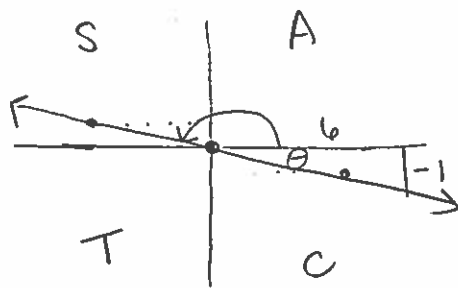


M2200

Midyear Review

- |       |       |       |       |
|-------|-------|-------|-------|
| 1. B  | 7. A  | 17. B | 23. C |
| 2. C  | 8. A  | 18. D | 24. D |
| 3. D  | 9. A  | 19. C | 25. C |
| 4. D  | 10. A | 20. C | 26. B |
| 5. D  | 11. D | 21. D | 27. B |
| 6. A  | 12. B | 22. B | 28. B |
| 7. A  | 13. B | 23. C | 29. A |
| 8. C  | 14. A | 24. D |       |
| 9. A  | 15. B | 25. C |       |
| 10. A | 16. A | 26. B |       |
| 11. D |       | 27. B |       |
| 12. B |       | 28. B |       |
| 13. B |       | 29. A |       |
| 14. A |       |       |       |
| 15. B |       |       |       |
| 16. A |       |       |       |

30.  $6y + x = 0$   
 $6y = -x$   
 $y = -\frac{1}{6}x$



$$\boxed{x \geq 0}$$

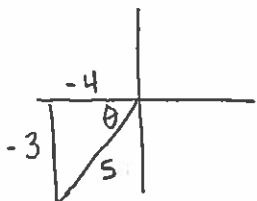
$$\tan \theta = \frac{-1}{6}$$

$$\theta = 9.5^\circ$$

$$\therefore \theta = 180^\circ - 9.5^\circ = 170.5^\circ \text{ reject.}$$

$$\text{or } \theta = 360^\circ - 9.5^\circ = \boxed{350.5^\circ}$$

31.



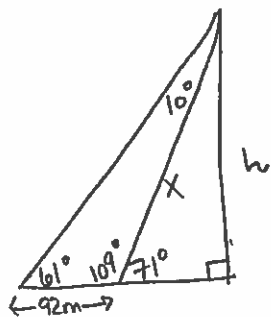
a)  $(-3)^2 + (-4)^2 = 9 + 16 = 25$

b)  $\sin \theta = \frac{-3}{5}$        $\cos \theta = \frac{-4}{5}$

c) ref L =  $37^\circ$        $\sin \theta = \frac{3}{5}$

d)  $\theta = 180^\circ + 37^\circ$   
 $= 217^\circ$

32.



$$\frac{\sin 10^\circ}{92} = \frac{\sin 61^\circ}{x}$$

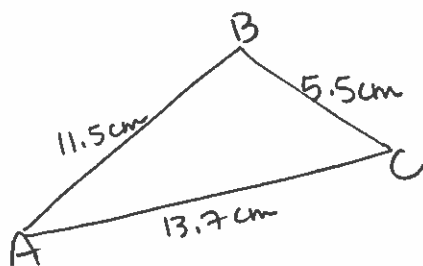
$$x = \frac{92(\sin 61^\circ)}{\sin 10^\circ}$$

$$x = 463.4 \text{ m}$$

$$\sin 71^\circ = \frac{h}{463.4}$$

$$\boxed{h = 438.2 \text{ m}}$$

33.



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$(5.5)^2 = (13.7)^2 + (11.5)^2 - 2(13.7)(11.5) \cos A$$

$$30.25 = 187.69 + 132.25 - 315.1 \cos A$$

$$30.25 - 187.69 - 132.25 = -315.1 \cos A$$

$$-289.69 = -315.1 \cos A$$

$$0.9194 = \cos A \quad (\cos^{-1})$$

$$\boxed{A = 23^\circ}$$

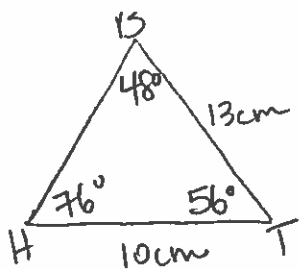
34.

$$y = -3x^2 + 12x - 10$$

$$y = -3(x^2 - 4x + 4) - 10 + 12$$

$$\boxed{y = -3(x-2)^2 + 2}$$

35.



