

2010 National Floriculture Career Development Event

Problem One

Assume you are responsible for helping a customer select a lighting system for the reception area in his sales office. The area has an 18' vaulted ceiling. He has set no limit on installation cost, but wants a lighting system with a low operating cost. He wants a lighting system that provides good general lighting and good plant growth. Use the table provided to determine the type of lighting you will recommend to him. Your recommendation is:

- A. cool white fluorescent tubes
- B. florescent plant growth lamps
- C. wide spectrum plant growth lamps
- D. metal halide lamps**

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Problem Two

Assume you are to prepare a materials estimate for the construction of 2 flower/shrub beds for a customer. One bed is to be a circle that is 16' in diameter and the other is a rectangle that is 8' x 14'. You are to determine the total linear feet of curbing needed and the cubic yards of top soil needed to fill both beds with a 3" layer. Round amounts up.

- A. 95 linear feet curbing and 3 cubic yards of top soil
- B. 38 linear feet curbing and 28 cubic yards of top soil
- C. 38 linear feet curbing and 3 cubic yards of top soil
- D. 95 linear feet curbing and 28 cubic yards of top soil

linear feet curbing for circular bed ($\pi d = \text{circumference}$)

$$3.14 \times 16' = 50.24' = 50' 3''$$

linear feet curbing for rectangular bed $(\text{length} + \text{width})2 = \text{linear feet}$

$$(8' + 14')2 = 44'$$

total curbing needed $50'3'' + 44' = 94' 3''$

cubic yards top soil needed for circular bed ($\pi r^2 h = \text{volume}$)

$$3.14 \times 8^2 \times (3/12) = 50.24 \text{ cubic feet} / 27 = 1.86 \text{ cubic yards}$$

cubic yards top soil needed for rectangular bed $(\text{length} \times \text{width} \times \text{height} = \text{volume})$

$$8 \times 14 \times 3/12 = 28 \text{ cubic feet} / 27 = 1.04 \text{ cubic yards}$$

total cubic yards of top soil needed $1.86 + 1.04 = 2.9$ or 3 cubic yards

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Problem Three

Assume your floral shop does some landscape design work for regular customers. Your shop is located in Indianapolis, Indiana. You are assigned to work with a homeowner who wants to incorporate flowering shrubs in his back lawn that will attract bluebirds year round. Use the charts provided to identify shrubs that would attract bluebirds.

- A. **WINTERBERRY, AMERICAN ELDER, ARROWWOOD, BAYBERRY, HIGH-BUSH BLACKBERRY**
- B. WINTERBERRY, AMERICAN ELDER, AMUR HONEYSUCKLE, BAYBERRY, HIGH-BUSH BLACKBERRY
- C. BLACK HAW, AMERICAN ELDER, ARROWWOOD, BAYBERRY, HIGH-BUSH BLACKBERRY
- D. WINTERBERRY, AMERICAN ELDER, ARROWWOOD, BAYBERRY, NANNYBERRY

