

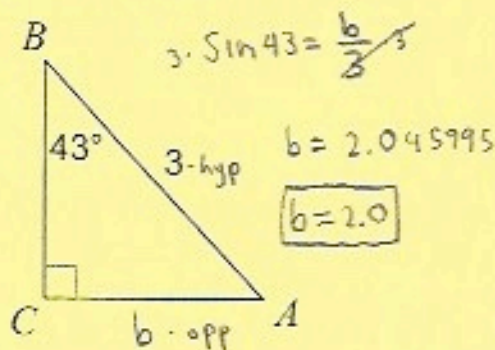
Secondary Math 3 Quarter 3 Final Review

Calculators Allowed

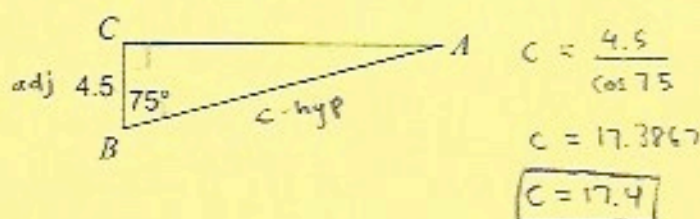
Solving Right Triangles

Find the indicated side or angle. Round to the nearest tenth.

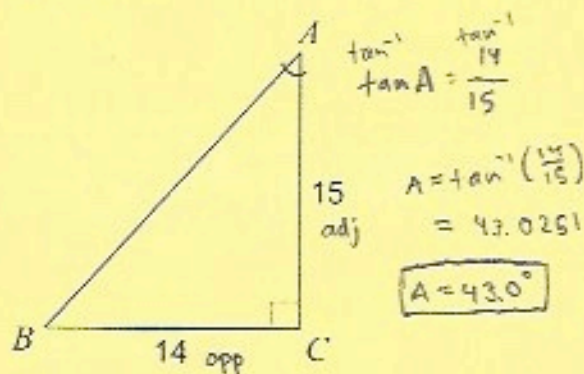
1. Side AC (side b).



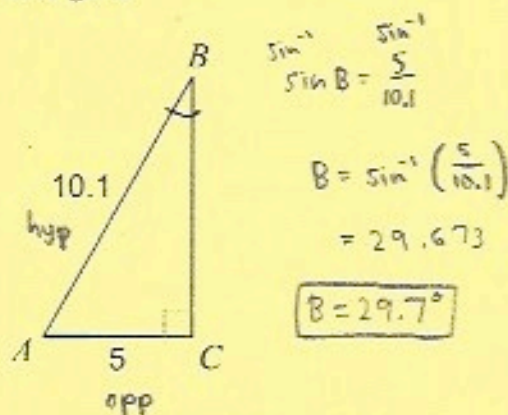
2. Side AB (side c).



3. Angle A.



4. Angle B.



Radians and Angles

Find a positive OR negative co-terminal angle for the given angle:

$$5. \quad 285^\circ + 360^\circ = 645^\circ$$

$$\text{or } -360^\circ = -75^\circ$$

$$6. \quad 215^\circ + 360^\circ = 575^\circ$$

$$\text{or } -360^\circ = -145^\circ$$

$$7. \quad -435^\circ + 360^\circ = -75^\circ + 360^\circ = 285^\circ$$

$$\text{or } -75^\circ$$

$$-360^\circ = -795^\circ \quad \text{or } -795^\circ$$

$$8. \quad \frac{5\pi}{6} + 2\pi \rightarrow \frac{5\pi}{6} + \frac{12\pi}{6} = \frac{17\pi}{6}$$

$$\text{or } -2\pi \rightarrow \frac{5\pi}{6} - \frac{12\pi}{6} = -\frac{7\pi}{6}$$

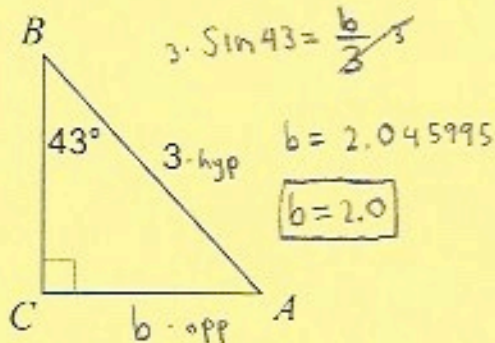
Secondary Math 3 Quarter 3 Final Review

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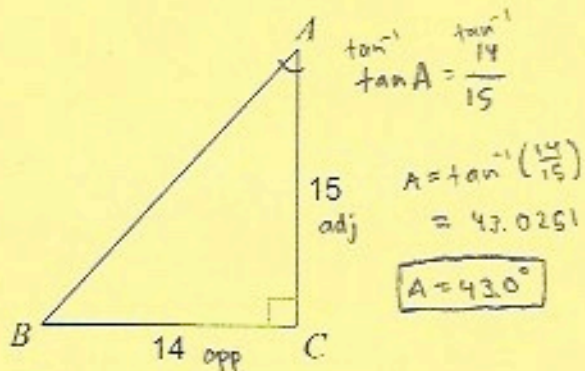
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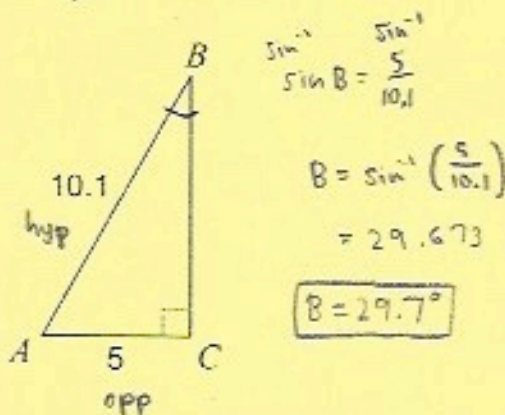
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$$\text{or } -2\pi \rightarrow \frac{5\pi}{6} - \frac{12\pi}{6} = -\frac{7\pi}{6}$$

