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5. Exponents

Simplify and write the answer so all exponents are positive:

1. (M) $(u^3v^5)^2\,u^4v^3 =$

2. (M) $(x^{-3}y^7)^2(5x^3y^{-2})^2 =$

3. (KD) $\dfrac{(6u^3v^{-5})^2}{(9u^2v^{-4})^3} =$

4. (KD) $\dfrac{(2a^2b^{-4})^3}{(6a^{-2}b^3)^2} =$

5. (KD) $\dfrac{(2x)^2(x^3y)^4}{x^5(4y)^3} =$

6. (D) $\dfrac{4(x^{-2}y^{-4})^3(3y)^2}{(6x^{-3}y^4)^2} =$

6.2 Multiplying Polynomials

Simplify and write in standard form:

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

2. (M) $3x(x^2-3)-(4x-5)(x+3)=$

3. (KD) $(2x+1)(3x-7)+(2x-7)(5x+4)=$

4. (KD) $(4x-3)(x^2+1)-(2x+3)(x-7)=$

5. (KD) $(2x-3)(x^2+9x-8)=$

6. (D) $(x-2)(2x^2-3x-1)-(x^2+4)(x^2-3x)=$

7.3 Factor Trinomials

Factor the expressions:

1. (E) $x^2 - 4x - 32 =$

2. (E) $x^2 - 10x - 24 =$

3. (M) $3x^2 + 4x - 7 =$

4. (M) $2x^2 + 7x - 15 =$

5. (KD) $6x^2 - 29x - 5 =$

6. (KD) $18x^2 - 24x + 10 =$

7. (KD) $12x^3 + x^2 - 6x =$

8. (D) $4x^2 + 27x + 45 =$

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7.4 Special Products and Factors

Expand the expressions:

1. (E) $(4a-7)(4a+7)=$

2. (E) $(9x-\sqrt{2})(9x+\sqrt{2})=$

3. (M) $(2x^2-3y)(2x^2+3y)$

4. (KD) $(3x^2y^2-ab^3)(3x^2y^2+ab^3)$

5. (KD) $(3\sqrt{x}-4\sqrt{y})(3\sqrt{x}+4\sqrt{y})$

6. (D) $(x\sqrt[3]{x}-y^2\sqrt[3]{y})(x\sqrt[3]{x}+y^2\sqrt[3]{y})$

Factor the expressions:

7. (E) $4u^2-25v^2=$

8. (E) $u^3-216=$

9. (M) $x^6-36y^8=$

10. (M) $x^6+64y^9=$

11. (KD) $50x^2y^6-32y^2=$

12. (KD) $32x^6-108y^3=$

13. (KD) $x^{\frac{2}{3}}-y^{\frac{2}{3}}=$

14. (KD) $x^{\frac{3}{4}}+y^{\frac{3}{4}}=$

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8.3 Adding, Subtracting Rational Expressions

Simplify:

1. (M) $\dfrac{3x+1}{x^2-25}-\dfrac{x-4}{x+5}=$

2. (M) $\dfrac{x+2}{x^2-2x-3}-\dfrac{5x}{x+1}=$

3. (KD) $\dfrac{2x-3}{x^2+2x-24}-\dfrac{x-7}{x^2+4x-12}=$

4. (KD) $\dfrac{x}{2x^2-3x-35}+\dfrac{x-2}{x^2-6x+5}=$

5. (KD) $\dfrac{3x+7}{2x^2+9x-5}-\dfrac{2x+1}{x^2+x-20}=$

6. (D) $\dfrac{2x-5}{x^2-7x+12}-\dfrac{2x^2-4x+7}{x^3-64}=$

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10.3 Composition of Functions

Find the composites $(f \circ g)(x)$ and $(g \circ f)(x)$ of the following functions.