A selection of flowering shrubs to attract birds

| REGION | SHRUB | FRUIT OR FLOWER | SEASON | BIRDS MOST OFTEN ATTRACTED |
|--|---------------------------|----------------------------|--------------------------|--|
| NORTHEAST Connecticut Delaware Illinois Indiana Iowa Kentucky Maine Maryland Massachusetts Michigan Minnesota Missouri New Hampshire New Jersey New York Ohio Ontario Pennsylvania Quebec Rhode Island Vermont Virginia West Virginia Wisconsin | AMERICAN ELDER | Blue-black berries | Late summer to midfall | BLUEBIRDS, CATBIRDS, FLICKERS, MOCKINGBIRDS, ROSE-BREADED GROSBEAKS, WOODPECKERS |
| | AMUR HONEYSUCKLE | Red berries | Fall to midwinter | CARDINALS, CEDAR WAXWINGS, ROBINS, THRASHERS, THRUSHES, TOWHEES, WINTER FINCHES |
| | ARROWWOOD | Blue-black berries | Fall | BLUEBIRDS, CATBIRDS, FLICKERS, ROBINS, THRUSHES |
| | BAYBERRY | Gray berries | Fall to early spring | BLUEBIRDS, CAROLINA WRENS, DOWNY WOODPECKERS, HERMIT THRUSHES, MYRTLE WARBLERS, TREE SWALLOWS |
| | BLACK HAW | Blue-black berries | Fall | CEDAR WAXWINGS, PILEATED WOODPECKERS, SWAINSON'S THRUSHES, YELLOW-BILLED CUCKOOS |
| | HIGH-BUSH BLUEBERRY | Blue-black berries | Midsummer to midfall | BLUEBIRDS, CHICKADEES, HERMIT THRUSHES, ORCHARD ORIOLES, ROBINS, TOWHEES |
| | NANNYBERRY | Black berries | Fall | CATBIRDS, CEDAR WAXWINGS, FLICKERS, HERMIT THRUSHES, ROBINS, ROSE-BREADED GROSBEAKS |
| | PINKSTER-BLOOM AZALEA | Pink or white flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | SARGENT CRAB APPLE | White flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | | Dark red fruit | Fall | CEDAR WAXWINGS, EVENING AND PINE GROSBEAKS, PURPLE FINCHES, ROBINS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | CARDINALS, CHATS, FINCHES, FLYCATCHERS, MOCKINGBIRDS, TREE SWALLOWS |
| | TATARIAN HONEYSUCKLE | Pink or red flowers | Late spring | RUBY-THROATED HUMMINGBIRDS, |
| | | Red or yellow berries | Summer | BROWN THRASHERS, CATBIRDS, CEDAR WAXWINGS, PURPLE FINCHES, ROBINS |
| | WINTERBERRY | Red berries | Late summer to midwinter | BLUEBIRDS, BROWN THRASHERS, CARDINALS, CEDAR WAXWINGS |
| SOUTH AND SOUTHEAST Alabama Arkansas Florida Georgia Louisiana Mississippi North Carolina South Carolina Tennessee | AMERICAN ELDER | Blue-black berries | Late summer to midfall | BROWN THRASHERS, CARDINALS, CAROLINA CHICKADEES, CHATS, FLICKERS, INDIGO BUNTINGS, MOCKINGBIRDS, PHOEBES |
| | ARROWWOOD | Blue-black berries | Fall | BROWN THRASHERS, CATBIRDS, PHOEBES, ROBINS, WHITE-EYED VIREOS |
| | BAYBERRY | Gray berries | Fall to early spring | DOWNY WOODPECKERS, HERMIT THRUSHES, MYRTLE WARBLERS, TREE SWALLOWS |
| | BLACK HAW | Blue-black berries | Fall | CAROLINA CHICKADEES, DOWNY AND RED-BELLIED WOODPECKERS, HERMIT THRUSHES, MOCKINGBIRDS |
| | HIGH-BUSH BLUEBERRY | Blue-black berries | Midsummer to midfall | CATBIRDS, CHATS, ORIOLES, PHOEBES, TANAGERS |
| | HYBRID WEIGELA | Pink, red or white flowers | Spring | RUBY-THROATED HUMMINGBIRDS |
| | MANY-FLOWERED COTONEASTER | Red berries | Fall | BLUEBIRDS, CEDAR WAXWINGS, MOCKINGBIRDS, ROBINS |
| | SAPPHIREBERRY | Blue berries | Fall | BLUEBIRDS, CARDINALS, CATBIRDS, MOCKINGBIRDS, SUMMER TANAGERS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | BLUEBIRDS, CATBIRDS, CEDAR WAXWINGS, MOCKINGBIRDS, WOOD THRUSHES |
| | SMOOTH SUMAC | Red berries | Fall to early spring | BLUEBIRDS, CAROLINA CHICKADEES, CATBIRDS, DOWNY WOODPECKERS, MOCKINGBIRDS |

(continued on next page)

A selection of flowering shrubs to attract birds (CONTINUED)

| REGION | SHRUB | FRUIT OR FLOWER | SEASON | BIRDS MOST OFTEN ATTRACTED |
|--|----------------------------|-------------------------------------|--------------------------|---|
| NORTH AND SOUTH CENTRAL Kansas Manitoba Nebraska North Dakota Oklahoma South Dakota Texas | BEAUTY BUSH | Pink flowers | Early summer | RUBY-THROATED AND RUFOUS HUMMINGBIRDS |
| | CORALBERRY | Purple-red berries | Fall to midwinter | HERMIT THRUSHES, PURPLE FINCHES, ROBINS, WAXWINGS, WOODPECKERS |
| | FRAGRANT SUMAC | Dark red berries | Summer | BLUEBIRDS, RED-HEADED WOODPECKERS, ROBINS, THRASHERS, YELLOW-SHAFTED FLICKERS |
| | NANNYBERRY | Black berries | Fall | CARDINALS, CATBIRDS, CEDAR WAXWINGS, FLICKERS, HERMIT THRUSHES, ROBINS |
| | ORANGE-EYED BUTTERFLY BUSH | Blue, pink, purple or white flowers | Midsummer to frost | RUBY-THROATED HUMMINGBIRDS |
| | SIBERIAN DOGWOOD | Blue-white berries | Fall | BLUEBIRDS, CARDINALS, CHATS, EVENING GROSBEAKS, THRUSHES, TREE SWALLOWS, WAXWINGS |
| | SIBERIAN PEA TREE | Yellow flowers | Spring | RUBY-THROATED AND RUFOUS HUMMINGBIRDS |
| | WINTERBERRY | Red berries | Late summer to midwinter | BLUEBIRDS, BROWN THRASHERS, CARDINALS, CEDAR WAXWINGS, PURPLE FINCHES, ROBINS |
| WEST AND SOUTHWEST Alberta Arizona Colorado Idaho Montana Nevada New Mexico Saskatchewan Utah Wyoming | AMERICAN ELDER | Blue-black berries | Late summer to midfall | LEWIS'S WOODPECKERS, MAGPIES, MOUNTAIN BLUEBIRDS, SPARROWS, THRUSHES, WARBLING VIREOS |
| | BLACK HAW | Blue-black berries | Fall | HERMIT THRUSHES, ROBINS, TOWNSEND'S SOLITAIRES, VEERIES, WAXWINGS |
| | NANNYBERRY | Black berries | Fall | BLUEBIRDS, BOHEMIAN AND CEDAR WAXWINGS, CATBIRDS, FLICKERS, HERMIT THRUSHES |
| | RED OSIER DOGWOOD | White berries | Summer | BULLOCK'S ORIOLES, CARDINALS, HERMIT THRUSHES, MOCKINGBIRDS, SWAINSON'S THRUSHES |
| | RUNNING SERVICEBERRY | Purple-black berries | Summer | GREEN-TAILED TOWHEES, LEWIS'S WOODPECKERS, MAGPIES, SWAINSON'S THRUSHES, TOWNSEND'S SOLITAIRES |
| | SIBERIAN PEA TREE | Yellow flowers | Spring | BROAD-TAILED HUMMINGBIRDS |
| | SNOWBERRY | White berries | Midsummer to midwinter | EVENING AND PINE GROSBEAKS, MAGPIES, ROBINS, RUFOUS-SIDED TOWHEES |
| | STAGHORN SUMAC | Red berries | Fall to early spring | EVENING GROSBEAKS, HERMIT THRUSHES, MAGPIES, ROBINS, TOWNSEND'S SOLITAIRES |
| | TATARIAN HONEYSUCKLE | Pink or red flowers | Late spring | BROAD-TAILED HUMMINGBIRDS, |
| | | Red or yellow berries | Summer | BOHEMIAN AND CEDAR WAXWINGS, HERMIT AND SWAINSON'S THRUSHES |
| FAR WEST British Columbia California Oregon Washington | BEAUTY BUSH | Pink flowers | Early summer | ANNA'S, BLACK-CHINNED, CALLIOPE AND RUFOUS HUMMINGBIRDS |
| | BLUE ELDER | Blue-black berries | Late summer | BLACK-HEADED GROSBEAKS, CALIFORNIA THRASHERS, PHAINOPEPLAS, STELLER'S JAYS, SWAINSON'S THRUSHES |
| | JAPANESE ROSE | Orange-red fruit | Fall | EVENING GROSBEAKS, ROBINS, THRUSHES, TOWHEES, TOWNSEND'S SOLITAIRES |
| | MAGELLAN FUCHSIA | Red and violet flowers | Early summer to frost | ANNA'S, BLACK-CHINNED, CALLIOPE AND RUFOUS HUMMINGBIRDS |
| | SNOWBERRY | White berries | Midsummer to midwinter | BLACK-HEADED, EVENING AND PINE GROSBEAKS, ROBINS, SPOTTED TOWHEES, VARIED THRUSHES, WREN TITS |