$$9. \frac{-\frac{4\pi}{3} + 2\pi}{-2\pi} = \frac{-\frac{4\pi}{3} + \frac{6\pi}{3}}{-2\pi} = \frac{2\pi}{-2\pi}$$

$$= \frac{-\frac{4\pi}{3} - \frac{6\pi}{3}}{2} = -\frac{10\pi}{3}$$

$$10. \frac{-\frac{\pi}{4} + 2\pi}{-2\pi} \Rightarrow \frac{+\frac{8\pi}{4}}{-2\pi} = \frac{7\pi}{4}$$

$$= \frac{-\frac{8\pi}{4}}{4} = -\frac{9\pi}{4}$$

Unit Circle Trig

Find the exact value of each trigonometric function.

$$11. \csc \frac{\pi}{4} = \frac{1}{\sin(\frac{\pi}{4})} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}}$$

$$= \boxed{\sqrt{2}}$$

$$12. \cos \frac{3\pi}{4} = \boxed{-\frac{\sqrt{2}}{2}}$$

$$13. \cot \frac{\pi}{2} = \frac{\cos(\frac{\pi}{2})}{\sin(\frac{\pi}{2})} = \frac{0}{1} = \boxed{0}$$

$$14. \tan \frac{\pi}{6} = \boxed{\frac{\sqrt{3}}{3}}$$

$$15. \sin \frac{5\pi}{6} = \boxed{\frac{1}{2}}$$

$$16. \sec \frac{5\pi}{6} = \frac{1}{\cos(\frac{5\pi}{6})} = \frac{1}{-\frac{\sqrt{3}}{2}} = \boxed{-\frac{2\sqrt{3}}{3}}$$

$$17. \sin \frac{17\pi}{6}$$

$$\sin\left(\frac{5\pi}{6}\right) = \boxed{\frac{1}{2}}$$

$$18. \cos \frac{9\pi}{4}$$

$$\cos\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$$

$$19. \cot \frac{8\pi}{3} = \frac{\cos(\frac{2\pi}{3})}{\sin(\frac{2\pi}{3})}$$

$$20. \tan\left(-\frac{\pi}{3}\right) = \tan\left(\frac{5\pi}{3}\right) = \boxed{-\sqrt{3}}$$

$$\text{or}$$

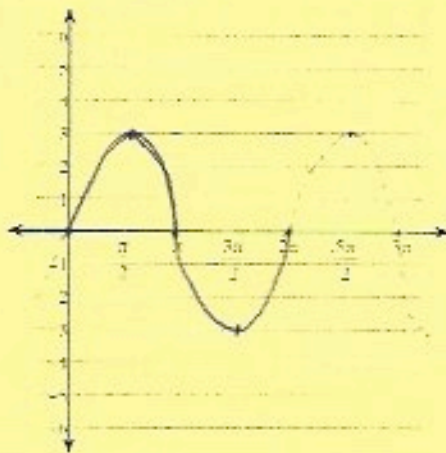
$$\frac{1}{\tan(\frac{2\pi}{3})} = \frac{1}{\tan(\frac{2\pi}{3})} = \frac{1}{-\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$$

$$y = a \cdot \sin b\theta \quad p = \frac{2\pi}{b}$$

Graphing Trig Functions

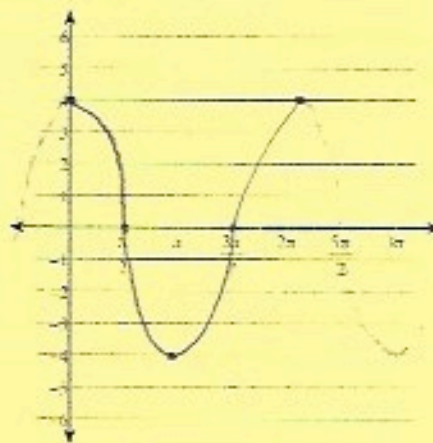
Graph the following functions. Identify the period and amplitude of each function.

