q = 800, AVC = $1.63, TVC = $1,300
- P = $1.55 < $1.63 = AVC
- TR = $1,240 < $1,300 = TVC
- i.e. The firm is not covering it’s variable costs. In the short-run, it would rather close its doors temporarily than remain open.
- Let’s check. Sure enough, if the firm were to shut down, it would lose $1,000. If it were to operate, the best it could do would be to lose $1,060. Go RORB III!

Applying RORB III: The long-run exit rule (all costs are variable)
- At q = 800, ATC = $2.88, TC = $2,300
- P = $1.55 < $2.88 = ATC
- TR = $1,240 < $2,300 = TC
- i.e. The firm is not covering it’s total costs. In the long-run, it would rather exit the industry than remain in.
- Let’s check. Sure enough, if the firm were to exit the industry (a long-run endeavor), it would lose $0. If it were to operate, the best it could do would be to lose $1,060. Go RORB III!

Situation 3: q* short-run = 0, q* long-run = 0.
Situation 4:  Price = $3.55,  TFC = $2,000

Overview
- This is the same situation as the first chart (situation 1) on your handout except that fixed costs have doubled. But wait! Fixed costs are supposed to be irrelevant to decision making. Therefore, in the short-run, this firm should do the same thing it did in situation 1. **These changes in fixed costs should not change the firm’s optimal short-run decisions.** In situation, the best short-run decision was to:
  a) Produce at (about) 1,600
  b) Stay open in the short-run
- In the long-run, however, these fixed costs (maybe an increase in one’s cost of a lease, insurance) can be varied. Nothing is fixed, by definition, in the long-run. One can get rid of these costs by varying them down to zero) by leaving the industry. **Therefore, these changes might change a firm’s optimal decision in the long-run.**

Applying RORB II
- The range of production in which MC is declining is not a range in which a firm, if it produces, will stop. If it is worth to produce when an MC - $3.00, it will be even more worth it to produce when MC = $1.25 and $0.75.
- The range of production in which MC is increasing is the relevant production range.
- So … If one is to produce, stop when MR = MC, i.e. about at 1,600 units.

Applying RORB III: The short-run shut-down rule
- At q = 1,600, AVC = $2.19, TVC = $3,500
- P = $3.55 > $2.19 = AVC
- TR = $5,680 > $3,500 = TVC
- i.e. The firm is covering its variable costs. In the short-run, it would rather remain open than temporarily close its doors.
- Let’s check. Sure enough, if the firm were to shut down, it would lose $2,000. If it were to operate, it would earn $180. Go RORB III!
- **Holy cow! Operate at q = 1,600 and stay open in the short-run are the same results as in situation 1. Fixed costs are irrelevant to good decision making!**

Applying RORB III: The long-run exit rule (all costs are variable)
- At q = 1,600, ATC = $3.44, TC = $5,500
- P = $3.55 > $3.44 = ATC
- TR = $5,680 > $5,500 = TC
- i.e. The firm is covering its total costs. In the long-run, it would rather stay in the industry & earn $180, than exit and earn $0. Go RORB III!
Situation 4: $q^\ast$ short-run = 1,600, $q^\ast$ long-run = 1,600.

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<th></th>
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This range is not relevant for RORB II. A firm will never stop in the range of declining MC. If it is worth it to produce at an MC or $3.00, it will be worth it to produce at a MC of $1.25.

This range is not relevant for RORB II. A firm will never stop in the range of declining MC. If it is worth it to produce at an MC or $3.00, it will be worth it to produce at a MC of $1.25.
Situation 5: Price = $2.55, TFC = $2,000

Overview
- This is the same situation as the second chart (situation 2) on your handout except that fixed costs have doubled. But wait! Fixed costs are supposed to be irrelevant to decision making. Therefore, in the short-run, this firm should do the same thing it did in situation 2. **These changes in fixed costs should not change the firm’s optimal short-run decisions.** In situation, the best short-run decision was to:
  a) Produce at (about) 1,200
  b) Stay open in the short-run
- In the long-run, however, these fixed costs (maybe an increase in one’s cost of a lease, insurance) can be varied. Nothing is fixed, by definition, in the long-run. One can get rid of these costs (vary them down to zero) by leaving the industry. **Therefore, these changes might change a firm’s optimal decision in the long-run.**

Applying RORB II
- The range of production in which MC is declining is not a range in which a firm, if it produces, will stop. If it is worth to produce when an MC - $3.00, it will be even more worth it to produce when MC = $1.25 and $0.75.
- The range of production in which MC is increasing is the relevant production range.
- So … If one is to produce, stop when MR = MC, i.e. about at 1,200 units.

Applying RORB III: The short-run shut-down rule
- At q = 1,200, AVC = $1.83, TVC = $2,200
- P = $2.55 > $1.83 = AVC
- TR = $3,060 > $2,200 = TVC
- i.e. The firm is covering its variable costs. In the short-run, it would rather remain open than temporarily close its doors.
- Let’s check. Sure enough, if the firm were to shut down, it would lose $2,000. If it were to operate, it would lose only $1,140. Go RORB III!
- **Holy cow! Operate at q = 1,200 and stay open in the short-run are the same results as in situation 2. Fixed costs are irrelevant to good decision making!**

Applying RORB III: The long-run exit rule (all costs are variable)
- At q = 1,200, ATC = $3.50, TC = $4,200
- P = $2.55 < $2.50 = ATC
- TR = $3,060 < $4,200 = TC
- i.e. The firm is not covering its total costs. In the long-run, it would rather leave in the industry & earn $0, than stay in and earn -$1,140. Go RORB III!
### Situation 5: \( q^* \) short-run = 1,200, \( q^* \) long-run = 0.

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</table>

**Total Costs**

**MC**

**Price** = $2.55

**Average Costs**

\( \text{AFC} \)

\( \text{AVC} \)

\( \text{ATC} \)

\( \text{TR} \)

\( \text{MR} \)

\( \pi \)

---

**Losses**

This range is not relevant for RORB II. A firm will never stop in the range of declining MC. If it is worth it to produce at an MC of $3.00, it will be worth it to produce at a MC of $1.25.

\[ \text{AFC} @ q^* \approx \$1.83 \]

\[ \text{AVC} @ q^* \approx \$2.55 \]

\[ \text{P @ q^* = } \$2.55 \]

\[ \text{ATC} @ q^* = \$3.50 \]