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Problem Four

Assume you are to assist a customer in applying Spring fertilizer to her lawn. Her lawn is 200' by 200' and her home and deck take up 4,300 square feet. She also has a 12' x 16' storage building in the back yard. Her soil test recommends 10-5-5 grade fertilizer applied at the rate of 0.2 lb. N / 1,000 square feet. Using the Amount of Fertilizer to Apply Based on Actual Nitrogen Recommendations table provided, identify the pounds of fertilizer that she would need.

- A. 71
- B. 142
- C. 177.5
- D. 124

| | |
|---|-----------------------------|
| Total square feet in yard including buildings | 40,000 square feet |
| Square feet in residence/deck | 4,300 square feet |
| Square feet in storage building | 192 square feet |
| Square feet to be fertilized | 35,508 square feet |
| pounds fertilizer to apply per 1,000 square feet | 2 pounds fertilizer |
| pounds fertilizer required to fertilize lawn | 71 pounds fertilizer |

$$(200' \times 200' = 40,000 \text{ ft}_2) - 4,300 \text{ ft}_2 \text{ residence \& deck} - (12' \times 16' = 192 \text{ ft}_2) \text{ storage building} = 35,508 \text{ ft}_2$$

$$35,508 \text{ ft}_2 / 1,000 = 35.5 \times 2 = 71 \text{ pounds fertilizer}$$

Amount of Fertilizer to Apply Based on Actual Nitrogen Recommendations

| Nitrogen Rate: | 0.1 lb. N / 1,000 sq. ft. | 0.2 lb. N / 1,000 sq. ft. | 1 lb. N / 1,000 sq. ft. |
|--------------------------------|----------------------------------|----------------------------------|--------------------------------|
| | lbs. fertilizer to | lbs. fertilizer to | lbs. fertilizer to |
| | <u>apply per 1,000 sq. ft.</u> | <u>apply per 1,000 sq. ft.</u> | <u>apply per 1,000 sq. ft.</u> |
| <u>Fertilizer Grade</u> | | | |
| 45-0-0 (urea) | 0.2 | 0.4 | 2.2 |
| 36-6-6 | 0.3 | 0.6 | 2.8 |
| 28-3-3 | 0.4 | 0.7 | 3.7 |
| 22-4-4 | 0.5 | 0.9 | 4.5 |
| 20-20-20 | 0.5 | 1.0 | 5.0 |
| 18-6-12 | 0.6 | 1.1 | 5.6 |
| 16-8-8 | 0.6 | 1.3 | 6.3 |
| 15-15-15 | 0.7 | 1.3 | 6.7 |
| 13-3-9 | 0.8 | 1.5 | 7.7 |
| 10-5-5 | 1.0 | 2.0 | 10.0 |
| 5-10-10 | 2.0 | 4.0 | 20.0 |

Example: If the N (nitrogen) recommendation is for 0.1 lb N / 1,000 sq. ft. and the fertilizer grade selected has a ratio of 18-6-12 (column 1), apply 0.6 lb. of this fertilizer per 1,000 square feet.

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Problem Five

Assume you are assisting a customer with the selection of a ground cover. The customer wants an evergreen cover that grows to no more than 8" in height, will withstand temperatures as low as -30 ° Fahrenheit, produces no flower or fruit, and will grow in the shade. Use the Guide to Groundcovers and USDA Plant Hardiness Zone Map attached to assist the customer. What ground cover would you recommend?