21. $y = 3\sin\theta$



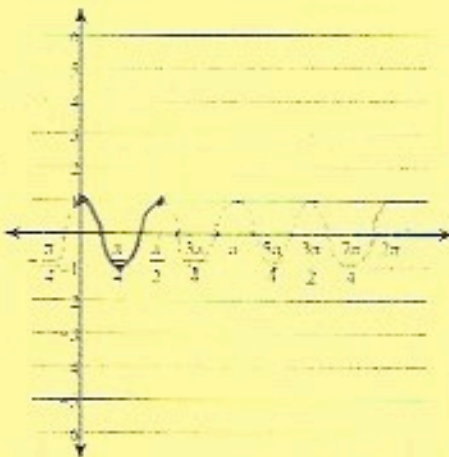
amp: 3
per: 2π

22. $y = 4\cos\theta$



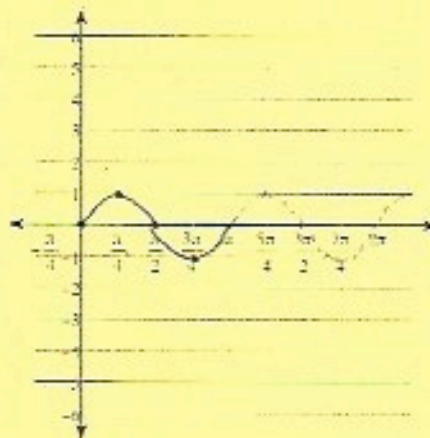
amp: 4
per: 2π

23. $y = \cos 4\theta$



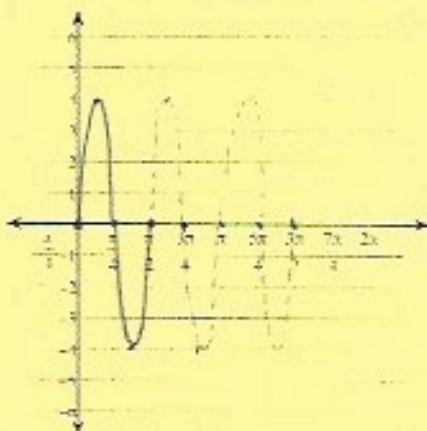
amp: 1
per: $\frac{\pi}{2}$
 $\frac{2\pi}{4} =$

24. $y = \sin 2\theta$



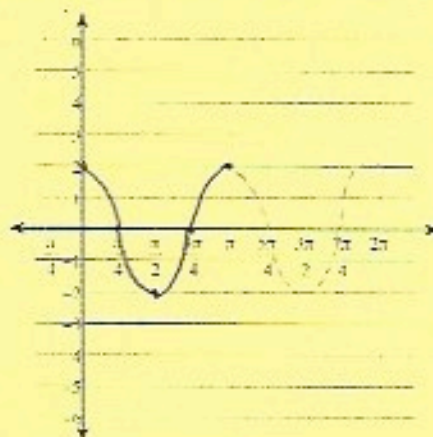
amp: 1
per: π
 $\frac{2\pi}{2} =$

25. $y = 4\sin 4\theta$



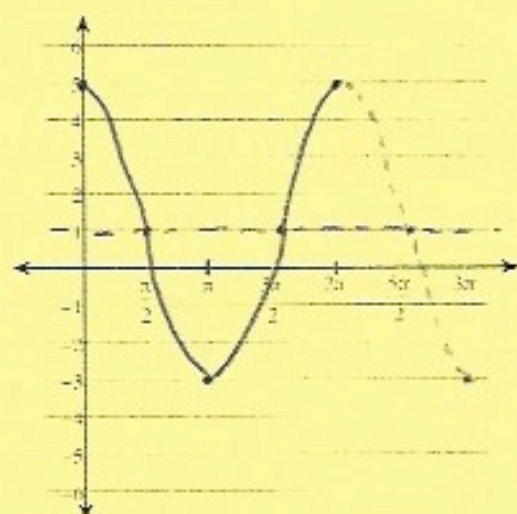
amp: 4
per: $\frac{\pi}{2}$
 $\frac{2\pi}{4} =$

26. $y = 2\cos 2\theta$



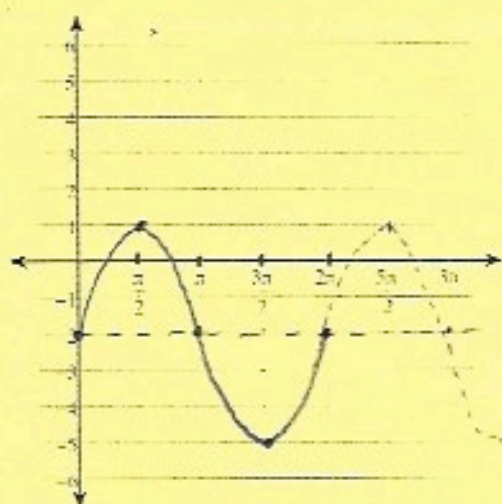
amp: 2
per: π
 $\frac{2\pi}{2} =$

27. $y = 4\cos\theta + 1$



amp: 4
per: 2π

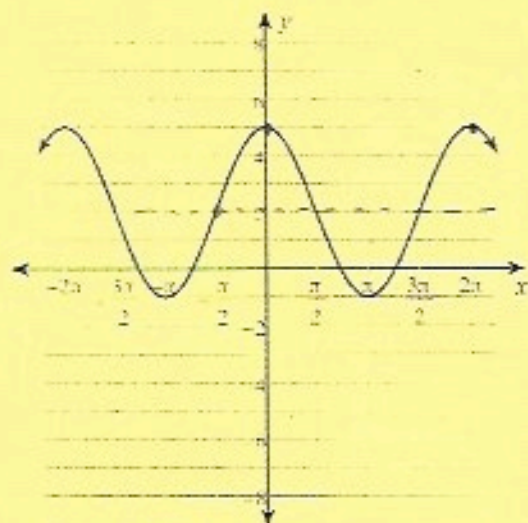
28. $y = 3\sin\theta - 2$



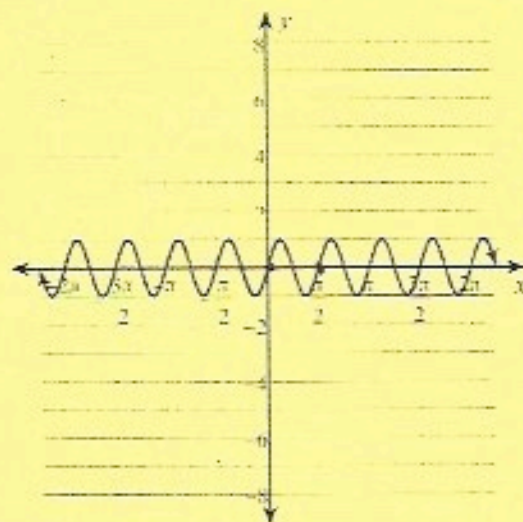
amp: 3
per: 2π

Write an equation for the following graphs:

29. $y = 3\cos\theta + 2$

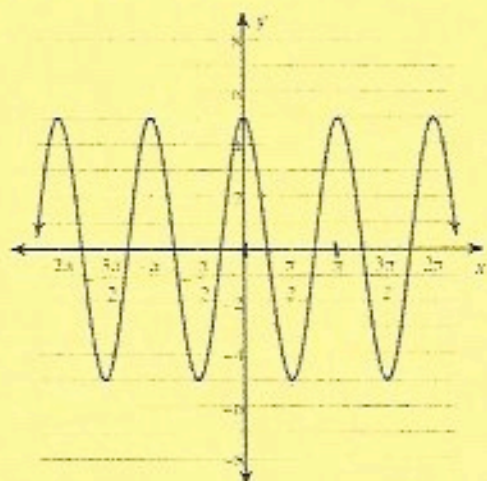


30. $y = \sin 4\theta$

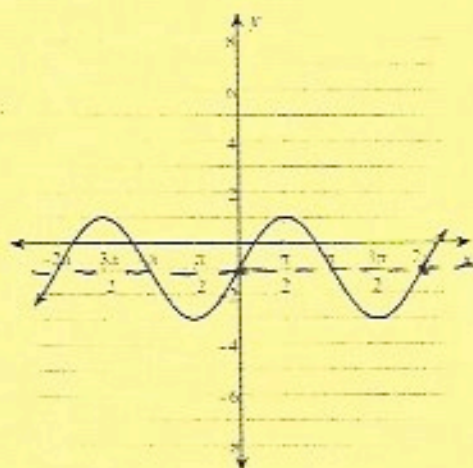


$P = \frac{\pi}{2}$, so $b = 4$
 $A = 1$

31. $y = 5\cos 2\theta$

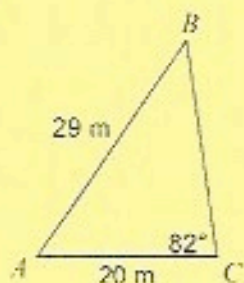


32. $y = 2\sin\theta - 1$



Law of Sines and Cosines

33. Find the measure of angle B.



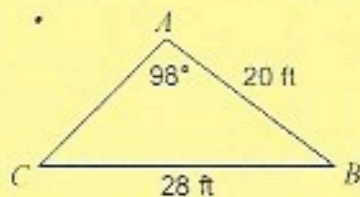
$$B = 43.074$$

$$= \boxed{43.1^\circ}$$

$$\frac{\sin 82}{29} = \frac{\sin B}{20}$$

$$\sin^{-1} 0.6829 = \sin^{-1} \sin B$$

35. Find the measure of angle C.

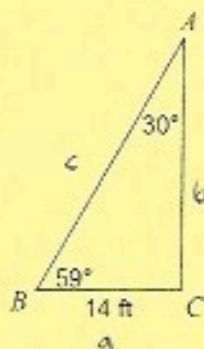


$$\frac{\sin C}{20} = \frac{\sin 98}{28} \cdot 20$$

$$\sin^{-1} \sin C = \sin^{-1} 0.7073$$

$$C = 45.01844 = \boxed{45.2^\circ}$$

37. Find the length of AC (side b).



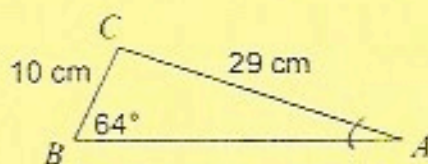
$$\frac{\sin 30}{14} = \frac{\sin 59}{b}$$

$$b = \frac{\sin 59}{\left(\frac{\sin 30}{14}\right)}$$

$$= 24.0007$$

$$= \boxed{24.0}$$

34. Find the measure of angle A.



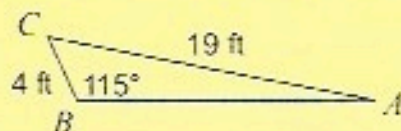
$$10 \cdot \frac{\sin A}{10} = \frac{\sin 64}{29} \cdot 10$$

$$\sin^{-1} \sin A = \sin^{-1} 0.3099$$

$$A = 18.05995$$

$$= \boxed{18.1^\circ}$$

36. Find the measure of angle A.



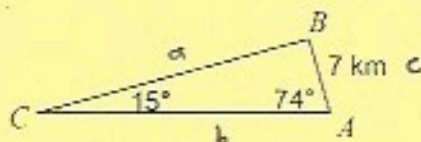
$$\frac{\sin A}{4} = \frac{\sin 115}{19} \cdot 4$$