1. (M) $f(x) = x - 3 \qquad g(x) = x^2 - 7x + 11$

2. (KD) $f(x) = \dfrac{3x+2}{x-7} \qquad g(x) = \dfrac{5x}{2x+1}$

3. (KD) $f(x) = \sqrt{x-3} \qquad g(x) = \dfrac{2x+1}{3x^2-16}$

Consider the function $h(x)$ below and find **two** different solutions to the following problem: find functions f and g so that $h(x) = f(g(x))$, where neither f nor g are the identity function.

4. (M) $h(x) = \sqrt{7x-1}$

5. (M) $h(x) = \dfrac{6}{x+4}$

6. (KD) $h(x) = \dfrac{x^2+4}{x^2+7}$

7. (D) $h(x) = \dfrac{4}{x+\sqrt{x}}$

10.4 Graphing Functions

Graph the piecewise-defined functions below:

1. (KD) $f(x) = \begin{cases} 3x - 2, & \text{if } -1 < x < 2 \\ 2x - 3, & \text{if } x \geq 2 \end{cases}$

2. (KD) $f(x) = \begin{cases} -x - 2, & \text{if } -3 \leq x < 1 \\ -2x + 4, & \text{if } 1 \leq x < 5 \end{cases}$

3. (KD) $f(x) = \begin{cases} 2x - 7, & \text{if } x \leq 1 \\ x + 1, & \text{if } x > 1 \end{cases}$

A quadratic function is given below. Use the points found below to get a good graph of it without using the calculator.
a) Find the x-intercepts of its graph, if any. Find the y-intercept.
b) Find the vertex (h, k) of the graph. Recall that $h = -\frac{b}{2a}$.

4. (M) $f(x) = \frac{1}{2}x^2 + 4x + 6$

5. (M) $f(x) = -x^2 - x + 6$

6. (M) $f(x) = x^2 - 6x + 13$

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11.2 Logarithms

Evaluate without using the calculator.

1. (M) $\log_9 81 =$ **2.** (M) $\log_8 256 =$ **3.** (M) $\log_3 729 =$

4. (KD) $\log_7 \frac{1}{49} =$ **5.** (KD) $\log_5 \frac{1}{125} =$ **6.** (KD) $\log_6 \frac{1}{216} =$

7. (KD) $\log_9 3 =$ **8.** (KD) $\log_{16} 2 =$ **9.** (KD) $\log_{100} 1000 =$

10. (KD) $\log_c \sqrt[4]{c^3} =$ **11.** (KD) $\log_{a^3} a^{12} =$ **12.** (D) $\log_{c^2} \sqrt[5]{c^2} =$

Simplify the following expressions.

13. (M) $(e^x + e^{-x})^2 =$ **14.** (M) $(2^x - 2^{-x})(2^x + 2^{-x}) =$ **15.** (M) $(e^x - 1)(e^{2x} + e^x + 1) =$

16. (M) $e^{\ln(x-1)} =$ **17.** (KD) $\dfrac{e^{2x} + 4e^x + 4}{e^x + 2} =$ **18.** (KD) $e^{2\ln(x+3)} =$

19. (KD) $e^{\frac{\ln x}{3}} =$ **20.** (KD) $\ln \sqrt{e^{-3x}} =$ **21.** (D) $e^{\frac{\ln x}{2}}(e^{3\ln x})^2 =$

Write as a sum or difference of logarithms. Express powers as factors. Simplify if possible.

22. (M) $\ln(e^3 x^8 y^{-2}) =$ **23.** (M) $\log_6(216(x^2 + 5x - 24)^3) =$ **24.** (M) $\log_3(81x^4y^2) =$

25. (M) $\ln \dfrac{x^3y^4}{x^{-2}y^8} =$ **26.** (KD) $\log_8 \dfrac{x^{-\frac{8}{3}}y^2}{64\sqrt[3]{x}y^4} =$ **27.** (KD) $\log_5 \sqrt[5]{\dfrac{x^3y^{-7}}{25y^3}} =$

Write as a single logarithm. Simplify if possible.