A. Myrtle or Periwinkle

B. Baltic English Ivy

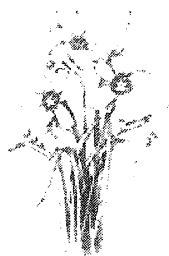
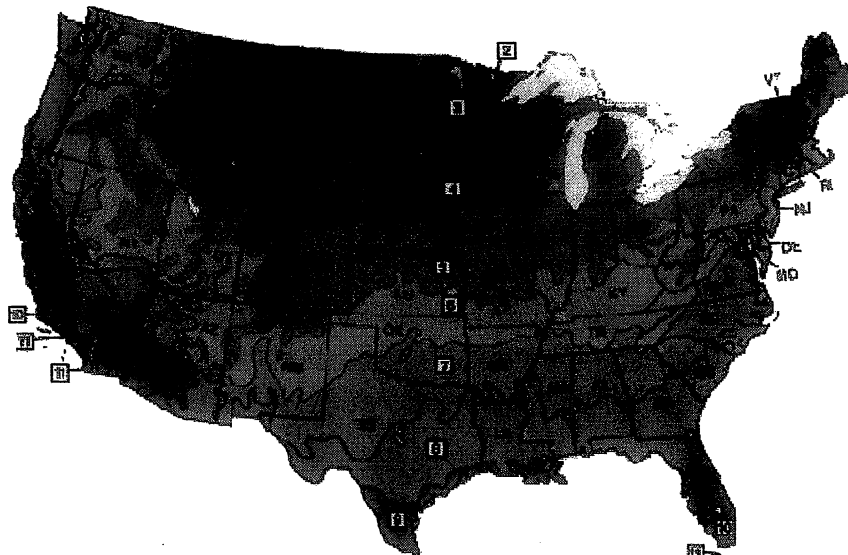
C. Ajuga or bugle

D. Wandering Jew

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Sunlight Gardens](#)[Online Shopping](#)[What's New for 2010](#)[Search](#)[Ball Caps](#)[Gift Certificates](#)[Hardiness Zones](#)[View My Order](#)[FAQ](#)[Request a Free Catalog](#)**USDA Plant Hardiness Zone Map**

| | | | | | |
|--|--------|--------------|--|---------|------------|
| | Zone 2 | -50° to -40° | | Zone 7 | 0° to 10° |
| | Zone 3 | -40° to -30° | | Zone 8 | 10° to 20° |
| | Zone 4 | -30° to -20° | | Zone 9 | 20° to 30° |
| | Zone 5 | -20° to -10° | | Zone 10 | 30° to 40° |
| | Zone 6 | -10° to -0° | | | |

The US Department of Agriculture Plant Hardiness Zone Map, revised in 1990, shows the lowest temperatures that can be expected each year in the United States. These temperatures are referred to as "average annual minimum temperatures" and are based on the lowest temperatures recorded for each of the years 1974 to 1986. The different zones represent areas of winter hardiness for agricultural and natural landscape plants.

For each plant we offer, we include a range of hardiness zones, for instance, Zones 3-8. This means that we think that as far as temperature goes, that a particular species when established should be able to grow anywhere on the map between and including Zones 3 to 8. This is very general and one would need to take into account specific cultural and habitat requirements. So use a zone to determine minimum temperature thresholds and our ranges to determine broad climate tolerances.

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A Guide to Groundcovers

| Groundcovers | | Evergreen | Deciduous | Height | Optimum Spacing | No. Needed to Plant 100 sq. ft. | Light Tolerance | Hardiness Zone Rating | Flower or Fruit Color and Time of Effectiveness |
|-------------------------------------|-----------------------------|-----------|-----------|------------------------|-----------------|---------------------------------|-----------------|-----------------------|--|
| Common Name | Botanical Name | | | | | | | | |
| Ajuga or bugle | Ajuga reptans | | • | 5" | 6 inches | 400 | sun or shade | 4 | blue or white flowers in summer |
| Cotoneaster, creeping | Cotoneaster adpressa | | • | 12" | 4 feet | 10 | sun | 4 | pink flowers, red fruit in summer and fall |
| Cotoneaster, rockspray | Cotoneaster horizontalis | semi | | 18" plus | 4 feet | 10 | sun | 4 | pink flowers, red fruit in summer and fall |
| Euonymus, big leaf wintercreeper | Euonymus fortunei radicans | • | | 18" plus | 3 feet | 14 | sun or shade | 5 | orange fruit in fall |
| Euonymus, purple leaf wintercreeper | Euonymus fortunei coloratus | • | | 18" | 3 feet | 14 | sun or shade | 5 | not of significance |
| Honeysuckle, creeping | Lonicera prostrata | | • | 12" | 3 feet | 14 | sun | 5 | pale yellow flowers in spring; red fruit in fall |
| Ivy, Baltic English | Hedera helix battica | • | | 8" | 18 inches | 44 | shade | 4 | none |
| Mondo | Ophiopogon japonicus | • | | 12" | 10 inches | 144 | partial shade | 8 | white or pink flowers in spring |
| Myrtle or Periwinkle | Vinca minor | • | | 8" | 12 inches | 92 | shade | 4 | blue flowers in spring |
| Oyster plant | Tragopogon portifolius | | • | 12" | 12 inches | 92 | sun or shade | 9 | not of significance |
| Pachysandra | Pachysandra terminalis | • | | 12" | 12 inches | 92 | shade | 4 | white flowers in spring |
| Sarcococca | Sarcococca nuscifolia | • | | tall—requires shearing | 3 feet | 14 | sun or shade | 7 | white flowers and scarlet berries in fall |
| Wandering Jew | Tradescantia albiflora | • | | 6" | 12 inches | 92 | shade | 9 | red-purple flowers in spring and summer |
| Weeping lantana | Lantana montevidensis | • | | 18" plus | 24 inches | 25 | sun | 9 | lavender flowers all year |
| Yellowroot | Xanthorrhiza simplicissima | | • | 18" plus | 18 inches | 44 | sun | 5 | brown-purple flowers in spring |