$$\sin^{-1} \sin A = \sin^{-1} 0.1908$$

$$A = 10.9996$$

$$= \boxed{11.0^\circ}$$

38. Find the length of BC (side a).

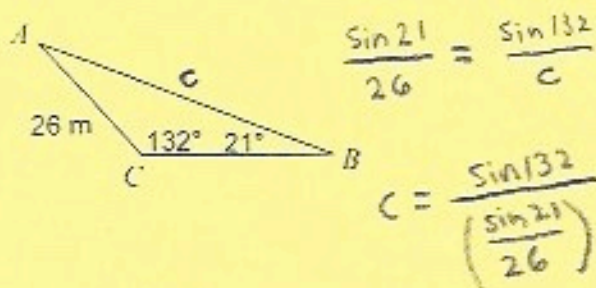


$$a \cdot \frac{\sin 15}{7} = \frac{\sin 74}{7} \cdot 7$$

$$a = \frac{\sin 74}{\left(\frac{\sin 15}{7}\right)} = 25.70824$$

$$= \boxed{25.7}$$

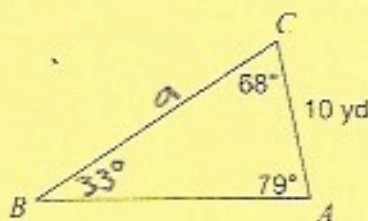
39. Find the length of AB (side c).



$$c = 53.91599$$

$$\boxed{c = 53.9}$$

40. Find the length of side BC (side a).



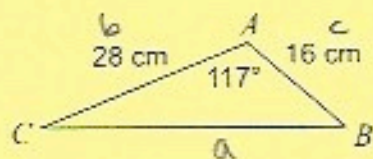
$$\frac{\sin 33}{10} = \frac{\sin 79}{a}$$

$$a = \frac{\sin 79}{\left(\frac{\sin 33}{10}\right)}$$

$$a = 18.0734$$

$$\boxed{a = 18.0}$$

41. Find the length of BC (side a).



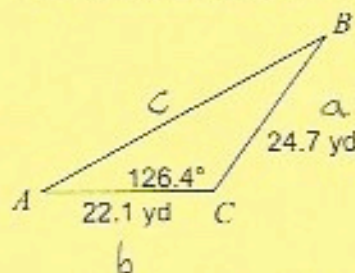
$$a^2 = 28^2 + 16^2 - 2(28)(16) \cdot \cos 117$$

$$a^2 = 1446.78$$

$$a = 38.0365$$

$$\boxed{a = 38.1}$$

42. Find the length of AB (side c).



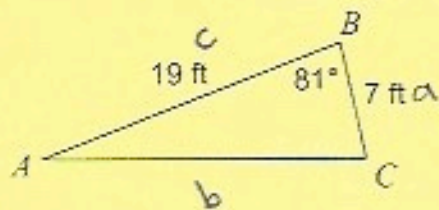
$$c^2 = (24.7)^2 + (22.1)^2 - 2(24.7)(22.1) \cdot \cos 126.4$$

$$c^2 = 1746.3591$$

$$c = 41.7895$$

$$\boxed{c = 41.8}$$

43. Find the length of side AC (side b).



$$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$

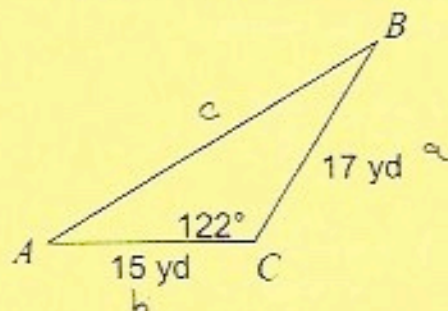
$$b^2 = 7^2 + 19^2 - 2(7)(19) \cdot \cos 81$$

$$b^2 = 368.3884$$

$$b = 19.1934$$

$$\boxed{b = 19.2}$$

44. Find the length of side AB (side c).



$$c^2 = 17^2 + 15^2 - 2(17)(15) \cdot \cos 122$$

$$c^2 = 784.2598$$

$$c = 28.0046$$

$$\boxed{c = 28.0}$$

Secondary Math 3 Quarter 2 Final Review

No Calculators

Dividing Polynomials

Divide the following polynomials.

45. $(9n^4 + 36n^3 + 31n^2 + 19n + 21) \div (n+3)$

$$\begin{array}{r} -3 \overline{) 9 \ 36 \ 31 \ 19 \ 21} \\ \underline{-27 \ 27 \ -12 \ -21} \\ 9 \ 9 \ 4 \ 7 \end{array}$$

$$9n^3 + 9n^2 + 4n + 7$$

46. $(a^5 - 4a^4 + 3a^3 - 36a^2 - 28a + 40) \div (a-5)$

$$\begin{array}{r} 5 \overline{) 1 \ -4 \ 3 \ -36 \ -28 \ 40} \\ \underline{5 \ 5 \ 40 \ 20 \ -40} \\ 1 \ 1 \ 8 \ 4 \ -8 \end{array}$$

$$a^4 + a^3 + 8a^2 + 4a - 8$$

47. $(x^3 + 8x^2 + 13x + 2) \div (x+2)$

$$\begin{array}{r} -2 \overline{) 1 \ 8 \ 13 \ 2} \\ \underline{-2 \ -12 \ -2} \\ 1 \ 6 \ 1 \end{array}$$

$$x^2 + 6x + 1$$

48. $(7x^3 - 45x^2 + 28x - 61) \div (x-6)$

$$\begin{array}{r} 6 \overline{) 7 \ -45 \ 28 \ -61} \\ \underline{42 \ -18 \ 60} \\ 7 \ -3 \ 10 \ -1 \end{array}$$

$$7x^2 - 3x + 10 - \frac{1}{x-6}$$

49. $(5x^3 + 4x^2 - 4x + 1) \div (x+1)$

$$\begin{array}{r} -1 \overline{) 5 \ 4 \ -4 \ 1} \\ \underline{-5 \ 1 \ 3} \\ 5 \ -1 \ -3 \ 4 \end{array}$$