SSA (Ambiguous Case)

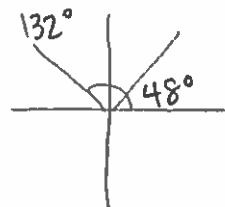
$$\frac{\sin 76^\circ}{13} = \frac{\sin B}{10}$$

$$\sin B = \frac{10(\sin 76^\circ)}{13}$$

$$\sin B = 0.7464$$

$$B = 48^\circ$$

$$T = 56^\circ$$



Only 1 triangle  
 $\sin 76^\circ + 132^\circ = 208^\circ (> 180^\circ)$

No triangle is possible.

$$\frac{\sin 56^\circ}{t} = \frac{\sin 76^\circ}{13}$$

$$t = \frac{13 \sin 56^\circ}{\sin 76^\circ}$$

$$t = 11 \text{ cm.}$$

$$\begin{array}{l} B = 48^\circ \\ T = 56^\circ \\ t = 11 \text{ cm} \end{array}$$

36.

$$y = a(x-p)^2 + q$$

$$y = a(x-2)^2 + 21$$

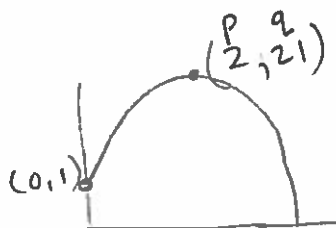
$$y = a(0-2)^2 + 21$$

$$1 = a(-2)^2 + 21$$

$$1 = 4a + 21$$

$$\frac{-20}{4} = \frac{4a}{4}$$

$$a = -5$$



$$\therefore y = -5(x-2)^2 + 21$$

at 3 seconds.

$$y = -5(3-2)^2 + 21$$

$$y = -5(1)^2 + 21$$

$$y = -5 + 21$$

$$\boxed{y = 16 \text{ m}}$$

$$37. R = (2.25 - 0.05x)(120 + 8x)$$

$$= 270 - 6x + 18x - 0.4x^2$$

$$R = -0.4x^2 + 12x + 270.$$

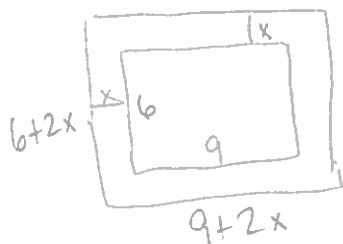
$$x = \frac{-b}{2a} = \frac{-12}{2(-0.4)} = 15$$

$$\text{Price} = 2.25 - 0.05(15)$$

$$= 2.25 - 0.75$$

$$\text{price} = \boxed{\$1.50}$$

38.



$$A_{\text{outside}} = (6+2x)(q+2x) \\ = 54 + 12x + 18x + 4x^2 \\ = 4x^2 + 30x + 54$$

$$A_{\text{inside}} = 9(6) \\ = 54$$

$$4x^2 + 30x + 54 -$$

$$4x^2 + 30x + 54 - 54 = 54 \rightarrow$$

Same area as the flower bed.

$$4x^2 + 30x - 54 = 0$$

$$2(2x^2 + 15x - 27) = 0 \quad P-54$$

$$(2x^2 + 18x) - 3x - 27 = 0 \quad \begin{array}{r} S-15 \\ -3, 18 \end{array}$$

$$2x(x+9) - 3(x+9) = 0$$

$$(2x-3)(x+9) = 0$$

$$2x-3=0 \quad x+9=0$$

$$x = \frac{3}{2} \quad x = -9 \text{ reject.}$$

Width is 1.5 m

$$39. \quad 2(x+3)^2 - 11(x+3) + 15$$

$$\text{let } m = x+3$$

$$= 2m^2 - 11m + 15$$

$$= (2m^2 - 5m)(6m + 15)$$

$$= m(2m-5) - 3(2m-5)$$

$$= (2m-5)(m-3)$$

Substitute

$$m = x+3$$

$$[2(x+3)-5][x+3-3]$$

$$= (2x+6-5)[x]$$

$$= [x][2x+1]$$

$$\text{or } 9(x-2)^2 - \frac{1}{4}(x-4)^2$$

$$= \left[3(x-2) - \frac{1}{2}(x-4)\right] \left[3(x-2) + \frac{1}{2}(x-4)\right]$$

$$= \left(3x-6 - \frac{1}{2}x+2\right) \left(3x-6 + \frac{1}{2}x-2\right)$$

$$= \left[\left(\frac{5}{2}x-5\right)\left(\frac{7}{2}x-8\right)\right]$$

$$40. a) \quad -9x^2y\sqrt{40x^5y^6} \\ = -9(2)x^2 \cdot x^2y \cdot y^3\sqrt{10x} \\ = -18x^4y^3\sqrt{10x}$$