A Guide to Vines

| Common Name | Botanical Name | Broad-Leaved Evergreen | Deciduous | Height | Climbing | Twining or Tendrils | Light Tolerance | Hardness Zone Rating | Flower or Fruit Color and Time of Effectiveness |
|---------------------------------|------------------------------------|------------------------|-----------|------------|----------|---------------------|------------------------|----------------------|---|
| Actinidia, bower | Actinidia arguta | | * | 30' | | * | full sun or semi-shade | 4 | white flowers in spring |
| Actinidia, Chinese | Actinidia chinensis | | * | 30' | | * | full sun or semi-shade | 7 | insignificant |
| Akebia, fiveleaf | Akebia quinata | semi | | 35' | | * | full sun or semi-shade | 4 | purple flowers in spring |
| Ampelopsis, porcelain | Ampelopsis brevipedunculata | | * | 20' | | * | semi-shade | 4 | multicolored fruit in fall |
| Bignonia (or crossvine) | Bignonia capreolata | | | 60' | | * | full sun or semi-shade | 6 | orange-red flowers in spring |
| Bittersweet, American | Celastrus scandens | | * | 20' | | * | sun or semi-shade | 2 | yellow and red fruit in fall and winter |
| Boston ivy | Parthenocissus tricuspidata | | * | 60' | | | sun or shade | 4 | insignificant |
| Bougainvillea | Bougainvillea glabra | * | | 20' | * | | full sun | 7 | multicolored in summer |
| Clematis | Clematis species | | * | 3 to 25' | | * | full sun or semi-shade | 4 to 7* | many colors of flowers in late spring |
| Eurogynus evergreen bittersweet | Eurogynus fortunei vegetus | * | | 25' | * | | sun or shade | 5 | yellow and red fruit in fall and winter |
| Fig, creeping | Ficus pumila | * | | 40' | * | | sun or shade | 9 | insignificant |
| Honeysuckle, trumpet | Lonicera sempervirens | | * | 50' | | * | full sun or semi-shade | 3 | orange flowers in summer, red fruit in fall |
| Hydrangea, climbing | Hydrangea anomala petiolaris | | * | 75' | * | | full sun or semi-shade | 4 | white flowers in summer |
| Ivy, English | Hedera helix | * | | 70' | * | | semi-shade | 6 | insignificant |
| Kidzu vine | Pueraria lobata | | * | 60' | | * | sun or shade | 6 | insignificant |
| Monks hood vine | Ampelopsis acutifolia | | * | 20' | | * | semi-shade | 4 | yellow-orange fruit in fall |
| Rambling roses | Rosa multiflora hybrids and others | | * | 10' to 20' | | support needed | sun | 5 | flowers of many colors in spring and summer |
| Trumpet vine | Campsis radicans | | * | 30' | * | | sun | 4 | orange flowers in summer |
| Virginia creeper | Parthenocissus quinquefolia | | * | 50' | * | | sun or shade | 3 | insignificant |
| Woodbine, Chinese | Lonicera tragophylla | | * | 50' | | * | shade | 5 | yellow flowers in summer, red fruit in fall |

*Dependent upon the actual species selected

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Problem Six

Assume your company has the contract to provide and install 10 shrubs for a customer. You are responsible for ordering premixed sand/peat to be used in the backfill mix. The backfill mix is to be 50% original soil and 50% sand/peat mix. The planting pits will have a volume of 18 cubic feet. The shrubs have a ball volume of 9.3 cubic feet. Make the following calculations.

How many cubic feet of sand/peat mix will be required to install the shrubs?

- A. 90 cubic feet
- B. 87 cubic feet
- C. 43.5 cubic feet**
- D. 180 cubic feet

$10 \times 18 = 180$ cubic feet of soil excavated

$9.3 \times 10 = 93$ total ball volume

$180 - 93 = 87$ backfill volume

$87 / 2 = 43.5$ cubic feet of sand/peat mix required

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Problem Seven

Assume you have been assigned the task of retail pricing a shipment of roses. Your shop was billed \$828 wholesale for 20 bundles, 36 roses per bundle. Your employer operates on a 3.5 to 1 markup on cut flowers. Use the Retailers' Markup Chart to determine the per rose and per dozen retail price for the roses. Round up to the nearest \$0.001.

A. \$59.00 per dozen; \$4.92 ea.

☒ B. \$62.10 per dozen; \$5.18 ea.