28. (KD) $2\log(5x^3) + \frac{1}{2}\log(625y^4) - 5\log x =$

29. (KD) $\frac{1}{2}\log(49x^{\frac{3}{4}}) + \frac{1}{4}\log(16x^7) =$

30. (KD) $\frac{1}{3}\ln(125x^{\frac{1}{2}}) + \frac{1}{2}\ln(625y^7) - \ln(x^{\frac{2}{3}}) =$

31. (KD) $\log_2(x-4) + 3\log_2(x+4) - 2\log_2(x^2 - 16) =$

32. (KD) $3\log_b(x^2 + 4x - 21) - 2\log_b(x+7) - 5\log_b(x-3) =$

33. (KD) $2\log_a(x+6) - 4\log_a(x^2 - 36) - 3\log_a(x-6) =$

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12. Solving Equations

Solve the equations.

1. (M) $2xe^x + x^2e^x = 0$

2. (M) $2 + \dfrac{2x+1}{x+4} = \dfrac{x-3}{x+4}$

3. (M) $3(x+2)^2(x-7)^4 + 4(x+2)^3(x-7)^3 = 0$

4. (M) $4(2x-1)(x-3)^4 - 4(2x-1)^2(x-3)^3 = 0$

5. (KD) $4x^4 - 11x^2 - 3 = 0$

6. (KD) $\dfrac{x+3}{x+1} + \dfrac{8x}{x^2-6x-7} = \dfrac{7}{x-7}$

7. (KD) $\dfrac{x}{x-1} - \dfrac{2x+30}{x^2+2x-3} = \dfrac{6}{x+3}$

8. (KD) $x + \sqrt{40-3x} = 4$

9. (KD) $2x + 4 = x - \sqrt{6x+51}$

10. (KD) $(2x-7)\sqrt{x+2} - \dfrac{x^2-7x+1}{2\sqrt{x+2}} = 0$

11. (KD) $2x(x^2+1)^{\frac{2}{3}} + \dfrac{4}{3}x^3(x^2+1)^{-\frac{1}{3}} = 0$

12. (KD) $\log_2(x+1) + \log_2(x+5) = 5$

13. (KD) $\log_3(x+14) + \log_3(x-10) = 4$

14. (D) $\sqrt{4x+5} + \sqrt{x+5} = 3$

13. Solving Inequalities

Solve the inequalities and write the solution in interval form.

1. (E) $4 \leq 3x - 1 < 21$

2. (E) $8 \leq 3x - 1 < 11$

3. (M) $|x - 7| > 3$

4. (M) $|2x - 6| < 9$

5. (M) $|x + 5| \leq 9$

6. (M) $|2x - 3| \geq 7$

Use the graph of a quadratic function to help you solve the following inequalities

7. (KD) $x^2 - 5x \geq 0$

8. (KD) $x^2 - 4x < 5x - 20$

9. (KD) $-2x^2 + x - 3 \leq 0$

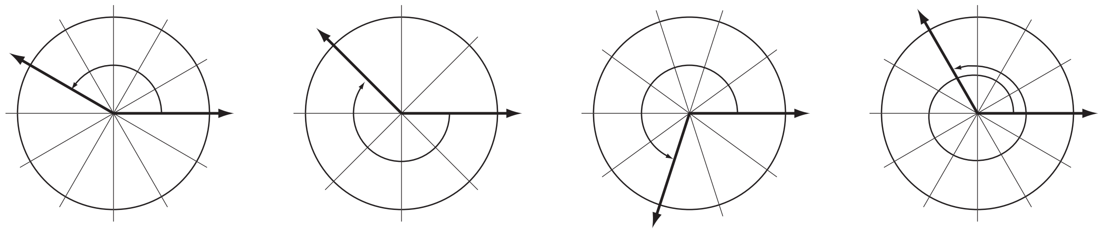
10. (KD) $\dfrac{x - 7}{2x + 3} > 0$

11. (D) $|x^2 - 8| \leq 2$

12. (D) $|x^2 + 2x - 15| > 7$

14. Angles

1. (M) Indicate both the radian and degree measure under the following angles. (Use equally-spaced lines to help you determine what the angles are.)