$$5x^2 - x - 3 + \frac{4}{x+1}$$

50. $(5x^3 + 29x^2 + 18x - 15) \div (x+5)$

$$\begin{array}{r} -5 \overline{) 5 \ 29 \ 18 \ -15} \\ \underline{-25 \ -20 \ 10} \\ 5 \ 4 \ -2 \ -5 \end{array}$$

$$5x^2 + 4x - 2 - \frac{5}{x+5}$$

51. $(n^4 - 2n^3 - 73n^2 - 73n + 27) \div (n-10)$

$$\begin{array}{r} 10 \overline{) 1 \ -2 \ -73 \ -73 \ 27} \\ \underline{10 \ 80 \ 70 \ -30} \\ 1 \ 8 \ 7 \ -3 \ -3 \end{array}$$

$$n^3 + 8n^2 + 7n - 3 - \frac{3}{n-10}$$

52. $(4x^3 - 27x^2 - 74x - 56) \div (x-9)$

$$\begin{array}{r} 9 \overline{) 4 \ -27 \ -74 \ -56} \\ \underline{36 \ 81 \ 63} \\ 4 \ 9 \ 7 \ 7 \end{array}$$

$$4x^2 + 9x + 7 + \frac{7}{x-9}$$

Is $d(x)$ a factor of $f(x)$? Show your work to support your answer.

53. $f(x) = 5x^2 - 22x + 24$
 $d(x) = x - 2$

$$\begin{array}{r} 2 \overline{) 5 \ -22 \ 24} \\ \underline{10 \ -24} \\ 5 \ -12 \end{array} \quad \text{☺}$$

Yes; $(x-2)(5x-12) = 5x^2 - 22x + 24$

54. $f(x) = 11x^5 - 18x^4 + 4x^3 - 4x^2 - 5x + 23$
 $d(x) = x - 1$

$$\begin{array}{r} 1 \overline{) 11 \ -18 \ 4 \ -4 \ -5 \ 23} \\ \underline{11 \ -7 \ -3 \ -7 \ -12} \\ 11 \ -7 \ -3 \ -7 \ -12 \end{array}$$

No there is a remainder.

55. $f(x) = 2x^4 + 6x^3 - 19x^2 + 11$
 $d(x) = x - 1$

$$\begin{array}{r} 1 \overline{) 2 \ 6 \ -19 \ 0 \ 11} \\ \underline{2 \ 8 \ -11 \ -11} \\ 2 \ 8 \ -11 \ -11 \end{array} \quad \text{☺}$$

Yes; $(x-1)(2x^3 + 8x^2 - 11x - 11)$

56. $f(x) = x^3 + 2x^2 - x - 2$
 $d(x) = x + 2$

$$\begin{array}{r} -2 \overline{) 1 \ 2 \ -1 \ -2} \\ \underline{-2 \ 0 \ 2} \\ 1 \ 0 \ -1 \end{array} \quad \text{☺}$$

Yes; $(x+2)(x^2-1)$

Zeros of Polynomials and Graphing Polynomials

57. $f(x) = x(x+1)(x+3)$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
0	1	STR
-1	1	STR
-3	1	STR

Left End Behavior:

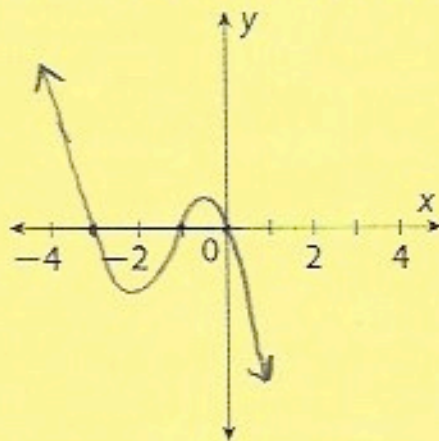
$x \rightarrow -\infty, y \rightarrow \infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow -\infty$

odd, pos ↗
 ↘

Sketch a graph of the function $f(x)$:



$$58. f(x) = -(x-1)(x+2)^3 = -(x-1)(x+2)(x+2)(x+2)$$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
1	1	Straight
-2	3	inflection

Left End Behavior:

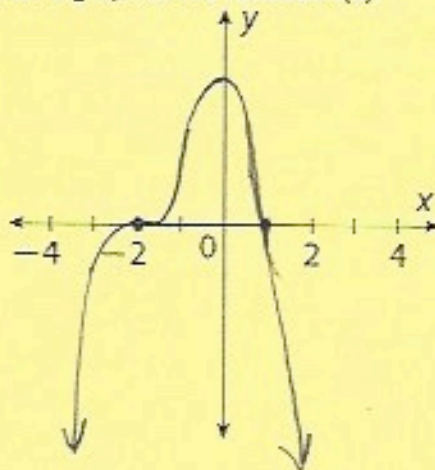
$$x \rightarrow -\infty, y \rightarrow -\infty$$

Right End Behavior:

$$x \rightarrow \infty, y \rightarrow -\infty$$

Neg, even 4

Sketch a graph of the function $f(x)$:



$$59. f(x) = -x(x-2)^2$$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
0	1	Straight
2	2	tangent

Left End Behavior:

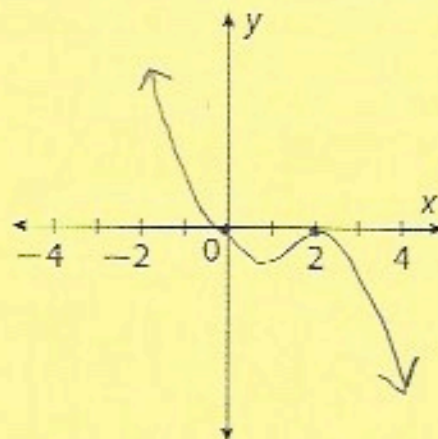
$$x \rightarrow -\infty, y \rightarrow \infty$$

Right End Behavior:

$$x \rightarrow \infty, y \rightarrow -\infty$$

3, - ↘

Sketch a graph of the function $f(x)$:



$$60. f(x) = (x+1)^2(x-1)(x-2)$$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
-1	2	tangent
1	1	Straight
2	1	Straight

Left End Behavior:

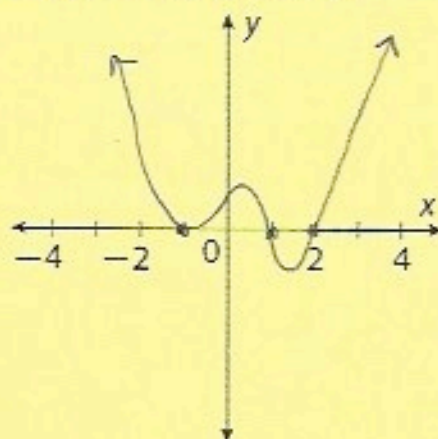
$$x \rightarrow -\infty, y \rightarrow \infty$$

Right End Behavior:

$$x \rightarrow \infty, y \rightarrow \infty$$

4, + ↗ ↘

Sketch a graph of the function $f(x)$:



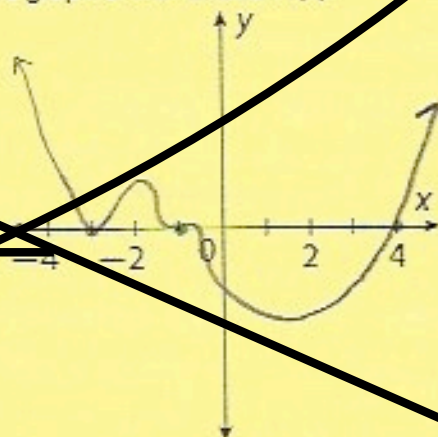
~~61. $f(x) = -(x+3)^2(x+1)^3(x-4)$~~

~~Find the zeros and multiplicity.~~
~~| Zeros | Multiplicity | Intersection |
|-------|--------------|--------------|
| -3 | 2 | Tangent |
| -1 | 3 | Inflection |
| 4 | 1 | Straight |~~
~~Left End Behavior:~~

~~$x \rightarrow -\infty, y \rightarrow \infty$~~

~~Right End Behavior:~~

~~$x \rightarrow \infty, y \rightarrow -\infty$~~

~~Sketch a graph of the function $f(x)$:~~


62. $f(x) = x^3(x+1)(x-2)$

Find the zeros and multiplicity.

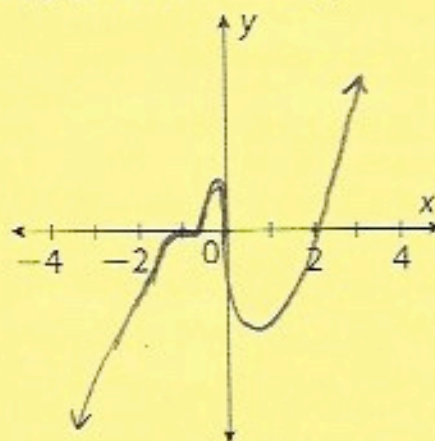
Zeros	Multiplicity	Intersection
0	3	inflection
-1	1	Straight
2	1	Straight

Left End Behavior:

$x \rightarrow -\infty, y \rightarrow -\infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow \infty$

Sketch a graph of the function $f(x)$:


63. $f(x) = -(x+1)(x-2)(x-3)$

Find the zeros and multiplicity.

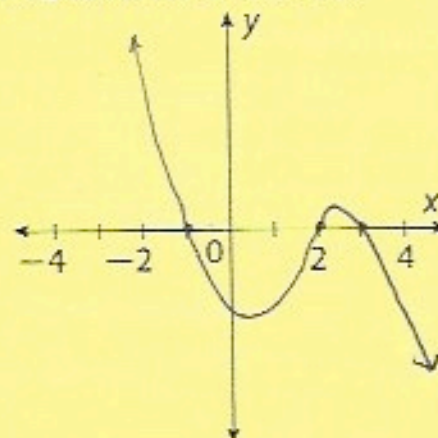
Zeros	Multiplicity	Intersection
-1	1	Straight
2	1	Straight
3	1	Straight

Left End Behavior:

$x \rightarrow -\infty, y \rightarrow \infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow -\infty$

Sketch a graph of the function $f(x)$:


61. $f(x) = -(x+3)^2(x+1)(x-4)$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
-3	2	Tangent
-1	3	Inflection
4	1	Straight

Left End Behavior:

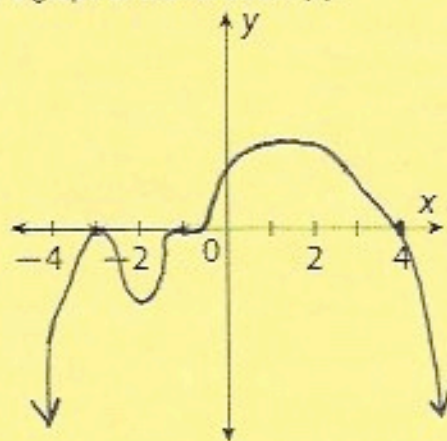
$x \rightarrow -\infty, y \rightarrow -\infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow -\infty$