C. \$69.00 per dozen, \$5.75 ea.

D. \$23.00 per dozen; \$1.92 ea.

20 bundles @ 36 roses per bundle = 720 individual roses

$\$828 / 720 = \1.15 per rose

$3 \times \$16.20 + \$13.50 = \$62.10$ retail price per dozen

$\$63.10 / 12 = \5.18 retail price per rose

or

$4 \times \$13.50 + \$8.10 = \$62.10$ retail price per dozen

$\$63.10 / 12 = \5.18 retail price per rose

Retailers Markup Chart *

| You Pay per flower | 100% Markup | 150% Markup | 200% Markup | 250% Markup | 300% Markup | 350% Markup | 400% Markup |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 0.02 | 0.48 | 0.60 | 0.72 | 0.84 | 0.96 | 1.08 | 1.20 |
| 0.03 | 0.72 | 0.90 | 1.08 | 1.26 | 1.44 | 1.62 | 1.80 |
| 0.04 | 0.96 | 1.20 | 1.44 | 1.68 | 1.92 | 2.16 | 2.40 |
| 0.05 | 1.20 | 1.50 | 1.80 | 2.10 | 2.40 | 2.70 | 3.00 |
| 0.06 | 1.44 | 1.80 | 2.16 | 2.52 | 2.88 | 3.24 | 3.60 |
| 0.07 | 1.68 | 2.10 | 2.52 | 2.94 | 3.36 | 3.78 | 4.20 |
| 0.08 | 1.92 | 2.40 | 2.88 | 3.36 | 3.84 | 4.32 | 4.80 |
| 0.09 | 2.16 | 2.70 | 3.24 | 3.78 | 4.32 | 4.86 | 5.40 |
| 0.10 | 2.40 | 3.00 | 3.60 | 4.20 | 4.80 | 5.40 | 6.00 |
| 0.11 | 2.64 | 3.30 | 3.96 | 4.62 | 5.28 | 5.94 | 6.60 |
| 0.12 | 2.88 | 3.60 | 4.32 | 5.04 | 5.76 | 6.48 | 7.20 |
| 0.13 | 3.12 | 3.90 | 4.68 | 5.46 | 6.24 | 7.02 | 7.80 |
| 0.14 | 3.36 | 4.20 | 5.04 | 5.88 | 6.72 | 7.56 | 8.40 |
| 0.15 | 3.60 | 4.50 | 5.40 | 6.30 | 7.20 | 8.10 | 9.00 |
| 0.16 | 3.84 | 4.80 | 5.76 | 6.72 | 7.68 | 8.64 | 9.60 |
| 0.17 | 4.08 | 5.10 | 6.12 | 7.14 | 8.16 | 9.18 | 10.20 |
| 0.18 | 4.32 | 5.40 | 6.48 | 7.56 | 8.64 | 9.72 | 10.80 |
| 0.19 | 4.56 | 5.70 | 6.84 | 7.98 | 9.12 | 10.26 | 11.40 |
| 0.20 | 4.80 | 6.00 | 7.20 | 8.40 | 9.60 | 10.80 | 12.00 |
| 0.21 | 5.04 | 6.30 | 7.56 | 8.82 | 10.08 | 11.34 | 12.60 |
| 0.22 | 5.28 | 6.60 | 7.92 | 9.24 | 10.56 | 11.88 | 13.20 |
| 0.23 | 5.52 | 6.90 | 8.28 | 9.66 | 11.04 | 12.42 | 13.80 |
| 0.24 | 5.76 | 7.20 | 8.64 | 10.08 | 11.52 | 12.96 | 14.40 |
| 0.25 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 |
| 0.26 | 6.24 | 7.80 | 9.36 | 10.92 | 12.48 | 14.04 | 15.60 |
| 0.27 | 6.48 | 8.10 | 9.72 | 11.34 | 12.96 | 14.58 | 16.20 |
| 0.28 | 6.72 | 8.40 | 10.08 | 11.76 | 13.44 | 15.12 | 16.80 |
| 0.29 | 6.96 | 8.70 | 10.44 | 12.18 | 13.92 | 15.66 | 17.40 |
| 0.30 | 7.20 | 9.00 | 10.80 | 12.60 | 14.40 | 16.20 | 18.00 |

| You Pay per Bunch | 1.00 Markup | 1.50 Markup | 2.00 Markup | 2.50 Markup | 3.00 Markup | 3.50 Markup | 4.00 Markup |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 0.50 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 2.25 | 2.50 |
| 0.75 | 1.50 | 1.88 | 2.25 | 2.63 | 3.00 | 3.38 | 3.75 |
| 1.00 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 |
| 1.25 | 2.50 | 3.13 | 3.75 | 4.38 | 5.00 | 5.63 | 6.25 |
| 1.50 | 3.00 | 3.75 | 4.50 | 5.25 | 6.00 | 6.75 | 7.50 |
| 1.75 | 3.50 | 4.38 | 5.25 | 6.13 | 7.00 | 7.88 | 8.75 |
| 2.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 |
| 2.25 | 4.50 | 5.63 | 6.75 | 7.88 | 9.00 | 10.13 | 11.25 |
| 2.50 | 5.00 | 6.25 | 7.50 | 8.75 | 10.00 | 11.25 | 12.50 |
| 2.75 | 5.50 | 6.88 | 8.25 | 9.63 | 11.00 | 12.38 | 13.75 |
| 3.00 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 |
| 4.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 |
| 5.00 | 10.00 | 12.50 | 15.00 | 17.50 | 20.00 | 22.50 | 25.00 |

*Determine the markup you want to charge, and this chart will give you the selling price per dozen (top chart) or per bunch (bottom chart)

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Problem Eight

Assume you are responsible for ordering potting soil for bedding plant production in the greenhouse operation you are employed in. The potting soil comes in 3 cubic foot bags. Use the chart below to determine the number of bags to order to fill the following standard round pots and cell packs. Round your answer up to the next whole bag of potting soil.