2. (M) Sketch angles in standard position with indicated radian measure.

$\frac{7\pi}{6}$ $\quad -\frac{3\pi}{4}$ $\quad \frac{3\pi}{7}$ $\quad -\frac{4\pi}{3}$ $\quad \frac{34\pi}{5}$ $\quad -\frac{13\pi}{8}$

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15. Trig. Functions of Standard Angles

We can evaluate trigonometric functions at multiples of $\frac{\pi}{6}$, $\frac{\pi}{4}$ and $\frac{\pi}{3}$ with little memorizing and by simply reading the picture. (Note that the discussion that follows applies to "non-easy" multiples of those angles, whose terminal side is not on the x- or y-axis; for example, for angle $3\frac{\pi}{3} = \pi$, trigonometric function values are obvious, because its associated point on the unit circle is obviously $(-1, 0)$).

First, we need to memorize these six numbers and their relative sizes:

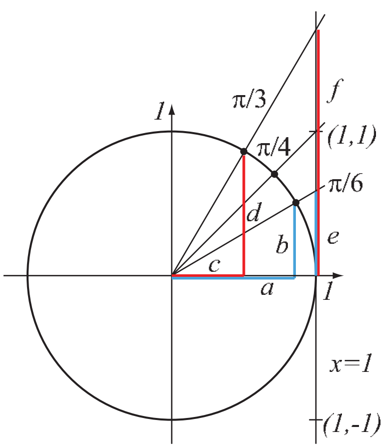
$$\text{values of cosines and sines of standard angles are } \frac{1}{2} < \frac{\sqrt{2}}{2} < \frac{\sqrt{3}}{2} \qquad (\approx 0.5 < 0.7 < 0.9)$$

$$\text{values of tangents and cotangents of standard angles are } \frac{1}{\sqrt{3}} < 1 < \sqrt{3} \qquad (\approx 0.6 < 1 < 1.7)$$

That $\frac{\sqrt{2}}{2}$ is associated with multiples of $\frac{\pi}{4}$ simply has to be memorized, so

$$\cos\frac{\pi}{4} = \frac{\sqrt{2}}{2} \qquad \sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

The task is to figure out which of the values $\frac{1}{2}$, $\frac{\sqrt{3}}{2}$ cosines and sines take for multiples of $\frac{\pi}{6}$ and $\frac{\pi}{3}$.



Consider the angles $\frac{\pi}{6}$ and $\frac{\pi}{3}$. When drawing the picture, try to be reasonably accurate in placement of the angle, but the most important feature of the picture is that

$$\text{the terminal side of } \frac{\pi}{6} \text{ is "closer" to the } x\text{-axis}$$

$$\text{the terminal side of } \frac{\pi}{3} \text{ is "closer" to the } y\text{-axis}$$

From this we infer that the lengths of sides of the indicated triangles have the following relationship:

$$a > b \text{ and } c < d$$

Because a, b, c and d can only be $\frac{1}{2}$ or $\frac{\sqrt{3}}{2}$, we conclude that

$$a = \frac{\sqrt{3}}{2} \quad b = \frac{1}{2} \qquad c = \frac{1}{2} \quad d = \frac{\sqrt{3}}{2}$$

and therefore, as a, b, c and d are the x- and y-coordinates of points on the unit circle associated to angles $\frac{\pi}{6}$ and $\frac{\pi}{3}$, and therefore their cosines and sines,

$$\cos\frac{\pi}{6} = \frac{\sqrt{3}}{2} \quad \sin\frac{\pi}{6} = \frac{1}{2} \qquad \cos\frac{\pi}{3} = \frac{1}{2} \quad \sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