6, - ↙ ↘

Sketch a graph of the function $f(x)$:



62. $f(x) = x^3(x+1)(x-2)$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
0	3	inflection
-1	1	Straight
2	1	Straight

Left End Behavior:

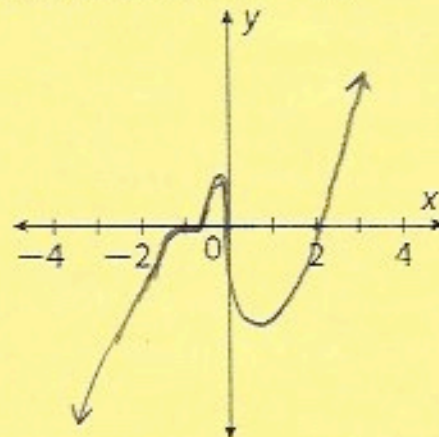
$x \rightarrow -\infty, y \rightarrow -\infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow \infty$

5, + ↙ ↗

Sketch a graph of the function $f(x)$:



63. $f(x) = -(x+1)(x-2)(x-3)$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
-1	1	Straight
2	1	Straight
3	1	Straight

Left End Behavior:

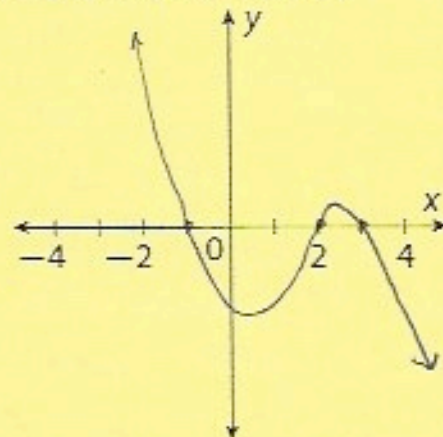
$x \rightarrow -\infty, y \rightarrow \infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow -\infty$

3, - ↙ ↘

Sketch a graph of the function $f(x)$:



64. $f(x) = x^2(x-2)$

Find the zeros and multiplicity.

Zeros	Multiplicity	Intersection
0	2	tangent
2	1	straight

Left End Behavior:

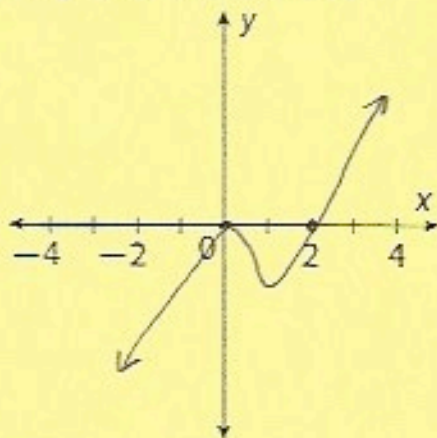
$x \rightarrow -\infty, y \rightarrow -\infty$

Right End Behavior:

$x \rightarrow \infty, y \rightarrow \infty$

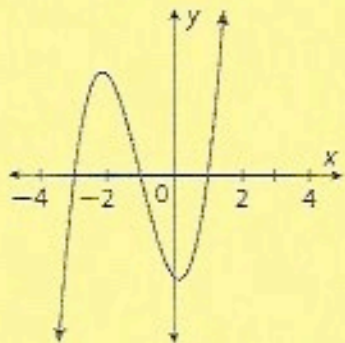
3, + ↗

Sketch a graph of the function $f(x)$:



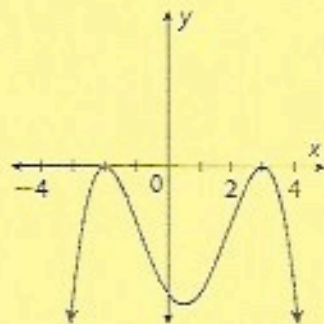
Write a function in factored form for the graph.

65.



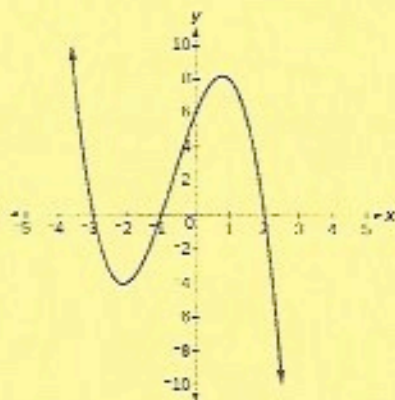
$f(x) = (x+3)(x+1)(x-1)$

66.



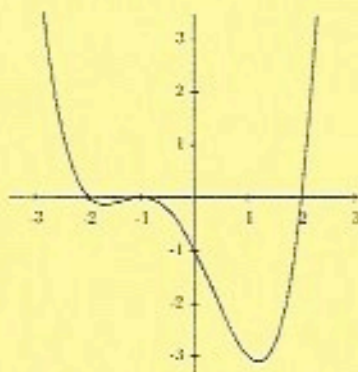
$f(x) = -(x+2)^2(x-3)^2$

67.



$f(x) = -(x+3)(x+1)(x-2)$

68.



$f(x) = (x+2)(x+1)^2(x-2)$