- 600 ea. standard cell packs (8-6 cell packs per tray)
- 1,000 ea. 4" standard round pots
- 500 ea. 6" standard round pots

Bags of potting soil to order:

- A. 52
- B. 134
- C. 10
- D. 70

600 standard cell packs / 5.9 packs per cubic foot / 3 cubic feet per bag = 34 bags

1,000 standard round pots / 48 pots per cubic foot / 3 cubic feet per bag = 7 bags

500 standard round pots / 16 pots per cubic foot / 3 cubic feet per bag = 11 bags

Total = 52 bags

| Pot Size (in) | Approximate Dimension Top x Depth x Bottom (in) | Number of Pots/ft ³ | Type | Approximate Dimension Top x Depth x Bottom (in) | Units/ft ³ |
|----------------------------|---|--------------------------------|----------------------------|---|-----------------------|
| Standard Round Pots | | | | | |
| 2¼ | 2¼ x 2¼ x 1¾ | 256 | Germination tray | 11½ x 21¼ x 1½ | 7.0 |
| 2½ | 2¾ x 2¼ x 2 | 208 | 20-row Seeding tray | 11½ x 21¼ x 1½ | 11.0 |
| 3 | 3 x 2 13/16 x 2¼ | 120 | Standard Cell-Packs | | |
| 3½ | 3¾ x 3 3/10 x 2¾ | 80 | 8-4 cell packs per tray | | 5.4 |
| 4 | 4 x 3 7/8 x 2¾ | 48 | 8-6 cell packs per tray | | 5.9 |
| 4½ | 4¾ x 4¾ x 3 | 40 | 10-4 cell packs per tray | | 6.2 |
| 5 | 5 x 3½ x 4 | 28 | 10-6 cell packs per tray | | 6.7 |
| 5½ | 5½ x 5¾ x 3 13/16 | 20 | 12-4 cell packs per tray | | 6.0 |
| 6 | 6 x 5¾ x 4 1/16 | 16 | 12-6 cell packs per tray | | 7.0 |
| 7 | 6¾ x 7¾ x 4 11/16 | 10 | Standard size | 11¼ x 21¼ x 2 | |

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Problem Nine

Assume you are a sales person in a retail florist shop. A customer brings the following merchandise to you to check out:

| | | | |
|--------------------|----------------|----------|-------------|
| 1 roll | ribbon | priced @ | \$8.75 ea. |
| 3 ea. | plastic robins | priced @ | \$5.80 ea. |
| 1 ea. | wreath | priced @ | \$18.98 ea. |
| 6 ea. | roses | priced @ | \$3.25 ea. |
| Total | | | _____ |
| sales tax 0.0825 % | | | _____ |
| TOTAL DUE | | | _____ |

The electrical power is off and you have to determine the amount of the sale and change due. The customer hands you a \$100.00 bill. Which of the following would be correct?

- A. Your total is \$69.96. Your change is: 4 pennies (\$69.70), 1 nickel (\$69.75), 1 quarter (\$70.00), 1 ten (\$80.00) and 1 twenty (\$100.00). Thank you.
- B. Your total is \$69.96. Your change is: 4 pennies (\$70.00), 1 ten (\$80.00) and 1 twenty (\$100.00). Thank you.
- C. Your total is \$64.63. Your change is: 2 pennies (\$64.70), 1 nickel (\$64.75), 1 quarter (\$65.00), 1 five (\$70.00), 1 ten (\$80.00) and 1 twenty (\$100.00). Thank you.
- D. Your total is \$64.63 Your change is: 2 pennies (\$64.75), 1 dime (\$64.75), 1 quarter (\$70.00), 1 ten (\$80.00) and 1 twenty (\$100.00). Thank you.

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Problem Ten

Assume your employer is installing a new quonset-type greenhouse with a covering width of 34' and a length of 100'. It is to be a metal frame greenhouse and is to be covered with a double thickness plastic cover. It is to be designed for a wind velocity of 20 miles per hour and a inside-to-outside-temperature difference of 50° Fahrenheit. Use Tables 9, 10, and 12 provided to determine the total heat loss for the greenhouse in MBtu/hr.

standard heat loss (Table 3-12) x K (Table 3-9) x C (Table 3-10) = corrected heat loss (MBtu/hr)

- A. 280.651 MBtu/hr
- B. 165.734 MBtu/hr
- C. 314.751 MBtu/hr
- D. 150.192 MBtu/hr**

**Table 3-9 Climate Factors (K) for Various Average Wind Velocity and Temperature Conditions
50° Fahrenheit Inside-Outside Temperature Difference & 20 mph Wind Velocity = 0.72**

Table 3-10 Greenhouse Construction Factors (C) for the Common Type of Greenhouses = 0.70