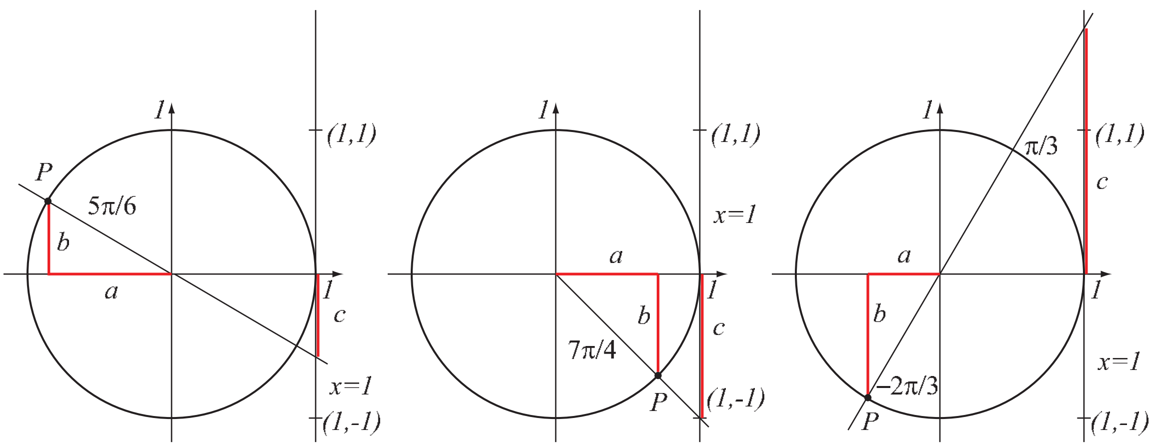
The tangent of an angle can be read on the line $x = 1$: it is the y-coordinate of the intersection of the terminal side of the angle (or its extension past the origin) with the line $x = 1$.

The terminal side of $\frac{\pi}{4}$ is midway between the x- and y-axes, so by symmetry it will intersect the line $x = 1$ at the point $(1, 1)$. From the fact that the terminal side of $\frac{\pi}{6}$ is "closer" to the x-axis and that the terminal side of $\frac{\pi}{3}$ is "closer" to the y-axis it is clear that $e < 1$ and $f > 1$. Because e and f can only be $\frac{1}{\sqrt{3}}$ or $\sqrt{3}$, we conclude $e = \frac{1}{\sqrt{3}}$ and $f = \sqrt{3}$. Therefore,

$$\tan\frac{\pi}{6} = \frac{1}{\sqrt{3}} \qquad \tan\frac{\pi}{4} = 1 \qquad \tan\frac{\pi}{3} = \sqrt{3}$$

For general multiples of $\frac{\pi}{6}$, $\frac{\pi}{4}$ and $\frac{\pi}{3}$ we just need to draw a picture and infer trigonometric function values from it.

Example. Determine the values of trigonometric functions of angles $\frac{5\pi}{6}$, $\frac{7\pi}{4}$ and $-\frac{2\pi}{3}$.



Angle $\frac{5\pi}{6}$*.* The terminal side of this angle is clearly "closer" to the x-axis, so for the sides of the appropriate triangle we conclude $a > b$, thus $a = \frac{\sqrt{3}}{2}$ and $b = \frac{1}{2}$. Lengths a and b are equal to sizes of the x- and y-coordinates, and the position of the point P determines the signs of those coordinates. For angle $\frac{5\pi}{6}$, the point P has a negative x- and positive y-coordinate, so we conclude:

$$\cos\frac{5\pi}{6} = -\frac{\sqrt{3}}{2} \qquad \sin\frac{5\pi}{6} = \frac{1}{2}$$

To read the tangent of the angle on the line $x = 1$, we extend the terminal side past the origin and look where this line crosses the line $x = 1$. From the picture, since the line is "closer" to the x-axis, we infer $c < 1$, so $c = \frac{1}{\sqrt{3}}$. Since tangent is the y-coordinate of the intersection, which is below the x-axis, we get $\tan\frac{5\pi}{6} = -\frac{1}{\sqrt{3}}$.