$$b) \quad \frac{-72\sqrt{y^9}}{6\sqrt{y^3}} = -12\sqrt{\frac{y^9}{y^3}} = -12\sqrt{y^6} \\ = -12y^3$$

$$c) \quad 3\sqrt{xy} \cdot 5\sqrt{x^3} \\ = 15\sqrt{x^4y} \\ = 15x^2\sqrt{y}$$

$$d) \quad \sqrt{3x}(\sqrt{4x^2} + 2\sqrt{x}) \\ = \sqrt{12x^3} + 2\sqrt{3x^2} \\ = 2x\sqrt{3x} + 2x\sqrt{3x} \\ = 4x\sqrt{3x}$$

$$e) \quad (3\sqrt{x}-1)(2\sqrt{x}+7) \\ = 6x + 21\sqrt{x} - 2\sqrt{x} - 7 \\ = 6x + 19\sqrt{x} - 7$$

$$f) \quad \frac{\sqrt[3]{24x^3}}{\sqrt[3]{8x}} \\ = \sqrt[3]{\frac{24}{8}x^2} \\ = \sqrt[3]{3x^2}$$

$$g) \quad \frac{6\sqrt{x^5}}{\sqrt{25x^2}} = \frac{6\sqrt{x^5}}{5x} = \frac{6x^2\sqrt{x}}{5x} = \frac{6x\sqrt{x}}{5}$$

$$41. a) 4\sqrt{5} - 2\sqrt{75} + 3\sqrt{25}$$

$$= 4\sqrt{5} - 2(5)\sqrt{3} + 3(5)$$

$$= 4\sqrt{5} - 10\sqrt{3} + 15.$$

$$b) \frac{1}{3}\sqrt[3]{72} - \frac{2}{3}\sqrt[3]{54} - \frac{1}{2}\sqrt[3]{108} - \frac{5}{6}\sqrt[3]{24}$$

$$= \frac{1}{3}\sqrt[3]{8 \cdot 9} - \frac{2}{3}\sqrt[3]{27 \cdot 2} - \frac{1}{2}\sqrt[3]{27 \cdot 4} - \frac{5}{6}\sqrt[3]{8 \cdot 3}$$

$$= \frac{1}{3}(2)\sqrt[3]{9} - \frac{2}{3}(3)\sqrt[3]{2} - \frac{1}{2}(3)\sqrt[3]{4} - \frac{5}{6}(2)\sqrt[3]{3}$$

$$= \frac{2}{3}\sqrt[3]{9} - 2\sqrt[3]{2} - \frac{3}{2}\sqrt[3]{4} - \frac{5}{3}\sqrt[3]{3}$$

$$c) 2\sqrt{5}(3\sqrt{2} + 4\sqrt{3})$$

$$= 6\sqrt{10} + 8\sqrt{15}$$

$$d) \frac{2\sqrt{3}-\sqrt{6}}{3\sqrt{6}+2\sqrt{3}} \cdot \frac{3\sqrt{6}-2\sqrt{3}}{3\sqrt{6}-2\sqrt{3}} = \frac{6\sqrt{18} - 4(3) - 3(6) + 2\sqrt{18}}{9(6) - 4(3)}$$

$$= \frac{6(2\sqrt{2}) - 12 - 18 + 2(3)\sqrt{2}}{54 - 12} = \frac{18\sqrt{2} - 30 + 6\sqrt{2}}{42}$$

$$= \frac{24\sqrt{2} - 30}{42} = \frac{4\sqrt{2} - 5}{7}$$

$$42. a) (\sqrt{x+5})^2 = (\sqrt{3x+1})^2$$

$$x+5 = 3x+1$$

$$\frac{4}{2} = \frac{2x}{2}$$

$$x=2$$

Verify

$$\sqrt{2+5} = \sqrt{3(2)+1}$$

$$\sqrt{7} = \sqrt{6+1}$$

$$\sqrt{7} = \sqrt{7} \quad \checkmark$$

$$b) \sqrt{7x+25} - x = 1$$

$$(\sqrt{7x+25})^2 = (x+1)^2$$

$$7x+25 = x^2+2x+1$$

$$x^2-5x-24=0$$

$$(x-8)(x+3)=0$$

$$x=8 \quad x=-3 \text{ reject}$$

Verify

$x=8$	$x=-3$
$\sqrt{7(8)+25} - 8 = 1$	$\sqrt{7(-3)+25} + 3 = 1$
$\sqrt{81} - 8 = 1$	$\sqrt{4} + 3 = 1$
$9 - 8 = 1$	$2 + 3 = 1$
$1 = 1 \quad \checkmark$	$5 \neq 1$

Solution  $x=8$ .