**Table 3-12 Standard Heat-Loss Values for Quonset-Type Greenhouses = 269 Covering Loss
= 29 Combined End Loss**

$$29 \times .72 \times .70 = 14.616$$

$$269 \times .72 \times .70 = 135.576$$

Total heat loss in MBtu/hr = 150.192

Table 3-9 Climate Factors (K) for Various Average Wind Velocity and Temperature Conditions¹

| <i>Inside-to-Outside Temperature Difference in °F (°C)</i> | <i>Wind Velocity in mph (m/sec)</i> | | | | |
|--|-------------------------------------|-------------|--------------|--------------|--------------|
| | 15 (6.7) | 20 (8.9) | 25 (11.2) | 30 (13.4) | 35 (15.6) |
| 30 (16.7) | .41 | .43 | .46 | .48 | .50 |
| 35 (19.4) | .48 | .50 | .53 | .55 | .57 |
| 40 (22.2) | .55 | .57 | .60 | .62 | .64 |
| 45 (25.0) | .62 | .65 | .67 | .70 | .72 |
| 50 (27.8) | .69 | .72 | .74 | .77 | .80 |
| 55 (30.6) | .77 | .80 | .83 | .86 | .89 |
| 60 (33.33) | .84 | .88 | .91 | .94 | .98 |
| 65 (36.1) | .92 | .96 | .99 | 1.03 | 1.07 |
| 70 (38.9) | 1.00 | 1.04 | 1.08 | 1.12 | 1.16 |
| 75 (41.7) | 1.08 | 1.12 | 1.17 | 1.21 | 1.25 |
| 80 (44.4) | 1.16 | 1.21 | 1.26 | 1.30 | 1.35 |
| 85 (47.2) | 1.25 | 1.30 | 1.35 | 1.40 | 1.45 |
| 90 (50.0) | 1.33 | 1.38 | 1.44 | 1.49 | 1.54 |

¹ Standard heat-loss values from Tables 3-7, 3-8, and 3-12 are multiplied by a factor (K) to correct them from local wind and temperature conditions.

Table 3-10 Greenhouse Construction Factors (C) for the Common Types of Greenhouses

| <i>Type of Greenhouse</i> | <i>C</i> |
|---|----------|
| All metal (tight glass house-20-24" [51 or 61 cm] glass width | 1.08 |
| Plastic-covered house (single thickness) | 1.00 |
| Plastic-covered house (double thickness) | 0.70 |
| Corrugated single-layer polycarbonate on metal | 1.00 |
| Acrylic or polycarbonate twin-wall panel 8mm thick | 0.65 |
| Acrylic or polycarbonate twin-wall panel 16 mm thick | 0.58 |

Table 3-12 Standard Heat-Loss Values for Quoset-Type Greenhouses for the Combined Ends and for the Entire Covering Along the Length of the Greenhouse¹

| | | Covering Width in ft (m) | | | | | | | | | | | |
|--------------|--|--------------------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| | | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |
| | | (5.5) | (6.1) | (6.7) | (7.3) | (7.9) | (8.5) | (9.1) | (9.8) | (10.4) | (11.0) | (11.6) | (12.2) |
| | | End Loss in MBtu/hr | | | | | | | | | | | |
| House Length | | | | | | | | | | | | | |
| in ft (m) | | 8 | 10 | 12 | 15 | 17 | 20 | 23 | 26 | 29 | 33 | 36 | 40 |
| 5 (1.5) | | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 13 | 14 | 15 | 15 |
| 10 (3.0) | | 14 | 16 | 17 | 19 | 21 | 22 | 24 | 25 | 27 | 28 | 30 | 32 |
| 20 (6.1) | | 28 | 32 | 35 | 38 | 41 | 44 | 47 | 51 | 54 | 57 | 60 | 63 |
| 30 (9.1) | | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 81 | 85 | 90 | 95 |
| 40 (12.2) | | 57 | 63 | 70 | 76 | 82 | 89 | 95 | 101 | 103 | 114 | 120 | 127 |
| 50 (15.2) | | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 134 | 142 | 150 | 158 |
| 60 (18.3) | | 85 | 95 | 104 | 114 | 123 | 133 | 142 | 152 | 161 | 171 | 180 | 190 |
| 70 (21.3) | | 100 | 111 | 122 | 133 | 144 | 155 | 166 | 177 | 188 | 199 | 211 | 222 |
| 80 (24.4) | | 114 | 127 | 139 | 152 | 174 | 177 | 190 | 202 | 215 | 228 | 240 | 253 |
| 90 (27.4) | | 128 | 142 | 157 | 171 | 185 | 199 | 214 | 228 | 242 | 256 | 271 | 285 |
| 100 (30.5) | | 142 | 158 | 174 | 190 | 206 | 221 | 237 | 253 | 269 | 285 | 301 | 316 |
| 200 (61.0) | | 285 | 316 | 348 | 380 | 411 | 443 | 475 | 506 | 538 | 570 | 601 | 633 |
| 300 (91.4) | | 427 | 475 | 522 | 569 | 617 | 664 | 712 | 759 | 807 | 854 | 902 | 949 |
| 400 (121.9) | | 570 | 633 | 696 | 759 | 822 | 886 | 949 | 1,012 | 1,075 | 1,139 | 1,202 | 1,265 |
| 500 (152.4) | | 712 | 791 | 870 | 949 | 1,028 | 1,107 | 1,187 | 1,265 | 1,345 | 1,424 | 1,503 | 1,582 |

¹These values are for standard conditions, including a 70 ° F(39 ° C) difference from outside to inside temperature and an average wind velocity of 15 mph (6.7 m/sec).