Other values of trigonometric functions are simply computed from the values of cosine, sine and tangent using basic trigonometric identities:

$$\sec\frac{5\pi}{6} = \frac{1}{\cos\frac{5\pi}{6}} = -\frac{2}{\sqrt{3}}, \qquad \csc\frac{5\pi}{6} = \frac{1}{\sin\frac{5\pi}{6}} = -2, \qquad \cot\frac{5\pi}{6} = \frac{1}{\tan\frac{5\pi}{6}} = -\sqrt{3}$$

Angle $\frac{7\pi}{4}$. The terminal side of this angle is clearly "equidistant" to the x and y-axes, so for the sides of the appropriate triangle we conclude $a = b$. Because this is a multiple of $\frac{\pi}{4}$, we must have $a = \frac{\sqrt{2}}{2}$ and $b = \frac{\sqrt{2}}{2}$. For angle $\frac{7\pi}{4}$, the point P has a positive x- and negative y-coordinates, so we conclude:

$$\cos\frac{7\pi}{4} = \frac{\sqrt{2}}{2} \qquad \sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$$

To read the tangent of the angle on the line $x = 1$, we look where the terminal side crosses the line $x = 1$. From the picture, since the line is "equidistant" to the x and y-axes, we infer $c = 1$. Since tangent is the y-coordinate of the intersection, which is below the x-axis, we get $\tan\frac{7\pi}{4} = -1$. Other trigonometric function values are $\sec\frac{7\pi}{4} = \frac{2}{\sqrt{2}} = \sqrt{2}$, $\csc\frac{7\pi}{4} = -\frac{2}{\sqrt{2}} = -\sqrt{2}$, $\cot\frac{7\pi}{4} = -1$.

Angle $-\frac{2\pi}{3}$. The terminal side of this angle is clearly "closer" to the y-axis, so for the sides of the appropriate triangle we conclude $a < b$, thus $a = \frac{1}{2}$ and $b = \frac{\sqrt{3}}{2}$. For angle $-\frac{2\pi}{3}$, the point P has negative x- and y-coordinates, so we conclude:

$$\cos\left(-\frac{2\pi}{3}\right) = -\frac{1}{2} \qquad \sin\left(-\frac{2\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

To read the tangent of the angle on the line $x = 1$, we extend the terminal side past the origin and look where this line crosses the line $x = 1$. From the picture, since the line is "closer" to the y-axis, we infer $c > 1$, so $c = \sqrt{3}$. Since tangent is the y-coordinate of the intersection, which is above the x-axis, we get $\tan\left(-\frac{2\pi}{3}\right) = \sqrt{3}$. Other trigonometric function values are $\sec\left(-\frac{2\pi}{3}\right) = -2$, $\csc\left(-\frac{2\pi}{3}\right) = -\frac{2}{\sqrt{3}}$, $\cot\left(-\frac{2\pi}{3}\right) = \frac{1}{\sqrt{3}}$.

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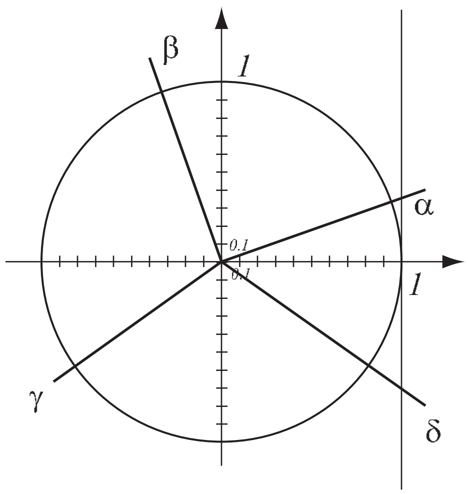
15. Trigonometric Function Values

Use the unit circle and the line $x = 1$ to estimate the values of the trigonometric functions of the angles drawn.



1. (M) $\cos\alpha =$ $\tan\alpha =$ $\csc\alpha =$

2. (M) $\sin\beta =$ $\cot\beta =$ $\sec\beta =$

3. (M) $\sin\gamma =$ $\tan\gamma =$ $\sec\gamma =$

4. (M) $\cos\delta =$ $\cot\delta =$ $\csc\delta =$

For each of the following, draw the unit circle and the appropriate angle in order to infer from the picture the exact values of the trigonometric functions.

5. (M) $\sin 210° =$ $\tan\dfrac{2\pi}{3} =$ $\csc(-90°) =$ $\cot\left(-\dfrac{\pi}{4}\right) =$

6. (M) $\cot(-150°) =$ $\sec\left(-\dfrac{5\pi}{6}\right) =$ $\cos\dfrac{5\pi}{3} =$ $\csc 225° =$

7. (M) $\sec 495° =$ $\tan\left(-\dfrac{9\pi}{2}\right) =$ $\cos(-600°) =$ $\sin\dfrac{47\pi}{3} =$

8. (M) If $\cos\theta = -\dfrac{3}{7}$ and θ is in the third quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

9. (M) If $\tan\theta = 4$ and θ is in the third quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

10. (M) If $\sin\theta = \dfrac{3}{8}$ and θ is in the second quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

11. (M) If $\sec\theta = \dfrac{15}{2}$ and θ is in the fourth quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

12. (M) If $\cot\theta = -\dfrac{1}{3}$ and θ is in the second quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

13. (M) If $\csc\theta = -7$ and θ is in the fourth quadrant, find the exact values of all the trigonometric functions of θ. Draw a picture.

18. Trigonometric Identities

Show the identity.

1. (M) $\sin\theta\csc\theta - \cos^2\theta = \sin^2\theta$

2. (M) $\tan\theta(\sec\theta + \tan\theta) = \sec\theta(\sec\theta + \tan\theta) - 1$

3. (M) $\dfrac{\sin(\alpha+\beta)}{\cos\alpha\cos\beta} = \tan\alpha + \tan\beta$

4. (M) $1 - \dfrac{\sin^2\theta}{1+\cos\theta} = \cos\theta$

5. (KD) $\dfrac{\sin\theta\cos\theta}{(\cos\theta - \sin\theta)(\cos\theta + \sin\theta)} = \dfrac{1}{2}\tan(2\theta)$

6. (KD) $\dfrac{1}{1-\sin\theta} + \dfrac{1}{1+\sin\theta} = 2\sec^2\theta$

7. (D) $\dfrac{\cos\theta}{1+\sin\theta} + \dfrac{1+\sin\theta}{\cos\theta} = 2\sec\theta$

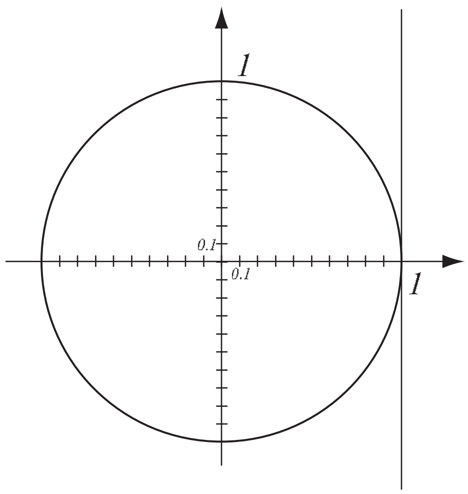
8. (KD) Develop the formula for $\cos(4\theta)$ by using double-angle identities. The final expression should only have $\sin\theta$ and $\cos\theta$ in it.

9. (KD) Develop the formula for $\cos(3\theta)$ by starting as follows and using sum and double-angle identities. The final expression should only have $\sin\theta$ and $\cos\theta$ in it.

$\cos(3\theta) = \cos(2\theta + \theta) =$

19. Inverse Trigonometric Functions

Use the unit circle and the line $x = 1$ to draw the angles requested. Some may be undefined.



1. (M) $\arccos 0.25$ $\quad \arcsin 0.9$ $\quad \arctan 0.3$

2. (M) $\arctan(-1.2)$ $\quad \arccos(-0.55)$ $\quad \arcsin(-0.15)$

3. (M) $\arccos(-1.4)$ $\quad \arctan 2$ $\quad \arcsin(-1)$

For each of the following, use the unit circle and the line $x = 1$ to help you find the exact angles of the inverse trigonometric functions. Some may be undefined.

4. (M) $\arcsin \frac{\sqrt{3}}{2} =$ $\quad \arccos \frac{\sqrt{2}}{2} =$ $\quad \arctan \frac{1}{\sqrt{3}} =$ $\quad \arctan \sqrt{3} =$

5. (M) $\arccos\left(-\frac{1}{2}\right) =$ $\quad \arctan(-1) =$ $\quad \arcsin\left(-\frac{\sqrt{2}}{2}\right) =$ $\quad \arctan\left(-\frac{1}{\sqrt{3}}\right) =$

6. (M) $\arcsin \sqrt{3} =$ $\quad \arcsin\left(-\frac{1}{2}\right) =$ $\quad \arctan 1 =$ $\quad \arccos \frac{2}{\sqrt{3}} =$

Find the exact value of the expressions. For some of them, you will need a picture.

7. (M) $\sin(\arcsin 0.83) =$ $\quad \tan(\arctan 5) =$

8. (KD) $\arccos\left(\cos \frac{2\pi}{7}\right) =$ $\quad \arcsin\left(\sin \frac{7\pi}{5}\right) =$

9. (KD) $\arctan\left(\tan\left(-\frac{4\pi}{9}\right)\right) =$ $\quad \arctan\left(\tan \frac{5\pi}{9}\right) =$

10. (D) $\tan\left(\arccos\left(-\frac{1}{3}\right)\right) =$ $\quad \sin(\arctan(-5)) =$

11. (D) $\sin\left(2\arccos\left(-\frac{4}{7}\right)\right) =$ $\quad \tan\left(2\arcsin\left(-\frac{7}{8}\right)\right) =$

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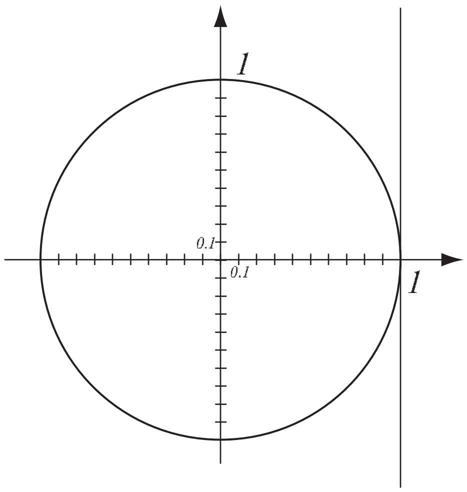
20. Trigonometric Equations

Use the unit circle and the line $x = 1$ to draw all the angles in $[0, 2\pi)$ that satisfy the equation. Some equations may have no solutions.



1. (M) $\sin\theta = 0.25$ $\cos\theta = 0.8$ $\tan\theta = 0.4$

2. (M) $\cot\theta = -1.2$ $\cos\theta = -0.15$ $\sec\theta = 1.5$

3. (M) $\sin\theta = 7$ $\csc\theta = 2.4$ $\cos\theta = -1$

Solve the equation and give a general formula for all solutions. Then list all the solutions that fall in the interval $[0, 2\pi)$.

4. (M) $2\sin\theta - \sqrt{2} = 0$

5. (KD) $2\cos(2\theta) - \sqrt{3} = 0$

6. (KD) $2\cos^2\theta + \cos\theta - 1 = 0$

7. (KD) $2\cos^2\theta - 5\cos\theta - 3 = 0$

8. (KD) $\sin(2\theta) + 2\sin^2\theta = 0$

9. (KD) $\sec^2\theta = 6\tan\theta + 8$